QUESTION PAPERS MID TERM EXAMINATION SEPTEMBER- 2019

B.TECH

(SEM – I/III/V/VII

INDEX

Name of the Deptt	Paper Code	SEM-I Page no.		SEM- III Page No.		SEM-V Page no.		VII Page no.	
		New	Old	New	Old	New	Old	New	C
Applied Chemistry	AC	01-02	---		---		---	---	---
Mechanical	AE	---	---	03-06	---	07-12	---	13-17	---
Applied Physics	AP	18-19	---	---	---	---	---	---	---
Bio Technology	BT	---	---	20-26	---	27-30	---	31-34	---
Civil Engineering	CE	---	---	35-40	---	41-46	---	47-51	---
Comp. Sc. & Engg.	CO	52-53	---	54-60	---	61-71	---	72-75	---
Applied Math	CS	---	---	76-77	---		---		
Electronics & Comn.	EC	---	---	78-90	---	91-103	---		
Electrical Engg	EE	---	---	108-113	---	114-118	---		
Electrical Engg	EE/EL	---	---	120-124	---	125-130	---		
Electrical Engg	EL	---	---		---		---		
Environmental Engg	EN	134A(FEC)	---	135-139	---	140-145	---		
Applied Physics	EP	---	---	150-155	---	160			
FEC	FEC	168-189 (1st & 3rd Sem)							
Humanities	HU	189A(FEC)	---	190-192	---	---	---		
Management	MG	---	---	198	---	---	---		
Information Tech.	IT	---	---	199-205	---	206-214	---		
Applied Math	MA	222	---		---		---		
Applied Math	MC	---	---	223-228	---	229-234	---	23	
Mechanical Engg	ME	240	---	241-246	---	247-254	---	25	
Mechanical (Prod)	PE	---	---	266-273	---	274-280	---	281	
Applied Chemistry	PS	---	---	---	---	---	---	---	
Applied Chemistry	PT	---	---	284-288	---	289-298	---	299-30	
Comp. Sc. & Engg.	SE	---	---	303-308	---	309-315	---	316-31	
DEPTT OF Design	DD	320-325	---	326-330	---		---	---	

Total No. of Pages: 02

Roll No. .....

FIRST SEMESTER

B.Tech. [Gp A]

MID SEMESTER EXAMINATION

Sept-2019

AC-101 CHEMISTRY

Time: 1.5 Hours

Max. Marks: 30

Note : Answer ALL questions. Assume suitable missing data, if any.

1 Answer all the following questions [2×5]

[a] Give the sources of UV and visible light in UV-visible spectrophotometer.

[b] Aniline absorbs at 280 nm but in acidic solution, the main absorption band is seen at 203 nm. Explain.

[c] Explain the structural change of methyl orange during titration.

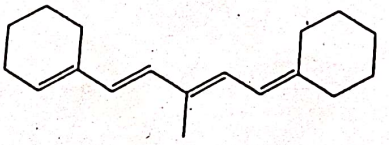
[d] Define glass transition temperature (T_g)? Suggest a suitable thermal method to determine the purity of a pharmaceutical molecule.

[e] Write down four limitations of Lambert – Beer's law.

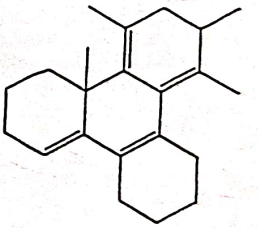
2 Explain the principal involved in thermo balance. Discuss the TGA thermogram of any metal oxalate. [2+3]

3 Calculate λ_{max} for the following molecules using Woodward – Fieser rule: [1½+1½+2]

(i)



(ii)



Define and explain chromophores with the help of a suitable example.

4 Distinguish between Iodimetry and Iodometry in volumetric analysis. A 30.00 L air sample was passed through an absorption tower contained a solution of Cd^{2+}, where H_2S was retained as CdS. The mixture was acidified and treated with 10.00 mL of 0.01070 M I_2. After the reaction,

$$S^{2-} + I_2 \rightarrow S_{(s)} + 2I^-$$

was complete, the excess iodine was titrated with 12.85 mL of 0.01344 M thiosulphate. Calculate the concentration of H_2S in ppm; use 1.20 g/L for the density of gas stream. [2+3]

5 Write four applications of thermal methods of analysis. Define alkalinity of water. Name the ions responsible for alkalinity. Draw the chemical structure of indicator EBT. [2+3]

THIRD SEMESTER
MID SEMESTER EXAMINATION

B.Tech. [AE]
Sept -2019

AE 201-Engineering Mechanics

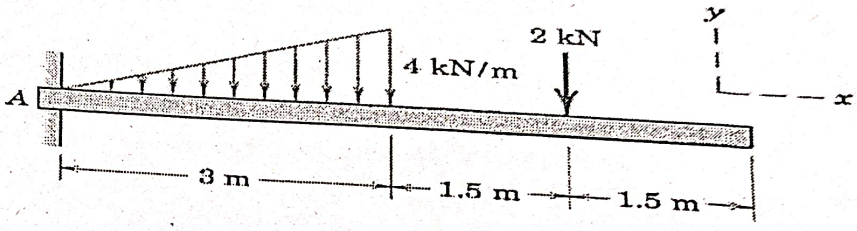
NOTE: Answer all the fallowing equations .Each question carry equal marks. Assume suitable missing data, if any.

Time: 01 hr 30 min **Max Marks: 20**

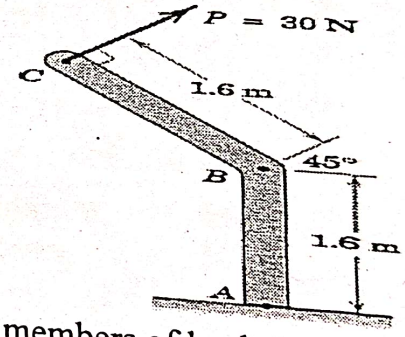
1 (a). State and prove Varignon's theorem. 2

(b) A point is acted upon by a set of three forces (3i+5j+2k),(2i+7j+3k) and (i+2j+5k) find the magnitude of resultant force and its direction cosines. 2

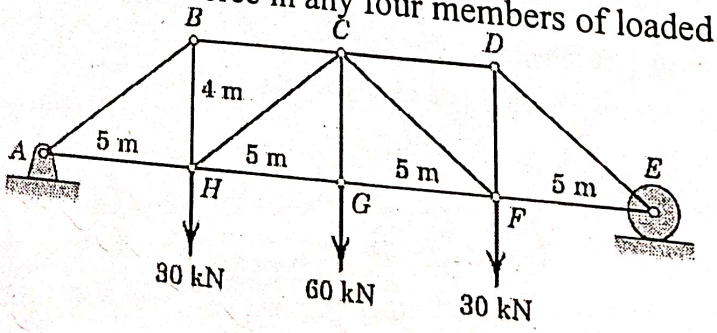
2 Determine reactions at A . 4



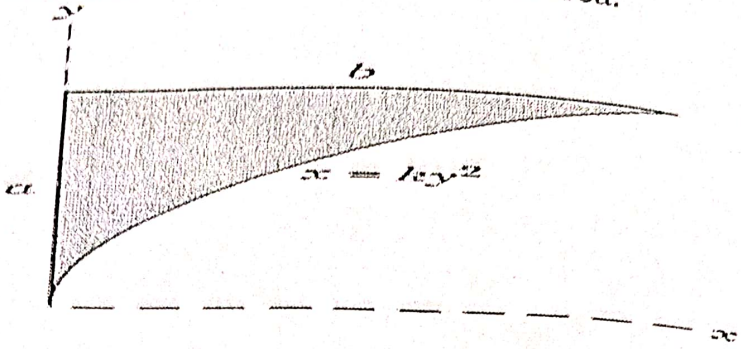
3 Determine the moment about point A and B . 4



4 Calculate the force in any four members of loaded truss. 4



5 Calculate the centroid of shaded area.



— 05 —

Total no. of pages: 1

Roll No.....

~~FIRST~~ SEMESTER – III

B. Tech.

MID SEMESTER EXAMINATION

September- 2019

AE203 THERMODYNAMICS

Time: 1:30 Hours

Max. Marks: 20

Note: Attempt all questions. Assume suitable data if any.

1.(a) Explain the physical significance of Exergy and Exergetic and second law efficiency. How you calculate second law efficiency in case of Energy producing system and energy absorption systems. (3)

(b) Prove that entropy of universe is increasing. (1)

(c) Derive the expression for rate of entropy change in following thermodynamic processes

(i) Constant Volume process (ii) Constant Pressure process

(iii) Isothermal process (iv) Polytropic Process (4)

2. Derive the expression for rate of heat Transfer and entropy change in following thermodynamic processes.

(i) Constant Volume process (ii) Constant Pressure process

(iii) Isothermal process (iv) Polytropic Process (1+1+1+3)

3.(a) Write down the physical significance of :

(i) Zeroth Law of thermodynamics

(ii) First law of thermodynamics (1)

(b) Explain the various statements involved in the second law of thermodynamics. Why is it more appropriate to calculate second law efficiency instead of COP in the refrigeration systems. (2)

(c) What are the assumptions involved for deriving Steady Flow Energy Equation(SFEE) . Write down the steady flow energy equation. Why this equation is different from energy equations in the closed system. Give Eight examples to satisfying SEEE. (3)

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MID TERM EXAMINATION

September 2019

BTECH – AUTO. ENGG

AE-207 Engineering Analysis and Design

Max. Time 1.5 Hr. Max. Marks 2

Note: 1. Answer ALL questions.
2. All questions carry equal marks.
3. Answers to all subparts of a question mus answered at one place.
4. Answer to each question must start on a fresh pag

Q.1 Explain the scientific design procedure product.

Q.2 What are the innovations principles sugge by Leonardo Da Vinci for a successful des engineer?

Q.3 Explain the need, comfort and lux segments of a products with 3 examples e

Q.4 Discuss the Principle of nature inspi innovations with suitable examples.

Q.5 Write short notes on the following:-

i. SWOC Analysis

ii. Mind mapping

iii. Provocation and movement

iv. Borrowing brilliance

Total No. of Pages 1

Roll No. .....

FIFTH SEMESTER B.Tech (AE)

MID SEM EXAMINATION **[SEPT. 2019]**

AE-301 MANUFACTURING TECHNOLOGY

Time: Time: 1 Hour 30 Minutes *Max. Marks: 20*

Note: Answer ***ALL*** questions. Assume suitable missing data, if any.

[1] What are the differences between the form cutting and generating processes used for gear making. With neat sketches compare the working principle, advantages and disadvantages of gear hobbing with gear shaping 5

[2] With reference to EDM, briefly discuss the following.

(i) Working principle with neat sketch (ii) Die electric fluids and their desirable properties (iii) Selection of tool materials (iv) Effect of current and spark frequency on surface finishing and MRR (v) Applications and limitations 5

[3] With the help of a neat sketch explain the working principle and constructional features of solid state LBM. Also discuss its advantages, disadvantages and applications. 5

[4] Write short notes on the following. [*Any Two*] 5

(i) Up milling and down milling (ii) Centre less grinding (iii)left hand thread cutting on a centre lathe

END

Total No. of Pages 02

5TH SEMESTER

Roll No. .....

B.Tech. [AE]

MID SEMESTER EXAMINATION

SEPT.-2019

AE-303; FLUID MECHANICS AND HYDRAULIC MACHINES

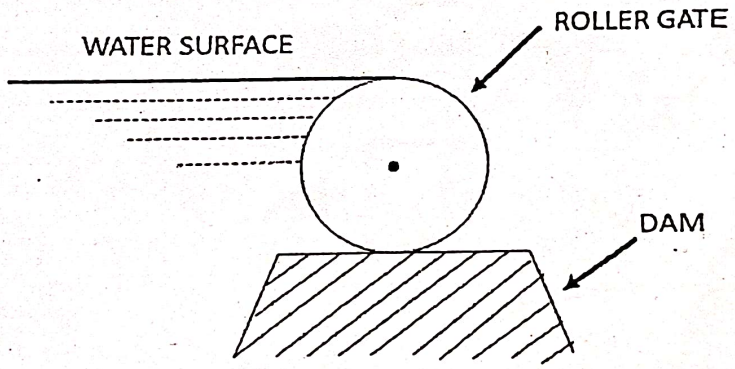
Time: 1:30 Hours

Max. Marks: 20

Note : Attempt all question. Assume suitable missing data, if any.

Q.1) A vertical gap 2.2cm wide of infinite extent contains a fluid of viscosity 2N-s/m^2 and specific gravity of 0.9. A metallic plate 1.2m x 1.2m x 0.2cm is to be lifted up with a constant velocity of 0.15m/s, through the gap, vertically upward. If the plate is in the middle of the gap, find the force required. Weight of the plate is 40N. (3)

Q.2) Find the magnitude and direction of the resultant force due to water acting on a roller gate of cylindrical form of 4.0m diameter (shown in fig), when the gate is placed on the dam in such a way that water is just going to spill. Take the length of the gate as 8.0m. (3)



Q.3) Discuss the stability of submerged and floating bodies. (3)

P.T.O.

Q.4) An open cylinder 30cm in diameter and 50cm high is fully
with water and rotated about its axis. Calculated the amou
water spilled when the speed of rotation is 180rpm.

Q.5) The velocity potential for a 2-D incompressible flow field
expressed as

$$\phi = x^2 - y^2 + 3xy$$

Determine the stream function.

Q.6) Thrust (T) developed by a propeller depends upon ang
velocity(ω), speed of advance (V), diameter (D), dyna
viscosity (μ), density(ρ), and speed of sound (C). Derive
thrust in term of dimensionless parameter.

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—10—

Total No. of Pages -1

Roll No. .....

VTH SEMESTER

B.Tech.

MID SEMESTER EXAMINATION **September-2019**

AE307; Combustion Generated Pollution

Time: 1:30 Hours *Max. Marks: 20*

Note: Attempt any four. Assume suitable missing data, if any.

Q.1) A hydrocarbon fuel is express as C_xH_y. Write the Stoichiometric equation for this fuel. The fuel contain 84% by mass of carbon and 16% by mass of hydrogen. Determine the Stoichiometric Air-Fuel ratio. (5)

Q.2) Discuss the self ignition characteristics of fuel, Octane number and Cetane number. (5)

Q.3) Define Stoichiometric ratio, Flash Point, Fire Point, Pour Point and Cloud Point of fuel. (5)

Q.4) What are the main sources of hydrocarbon emission in four stroke SI engine. (5)

Q.5) Explain the working of standard method of NO_x measurement with schematic diagram. (5)

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Roll No.....

Total No. of Pages _01

Course: B.Tech

5th SEMESTER

SEP-20

MID SEMESTER EXAMINATION

AE-309 Operations Research

Max. Marks : 30

Time: 1:30 Hours

Note : Answer any Three questions
Assume suitable missing data, if any.

1. Define the following with reference to the Linear Programming Problems: [5×2=10]
   (a) Unbounded Solution
   (b) Infeasible solution
   (c) Slack and surplus variables
   (d) Artificial variables
   (e) Dual form of simplex problems

2. Solve the following Linear Programming Problem using Big-M method. [10]

   Maximize $z = 8x_1 + 5x_2$

   Subject to

   $5x_1 + 3x_2 \geq 30$

   $2x_1 + 5x_2 \geq 20$

   $X_1 + x_2 \leq 8$

   $X_1, x_2 \geq 0$

3. Convert the following Primal form of the LPP into dual form of LPP. [10]

   Minimize $Z = x_1 - 3x_2 - 2x_3$

   Subject to

   $3x_1 - x_2 + 2x_3 \leq 7$

   $2x_1 - 4x_2 \geq 12$

   $-4x_1 + 3x_2 + 8x_3 = 10$

   $x_1, x_2 \geq 0$ and x_3 is unrestricted in sign.

4. Find the optimal solution to the transportation problem given below. [10]

Source	Destinations						Supply
		A	B	C	D	E	
	I	3	4	6	8	8	20
	II	2	10	1	5	30	30
	III	7	11	20	40	15	15
	IV	2	1	9	14	18	13
Demand		40	6	8	18	6	

-END-

Total Number of Pages: 01

SEM.: FIFTH

Roll No. .....

MID TERM EXAMINATION

B. Tech. Automobile Engg.

Sep - 2019

Paper Code: AE -317,

Course Title: Power Unit and Transmission

Time: 1.5 Hours

Max. Marks: 20

Note : (i) Attempt All questions.
(ii) All questions carry equal marks.
(iii) Assume suitable missing data, if any.

Q.1 Discuss tractive effort and other performance parameters of automobile.

Q.2 What are the purposes and requirements of the transmission?

Q.3 With the help of neat sketch, explain working of a diaphragm clutch.

Q.4 Derive the torque (T) relations for multi disc plates clutch.

Q.5 With help of neat sketch, explain working of a Vacuum clutch.

Total No. of Pages: 01 — 13 — Roll No. .....

B. Tech. (AE) Seventh Semester

Mid Semester Examination (Sep-2019)

AE405 DESIGN OF AUTOMOTIVE COMPONENTS

Time: 1 hr 30 min Max. Marks: 20

Note: Answer All FOUR Questions. Assume suitable missing data, if any. Note:-Data book is permitted.

(1) A multi- disc clutch, consists of two steel disks with one bronze disk. The inner and outer diameters of the contacting surfaces are 200 and 250 mm respectively. The coefficient of friction is 0.1 and the maximum pressure between the contacting surfaces is limited to $0.4N/mm^2$. Assuming uniform wear theory, calculate the required force to engage the clutch and the power transmission capacity at 720mm. [3+2]

(2) (a) A pair of helical gear consists of an 18 teeth pinion meshing with a 45 teeth gear. The Power 7.5kW at 2000 rpm is supplied to the pinion through its shaft. The normal module is 6mm, while the normal pressure angle is 20^0. The helix angle is 23^0. Determine the tangential, radial and axial components of the resultant tooth force between the meshing teeth. [1+1+1]

(b)Explain the virtual number of teeth for(i)Helical gears and, (ii) Bevel gears. Also draw neat sketch of virtual circles, and explain their important terms. [2]

(3) A pair of bevel gears is mounted on shafts, which are intersecting at right angles. The number of teeth on pinion and gear are 21 and 28 respectively. The pressure angle is 20^0. The pinion shaft is connected to an electric motor developing 5kW rated power at 1440 rpm. The service factor can be taken as 1.5. The pinion and gear are made of steel (σ_{ut}=750n/mm^2) and heat treated to a surface hardness of 380 BHN. The gears are machined by a manufacturing process, which limits the error between the meshing teeth to 10μm. The module and face width are 4 mm and 20mm respectively. Determine the factor of safety against bending as well as against pitting failure. [5]

(4) The pair of worm and worm wheel is designated as, 1/30/10/10. The input speed of worm is 1200rpm. The worm wheel is made of centrifugally cast, phosphor bronze and worm is made of case hardened carbon steel 14C6. Determine the power transmitting capacity based on the beam strength.

Total No. of Pages _02 Roll No.....

7th SEMESTER Course: B.Tech.[AE]

MID SEMESTER EXAMINATION SEP-2019

AE407, Production & Operations Management

Time: 1:30 Hours Max. Marks : 20

Note : Answer any TWO questions.
All questions carry equal marks.
Assume suitable missing data, if any.

1. (a) Describe how an operations strategy is formulated from the business strategy. What are the competitive dimensions concerned with the operations strategy? Discuss in detail.

(b) What is meant by the terms order qualifiers and order winners? Explain why they are important.

(c) A laboratory has six departments (A to F). Trays of samples move between the departments according to the information in Figure 1. This also indicates the space required by each department. Devise a layout for the laboratory that will fit into a convenient rectangular building and that minimizes the traffic between departments. [3+2+5]

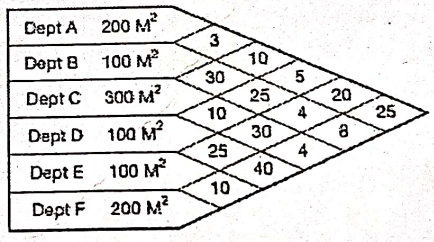

Figure 1. Flow between departments (in trays per day) and required sizes

2. (a) Describe the stages of the product life cycle. What are demand characteristics at each stage?

(b) Describe the strategic significance of design. How can organizations gain a competitive edge with product or service design?

P.T.O.

(c) The Management is considering opening a new foundry in Den..., Tex... Edwardsville, Illinois; or Fayetteville, Arkansas, to produce high-quality ... sights. The management assembled the following fixed-cost and variab... cost data (Table 1): [3+2+

Table 1. Various costs of production

LOCATION	FIXED COST PER YEAR	PER UNIT COSTS		
		MATERIAL	VARIABLE LABOR	OVERHEAD
Denton	$200,000	$ .20	$ .40	$ .40
Edwardsville	$180,000	$ .25	$ .75	$ .75
Fayetteville	$170,000	$1.00	$1.00	$1.00

i) Graph the total cost lines.

ii) Over what range of annual volume is each facility going to have ... competitive advantage?

iii) What is the volume at the intersection of the Edwardsville ar... Fayetteville cost lines?

3. (a) Discuss the factors influencing the decision of facility locations.

(b) Discuss the objectives of facility layout?

(b) The Action Toy Company has decided to manufacture a new train set, th... production of which is broken into six steps. The demand for the train is 4,80... units per 40-hour workweek: [3+2+5

TASK	PERFORMANCE TIME (SEC)	PREDECESSORS
A	20	None
B	30	A
C	15	A
D	15	A
E	10	B, C
F	30	D, E

i) Draw a precedence diagram of this operation.
ii) Given the demand, what is the cycle time for this operation?
iii) What is the theoretical minimum number of workstations?
iv) Assign tasks to workstations.

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Total No. of Pages 1 Roll No. .....

VIITH SEMESTER B.Tech (AUTOMOBILE ENGINEERI

MID SEMESTER EXAMINATION SEPT-2019

AE-409 Computer Aided Vehicle Design & Safety

Time: 1:5 Hours Max. Marks: 20

Note: Attempt any Five questions.
Assume suitable missing data, if any.

Q [1] Name any two type of crash test performed to safety of vehicle briefly describe the method with neat sketch.? [

Q [2] Why cooling of an Internal combustion engine is necessary. Discussed two type of cooling system and where they are used. [

Q [3] Why multi cylinder engines are used in automotive purpose.?

Q [4] what do you understand by motor vehicle act? Explain in brie

Q [5] What is active and passive safety? Explain any two safety equipments in a vehicle.

Q.6 Write short notes on any two

(a) Gradability

(b) Prototype making

(C) vehicle body type

-End-

Total Number of Pages: 01

Roll No. .....

SEM.: ~~FIFTH~~ VII

B. Tech. Automobile Engg.

Sep - 2019

MID TERM EXAMINATION

Paper Code: AE - 413,

Course Title: Vehicle TPT Management

Max. Marks: 20

Time: 1.5 Hours

Note: (i) Attempt All questions.

(ii) All questions carry equal marks.

(iii) Assume suitable missing data, if any.

Q.1 What do you understand by motor vehicles act? Explain in brief

Q.2 What is the necessity of driving licence? How you can obtain permanent driving licence. Write the procedure

Q.3 What do you mean by registration of a motor vehicles? Write the procedure how one can register motor vehicles?

Q.4 Write the short notes on:

(a) Causes of uneven tyre wear and their remedies.

(b) Test for competence to drive?

(c) Preventive Maintenance system in transport industry

(d) Draw any five Traffic signs.

Total No. of Pages: 2 *Roll No.....*

FIRST SEMESTER **B. Tech. [All Groups]**

MID SEMESTER EXAMINATION ***SEPT 2019***

AP101: PHYSICS-I

Time:1.5 Hours ***Max. Marks: 30***

Note: Attempt *ALL* questions.
Assume suitable missing data, if any.

1 [a] Write the mathematical expression for the law of addition of relativistic velocities. Spacecraft Alpha is moving at 0.9c with respect to the earth. If spacecraft Beta is to pass Alpha at a relative speed of 0.5c in the same direction, what speed must Beta have with respect to the earth? 3

[b] What do you mean by length contraction? A rod at rest in S-frame has a length L and is inclined at an angle θ with x-axis. Find its length L' and angle of inclination θ' to the x'-axis as measured by an observer in S' frame moving at a speed v with respect to S-frame along positive x-direction. 3

2 [a] Show that the momentum of a particle of rest mass m_o and kinetic energy KE is given by

$$p = \sqrt{\frac{(KE)^2}{c^2} + 2m_o(KE)}$$ 3

[b] A neutral meson of Energy E moving at a speed v decays into two γ-rays, one is of energy $E_1 = 70$ MeV along the direction of the neutral meson and the other is of energy $E_2 = 60$ MeV opposite to the former. Calculate the rest mass of the meson. 3

3 [a] A woman leaves the earth in a spacecraft that makes a round trip to the nearest star 4 light years distant, at a speed of 0.9c. How much younger is she upon her return than her twin sister who remained behind? 3

[b] A beam of monochromatic light of wavelength 5.82×10^{-7} m falls normally on a glass wedge with the wedge angle of 20 seconds of an arc. If the refractive index of glass is 1.5, find the number of dark fringes per cm of the wedge length.

4 [a] Discuss the formation of Newton's rings in reflected monochromatic light and show that the diameters of Newton's dark rings are proportional to the square root of natural numbers.

[b] Describe the construction and working of a Michelson's interferometer and explain the formation of circular fringes in it. If a shift of 100 circular fringes is observed when the movable mirror of Michelson's interferometer is shifted to 0.03 mm. Find the wavelength of the light used.

5 [a] What is the essential difference between Fraunhofer and Fresnel diffraction of light? Discuss Fraunhofer diffraction of light at a narrow slit and hence, deduce the conditions for maxima and minima and draw the intensity variation curve.

[b] What do you understand by absent spectra in the diffraction pattern due to a double slit? Plot the diffraction pattern obtained on screen for $d = 4e$, where d is the separation between the slits and e is the slit width.

END

Total No. of Pages: 2

Roll No. .....

III SEMESTER

B.Tech.(BT)

MID SEMESTER EXAMINATION

September-2019

BT-201 Introduction to Biotechnology

Time: 1:30 Hours

Max. Marks: 25

Note: Answer all the questions.
Assume suitable missing data, if any.

Q.1 Describe the structure and functions of any two of the following organelles. Also draw their well-labelled detailed structures [5]

(a) Eukaryotic nucleus
(b) Flagellar axoneme
(c) Mitochondria
(d) Chloroplast

Q.2 Answer any five of the following [5]

(a) What are the predominant tautomeric forms of A, T, G and C?
(b) Which interactions contribute to the stability and helicity of DNA?
(c) Name the scientists who got Nobel Prize in Physiology and Medicine in 1962 for determining the double helical structure of DNA
(d) Name the scientists who got Nobel Prize in Chemistry 2009 for describing the detailed structure of ribosome
(e) Give two examples of double membrane bound cell organelles in eukaryotes
(f) What are the major components of plant cell wall?

Q.3 Describe the roles of any three of the following [3]

(a) Centrosomes in spindle formation
(b) Lysosomes in autophagy
(c) Plant vacuoles in maintaining turgidity
(d) Gas vacuoles in cyanobacteria in maintaining buoyancy

P.T.O

Q.4 Write one difference between any three of the following
(a) Purine nucleosides and Pyrimidine nucleosides in DNA
(b) Nucleoid and Plasmid in bacterial cell
(c) Virulent plasmid and Bacteriocinogenic plasmid
(d) Fimbriae and Sex pili
(e) Autotrophs and Heterotrophs

Q.5 Answer any three of the following
(a) Draw the structure of deoxyadenosine triphosphate
(b) Describe Chargaff's molar equivalence rule
(c) Describe the impact of the structure of Gram negative bacteria wall on Gram staining
(d) Describe the structure of peptidoglycan

Q.6 Answer any one of the following
(a) Define any five of the following terms: (i) Homeostasi Multicellular; (iii) Protoplasm; (iv) Intussusception; (v) Sp tissues; (v) Organelles
(b) Write the values of the following in B-DNA: (i) Diameter of helix; (ii) Number of base pairs per turn; (iii) Distance b vertically stacked bases; (iv) Length of complete turn of helix; (pair twist (helical twist)

Q.7 Answer any one of the following
(a) Draw AT and GC base pairs. Show major and minor groove s these base pairs. What positions are involved in AT and GC bas Also write a note on phosphodiester bond in DNA
(b) Give a descriptive account of the chemical nature and structure bilayer. What is meant by membrane fluidity and dynamics?

END

Total No. of Pages:02 *Roll No. ... .*

B.Tech [BIOTECHNOLOGY] *Third Semester*

MID SEMESTER EXAMINATION *(September-2019)*

BT-203 BIOCHEMISTRY

Time: 1.30 Hours *Max. Marks: 20*

Note: Calculator is allowed
Answer all questions.
Assume suitable missing data, if any.

1. Give *brief* and **to the point** explanation of any ***Eight*** of the following **[1x8]**
   (i) Human cannot digest cellulose, still doctors suggest it to include in your diet, why?
   (ii) In ice each water molecule can form H bonding with an average ------ other water molecule. (fill the blank).
   (iii) -------measured as the force necessary to resist water movement in cell (fill the blank).
   (iv) Which are two crucial properties of water make it unique?
   (v) High heat of vaporization and high boiling point of water is attributed to -------- (fill the blank).
   (vi) What is the difference between configuration and conformation?
   (vii) The $[H^+]$ concentration at pH 4.4 is -----times higher than $[H^+]$ at pH 6.4(fill the blank).
   (viii) In equilibrium mixture of sugars concentration of α-D Glucose is ---- and β-D Glucose is..... (fill the blank).
   (ix) Which is the main force responsible for stability of DNA in chromosomal structure?
   (x) What is the contribution of Edward Buchner in biochemistry?
   (xi) What is the similarity between fossil fuel and lipids present in ou body?

2. Draw the structure of any ***Four*** of following **[1x4]**

   A. D-Xylulose
   B. N-acetyl-β D glucosamine
   C. Starch
   D. β-L-Fucose
   E. D-Galactouronoc acid
   F. Muramic acid
   G. Sucrose

P.T.O.

2. Attempt any ***Four*** of following [2x4]

I. If 1 ml of 10N NaOH is added to 1 litre of pure water at pH 7.0, what will be the final pH?

II. Describe any four significant axioms, which are characteristics of living state as per Lehninger (1984)

III. Calculate the pH of a buffer system that is 0.25M benzoic acid and 0.75M benzoate, if the pKa of benzoic acid is 4.2.

IV. Write different steps of cyclization of sugar in a solution.

V. Define Epimers and Enantiomers in sugars with example.

VI. Write down classification of organisms based on source of energy.

VII. Describe specific properties of water which is useful for life on earth.

-END-

— 24 —

Total No. of Pages 01 Roll No. .....

THIRD SEMESTER B.Tech [BT]

MID SEMESTER EXAMINATION SEPT-2019

BT205: Chemical Engineering Principles

Time: 1:30 Hours Max. Marks: 20

Note: Answer ALL questions.
Assume suitable missing data if any.

Q 1. (a) What do you mean by Synchronous culture. How synchronous growth is obtained in a bacterial culture? (3)

(b) Explain preparatory and pay off phases in Embden-Meyerhof-Parnas pathway. (3)

Q 2. Define MALTHUS law. Explain the various physical components required for microbial growth. (2+4)

Q 3. A plasmid containing strain of E. coli is used to produce recombinant protein in a 250 litre fermenter. The probability of plasmid loss per generation is 0.005. The specific growth rate of plasmid free cells is 1.4 h^{-1}; the specific growth rate of plasmid bearing cells is 1.2 h^{-1}. Estimate the fraction of plasmid bearing cells after 18 h growth if the inoculum contains only cells with plasmid. (3)

Q 4. (a)What do you mean by design criteria? (2)

(b) The equation for aerobic production of acetic acid from ethanol is:

$$C_2H_5OH + O_2 \rightarrow CH_3CO_2H + H_2O$$

Acetobacteraceti bacteria are added to vigorously-aerated medium containing 10 g/l ethanol. After some time, the ethanol concentration is 2 g/l and 7.5 g/l acetic acid is produced. Calculate the overall yield of acetic acid from ethanol. (3)

Total no. Pages: 02 *Roll no……*

Third Semester **B.Tech.**

MID SEMESTER EXAMINATION **September-2019**

BT 207 Engineering Analysis and Design

Time: 1hours 30mins. **MM: 20**

Q 1. A) What is sustainability and what is the key for sustainability? 2

B) Define biorefinery and what is the conversion processes used here? 2

OR

Q1. What are the basic steps for green chemistry which bioprocess engineering should include? 4

Q2. What are 12 principles developed by United States Environmental Protection Agency? 6

OR

Q2. What are the risk and controversy regarding the use of GM food ? 6

8

Q3. Write short note on any four:

a. BT Cotton
b. Flavour Savr tomato
c. Golden rice
d. Live attenuated vaccine
e. Subunit vaccine
f. Recombinant vector vaccine

P.T.O.

Q4. What are the factors influencing the rate of sedimentation in centrifugation ? 2

OR

Q4. What is the difference between basket centrifuge and tubular centrifuge ? 2

****

Total No. of pages 01 Roll No.....

5TH SEMESTER B.TECH. (Biotechnology)

MID SEMESTER EXAMINATION (Sep-2019)

BT301 Immunology and Immunotechnology

Time: 1:30hrs MM: 20

Note: Assume suitable missing data, if any.

1. Write true or false or fill in the blanks as specified: (5 marks)

i. Immunoglobulin digestion by pepsin results in ____+ _____ fragments.
ii. _____ is the largest secondary lymphoid organ.
iii. White blood cells characterised by their multi lobed nucleus are _____
iv. An antigen that undergoes high frequency of antigenic shift/ drift like influenza antigen does not exhibit clonal selection. T/F
v. Macrophages are non-phagocytic cells that act as antigen presenting cells T/F
vi. Thymus is an important site of exogenous antigen presentation. T/F
vii. An adjuvant triggers _____
viii. _____ is a pentameric antibody
ix. There are __ antigen binding sites in a mono-meric antibody.
x. "ELISA" stands for _____

2. Briefly describe the role of the following in antigen processing and presentation by MHC: (2x3 marks).
   a. Proteasome
   b. Invariant chain
   c. β2 microglobulin
3. Schematically show how IgM with variable region of $V_{H1}D_{H2}J_{H15}$ is obtained by recombination from the heavy chain gene segment, assuming that there ar 10 V_H, 10D_H and 15J_H segments as germ line variation. Is it possible t produce a IgG and a IgM with the same antigen specificity from a single cell clone?Explain. (6marks)
4. What are the factors that determine immunogenicity of an immunogen? (3 marks)

Total No. of Pages: 01 — 28 — Roll No. .....

B. Tech. (BT) Fifth Semester

Mid Semester Examination (Sep-2019)

BT-303 GENETIC ENGINEERING

Time: 1 hr 30 min Max. Marks: 20

Note: All Questions are Compulsory.

Q.1a How is gene cloning different from PCR? (6)

b. How can DNA Polymerase I be converted into Klenow fragment?

c. What is the advantage of pGEM3Z vector?

d. What is alkaline denaturation?

e. What is the importance of S1 nuclease?

f. What is the role of CTAB in plant DNA isolation?

Part B **(2x7=14)**

Q2.Briefly discuss the general properties of plasmids and any two vec constructed based on them.

Q3.What are the different enzymes used for DNA manipulation? Explain.

Q4. How is plasmid separated from genomic DNA on the basis of size conformation?

Q5. Describe the construction and cloning in YAC vectors.

Q6. What are bacteriophage vectors? Explain the construction of replacement insertion vectors.

Q7.How can you modify blunt ends of DNA molecule. Name 2 enzyr producing blunt ends.

Q8. Explain the role of Ti plasmid in plant transformation.

Total No pages: 01 Roll No.....

5TH SEMESTER B.Tech(Biotechnology)

MID TEM EXAMINATION SEPTMBER 2 019

BT 323: Population Genetics

Time: 1.30 hrs *Maximum Marks: 25*

Note: Answer any five of the following questions. Answer should be brief and to the point

1. What do you understand by Population Genetics and why study of population is important? Write in brief the development /History of Population Genetics. 2+3=5
2. Why Hardy Weinberg law is important? How it is helpful in population genetics? Write in details about the law. 1+4=5
3. What is Genomewide association study (GWAS). Write in brief about GWAS how it is helpful in population genetics 1+4=5
4. Write in short how mating system influences the gene and genotypic frequencies of individuals in a Population. 5
5. What is haplotype and HapMap project? Write in details 5
6. Write short notes on any two 2.5X2 =5

a) Chi square test and its application

b) Linkage and Linkage disequilibrium

c) Assortative mating and effect in population structure

Total No. of Pages: 2

Roll No. .....

FIFTH SEMESTER

B. Tech. (BT)

MID SEMESTER EXAMINATION

September-2019

BT-325 Cell Biology

Time: 1:30 Hours

Max. Marks: 25

Note: Answer all the questions.
Assume suitable missing data, if any.

Q.1 Describe any three of the following [9]

(a) Procaspase – Activation, catalytic action, examples, final target proteins

(b) Prophase I of meiosis

(c) Glycosaminoglycans – Properties, Monomeric units, Formation of proteoglycans, Functions

(d) CdKs – Role in regulation of S phase, Role in regulation of M phase, Self regulation

Q.2 Describe the roles of any four of the following in cell cycle [4]

(a) E2F transcription factor

(b) Anaphase Promoting Complex

(c) S-cyclin

(d) Wee kinase

(e) Separase

(f) Aurora kinase

Q.3 Answer any one of the following [3]

(a) Describe the roles of microtubules and motor proteins in various phases of mitosis. Clearly explain the action in all the phases

(b) Give a descriptive account of proapoptotic and antiapoptotic factors belonging to bcl-2 family of proteins

(c) Enumerate ten differences between mitosis and meiosis. How is mitotic anaphase different from meiotic anaphase I?

P.T.O.

Q.4 Write notes on any four of the following [4]

(a) Role of cytochrome c in apoptosis

(b) Oogenesis and significance of fertilization

(c) Formation of apoptotic bodies and their significance

(d) M checkpoint in cell cycle

(e) Functions of extracellular matrix

Q.5 Answer any five of the following [5]

(a) In which phase of the cell cycle do the terminally differentiated neurons exist?

(b) Which complex facilitates homologous recombination between homologous chromosomes during meiotic prophase?

(c) Name the subphase of meiotic prophase during which crossing over occurs

(d) Name the phase of cell cycle during which pre-replication complex is formed

(e) Where do chromosomes lie on the mitotic spindle during metaphase?

(f) What is the major microtubule organizing center of animal cell?

(g) What bears mechanical stress in case of connective tissues?

(h) Which glycoprotein provides tensile strength to extracellular matrix?

END

Total No. of Pages 02 Roll No. .....

VII SEMESTER B.Tech. [BIOTECHNOLOGY]

MID SEMESTER EXAMINATION Sep-2019

BT 405 Fundamentals of Computational Biology

Time: 1:30 Hours *Max. Marks: 20*

Note : Answer all questions.
All questions carry equal marks.
Assume suitable missing data, if any.

Q.1. What method can be used to depict the sequence features such as palindromes and repeats? Explain the techniques for denoising a dot plot. [4]

Q.2. What are the differences between mutations and polymorphisms? Elaborate the effects of Single Nucleotide Polymorphisms at exons of a protein-coding gene. [4]

Q.3. (a) Fill out the dynamic programming matrix for determining the optimal global alignment between the two sequences, CGGA and ACTG. Scoring: Match = +3; Mismatches and gap penalty = -1.

(b) What is the optimal score for the alignment(s)? Draw the optimal alignment(s) corresponding to this score. [2×2=4]

Q.4. Differentiate between the following with examples: [2×2=4]

a. Flat file and Relational databases.

b. Primary, Secondary and Composite Databases

Q.5. Describe GenBank flat file data format of neucliotide sequence. What information is present in the header part of the format? [4]

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Total No. of Pages 01

Roll No. .....

SEVENTH SEMESTER

B.Tech [BT]

MID SEMESTER EXAMINATION **SEPT-2019**

BT407: Bioprocess Tech & Downstream Processing

Time: 1:30 Hours *Max. Marks: 20*

Note: Answer ALL questions.
Assume suitable missing data if any.

Q 1 What do you mean by media formulation? Explain the role of inducers and antifoaming agents during media preparation. (2+3)

Q 2. Discuss the factors that affect the choice of selecting raw materials. Explain the various methods used for aseptic inoculation of media. (2+3)

Q 3. Define Crabtree effect. Discuss the possible ways by which *S. cerevisiae* can be employed in alcoholic fermentation of xylose. (2+2)

Q 4. Discuss the strategies for achieving overproduction of L-Lysine. Explain the submerged fermentation processes used in Citric acid production. (3+3)

Total No. of Pages: 01 — 34 — Roll No. .....

~~1st~~ SEMESTER – VII

B.Tech. - [BT]

MID SEMESTER EXAMINATION

September-2019

BT425, Biomaterials

Time: 1:30 Hour

Max. Marks: 25

Note: Assume missing data, if any

Q1 Give one example of the prosthetic implant where all three different types of biomaterials are being used. Explain it with the help of a diagram. (3)

Q2. What do you mean by the smart polymers? What benefit can we can get if we use the smart biomaterials over the normal (non-responsive) biomaterials. Describe it briefly with the help of an example. (3)

Q3. What do you mean by bio-ceramics? Classify the bio-ceramics into the three categories depending on their response inside the human body, give an example of each type. (4)

Q4. What characteristics of the metallic implants make them more suitable for the orthopaedic and dental applications? How has the corrosion resistance of the metallic implants been improved over the past few decades? (5)

Q5. Write a short notes on the followings: (2X5)

(a) Bioprinting

(b) Fibrous encapsulation

(c) Stress shielding

(d) Jaipur foot

(e) Natural and Synthetic biomedical polymers

****

Total pages 1 -35- Roll No. ....

III Semester

CE 201 CIVIL ENGINEERING BASICS & APPLICATION

Mid Term Exam Sep 2019

All Question carry equal marks
Assume Suitable Missing data if any
IS 10262-2019 is Permitted

1. Draw neat sketches to explain the following foundation
   a. Raft foundation
   b. Isolated Footing
   c. Combined Footing
   d. Pile foundation

2. Describe the Classification of different types of buildings as per National Building Code

3. Write short notes on
   a. Flemish bond
   b. Damp proof courses
   c. Composite masonry construction
   d. P.C.C, RCC. PSC

4. Explain any three tests on Cement as per IS269 -2015

5. Design a concrete mix design of your choice by referring code IS 10262-2019(excluding example Illustrated)

Total No. of pages : 1 III Sem Roll No.----------
B. Tech CIVIL ENGINEERING
MID SEMESTER EXAMINATION SEPTEMBER-2019
CE 203 ENGINEERING MECHANICS
TIME: 1.5 HOURS MAX. MARKS: 30

NOTE: Answer ALL Questions. Assume any missing data suitably. Marks allotted to questions are written against them.

1. Four coplanar forces 26 KN, 39 KN, 63 KN and 57 KN are applied at a point at inclinations of 10°, 114°, 183° and 261° respectively. The inclinations are taken from x-axis in an anticlockwise direction. Determine the resultant of the force system in terms of magnitude and direction. 6

2. Find forces in all the members of the pin-jointed truss shown in Fig. 1. 14

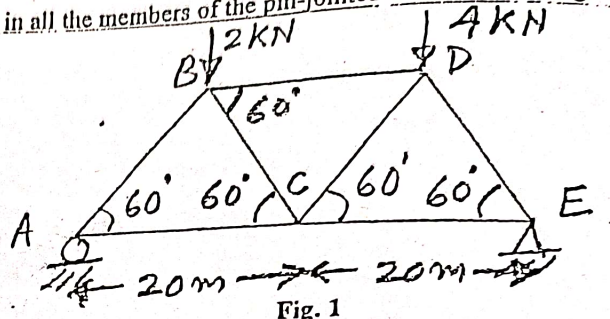


Fig. 1

3. Determine forces in members BD and CE of the truss shown in Fig 2, by method of sections. 6

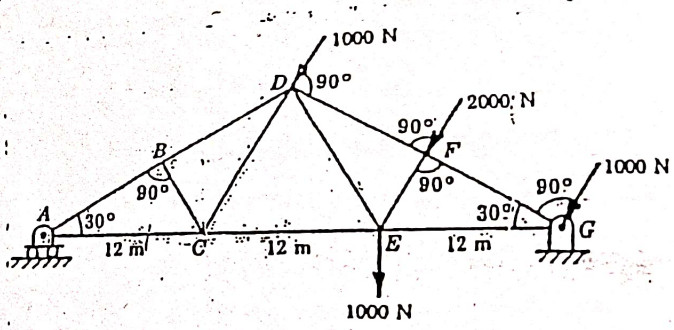


Fig.2

4. Write short notes on any four of the following topics. 4
a) Law of triangle of foces
b) Unit vector
c) Equilibrium of an object
d) Types of supports
e) Stress strain relation of mild steel

Total no. of pages = 4

THIRD SEMESTER — 37 — B.Tech. (Civil)

MID SEMESTER EXAMINATION September-2019

CE-205 Fluid Mechanics

Time: 1hour 30 minutes Max. Marks : 30

Note : Answer all questions.

Assume suitable missing data, if any.

1. A 90 N rectangular solid block slides down a 30° inclined plane. The plane is lubricated by a 3 mm thick film of oil of specific gravity 0.9 and viscosity 8.0 poise. If the contact area is 0.3 m^2, estimate the terminal velocity of the block.

2. The tank in figure.1 is closed at top and contains air at a pressure P_A. Calculate the value of P_A for the manometer readings shown.

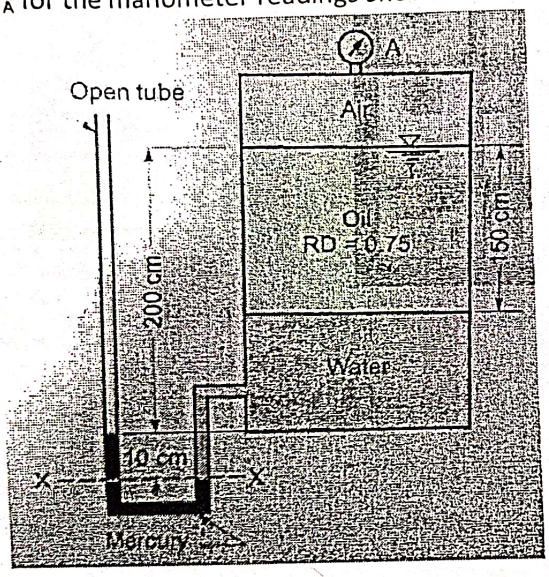


Figure 1

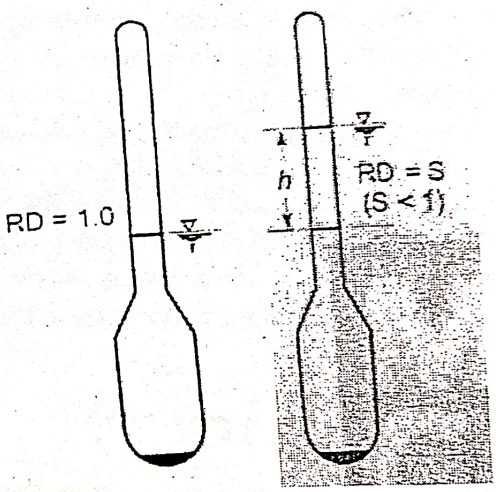


Figure 2

3. A plane area in the form of a right angle triangle of height h is immersed vertically in water with its vertex at the water surface. Calculate the total force on one side of the triangular plane and the location of the centre of pressure.

4. A hydrometer has a stem of diameter D and a weight W. Find the distance on the stem h between markings corresponding to relative densities of 1.0 and S. (figure 2)

5. (a) A steady, incompressible , two dimensional velocity field is given by $u = x + y = 1.0$, $v = x - y - 2.0$. Determine the location of the stagnation point, if it exists

(b) The velocity along the centreline of a nozzle of length L is given by $V = 2t\left(1 - \frac{x}{2L}\right)^2$ where V is velocity in m/s, t is time in secs from the commencement of flow, x is the distance from the inlet to the nozzle. Find the convective acceleration, local acceleration and the total acceleration when t= 3 secs, x= 0.5 m and L= 0.8 m.

THIRD SEMESTER B.TECH

MID SEMESTER EXAM (SEPTEMBER 2019)

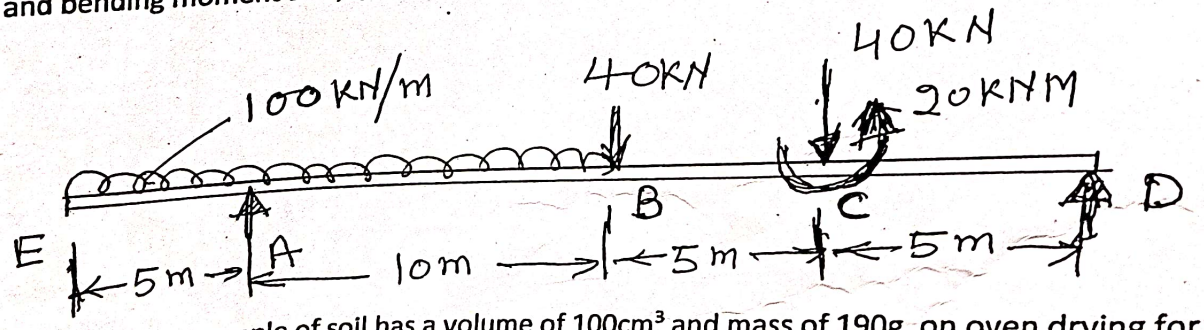
~~CE 307~~: ENGINEERING ANALYSIS AND DESIGN (CE 207)

TIME:1.5HOUR. MAX.MARKS:25

NOTE: Answer all questions. Assume any missing data suitably.

---

1. Answer the followings
   (a) List the different methods of design of reinforced concrete members which are accepted in practice.
   (b) What is meant by a limit state? Enumerate the five limit states commonly used in the limit states design.
   (c) Draw the experimental and design stress-strain curves using a partial safety factor of 1.15 for: (i) mild steel bars of grade F 250 AND (b) HYSD bars of grade F415.
   (d) Explain the terms: characteristic and factored loads —5.
   (e) Why does IS:456 Limit the design compressive strength in structural concrete to $0.67f_{ck}$ and not f_{ck}?
2. Explain briefly the following: (a) balanced section (b) under reinforced section and (c) over reinforced section; explain why is an over reinforced section not permitted in reinforced concrete. —5.
3. Find $x_{u,max}$ in term of effective depth d for Fe250,Fe415 and Fe500 steel. — 5.
4. Find reaction at A and B for the shown loaded and supported beam below. Also find values of shear and bending moment at A,B,C,D andE. —5.



5. An undisturbed sample of soil has a volume of $100cm^3$ and mass of 190g. on oven drying for 24 hours, the mass is reduced to 160g. If specific gravity of grains is 2.68, determine the water content, void ratio and degree of saturation of soil. —5.

TOTAL NO OF PAGES-02 ROLL NO----------

B.TECH (ENE) THIRD SEMESTER

MID- SEM- EXAMINATION SEP- 2019

CE- 251 BUILDING MATERIAL AND CONTRUCTION

TIME- 1-1/2 HRS MAX- MARKS-20

NOTE-ANSWER ANY- FOUR- QUESTIONS BUT QUESTION 07 IS COMPULSARY. ASSUME SUITABLY DATA IF ANY

Q1 (05MARKS)

.WHAT IS ROLE OF AN ENVIRONMENTAL ENGINEER IN CONSTRUCTION – OF PLASTIC WASTE AND CIVIL-WASTE IN DELHI NCR TO DECREASE THE AIR POLLUTION? EXPLAIN ITS MERIT AND DEMERITS DURING HIGHWINTER AND HIGH SUMMER PERIODS?

Q2 (05MARKS)

,EXPLAIN SELECTION OF SMART BUILDING MATERIALS IN FIRE PROOF CONSTRUCTION IN HIGH RISE BUILDING? DISCUSS MERITS AND DEMERITS?

Q3 (05MARKS)

WHICH DESIGN MIX ARE USED FOR METRO RAIL AND TV TOWER PROJECTS- WHY?

Q4 (05MARKS)

BRIEFLY DISCUSS THE EFFECTS OF ADMIXTURES- RATIO INFLUENCE THE HIGH PERFORMANCE CONCRETE?

Q5 (05MARKS)

WHY CEMENT MORTARS ARE USED IN BUILDINGS ? EXPLAIN ITS CAUSES AND EFFECTS?

Q6 (05MARKS)

DIFFERENTIATE BETWEEN ENGLISH BOND AND FLEMISH BOND IN BUILDING CONTRUCTIONS?

(05 MARKS)

Q7 WRITE TRUE OR FALSE

A).WHITE MARBLES ARE CALLED SEDIMENTARY ROCKS?

B). THE HARDNESS OF GOLD AS PERMOH^S SCALE IS 10?

C) .THE PRESENCE OF KALLAR OR REH RENDERS THE EARTH SUITABLE FOR BRICK MAKING?

D) .ALLAHABAD TILES ARE MOST SUITABLE THAN MANGALORE TILES?

E).CLINKERS ARE FORMED DURING CEMENT MANUFACTURING?

F) .BULKING OF SAND MORE IN FINE SANDCOMPARE TO COARSE SAND?

G) WATER CEMENT RATIO USUALLY 22.5 LITRES OF WATER IS REGUIRED FOR 50KG OF ORDINARY PORTLAND CEMENT?

H) THE TIMBER WHICH IS WELL SEASONED AND FREE FROM SAP SHOULD BE USED BECAUSE MOSTLY SAP WOOD IS ATTACKED BY FUNGUS?

J) VIOLET COLOURING SUBTANCES FOR GLASSES ARE MAKE BY MANGANESE DIOXIDE?

Total No. of pages 02
V th SEMESTER

Roll No.
B.Tech. [Civil Engg.]
Branch/ Group code

MID SEMESTER EXAMINATION SEPT. 2019

CE301
Paper Code

Analysis of Determinate Structures
Title of the Subject

Time: 1½ Hours

Max. Marks: 30

Note: Attempt any five questions. All questions carry equal marks. Assume suitable missing data if any.

Q.1 Determine the static degree of indeterminacy of the structures shown in all figures from Q.1.1 to Q.1.4 below and the kinematic degree of indeterminacy of the structures shown in figures Q.1.3 and Q.1.4.

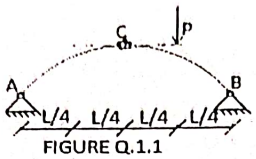


FIGURE Q.1.1

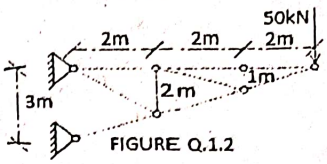


FIGURE Q.1.2

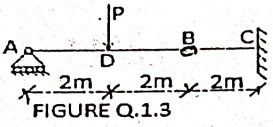


FIGURE Q.1.3

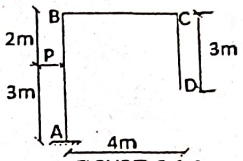


FIGURE Q.1.4

Q.2 Draw the influence line diagram for reaction at support A for the s/s beam shown in figure Q.2.1 below and determine the absolute maximum reaction at support A for the travel of several point load train shown in figure Q.2.2 from right to left in the span.

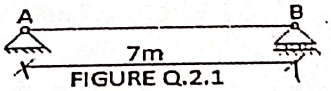


FIGURE Q.2.1

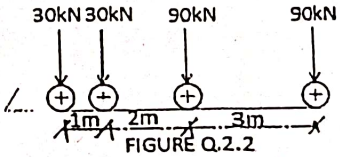


FIGURE Q.2.2

Q.3 Explain the Euler Bernoulli Beam model to determine the stress resultant in a beam problem and derive the necessary relation.

Q.4 Analyze the compound beam ABCDE shown in figure Q.4 below for the given loading and draw BMD and SFD.

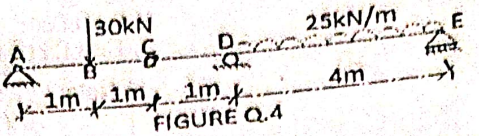


FIGURE Q.4

Q.5 Determine the strain energy stored in the s/s beam shown in figure Q.5.1 below and using principle of (real) work and energy (considering conservative system), obtain the vertical deflection under the load at the centre of the span at C. Take elastic rigidity for the span AB as EI.

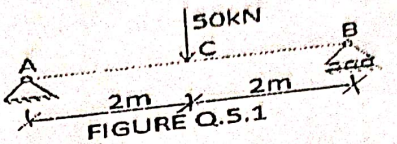


FIGURE Q.5.1

OR

Q.5 Determine the strain energy stored in the simple truss loaded as shown in figure Q.5.2 below and using principle of work and energy, obtain the vertical deflection of joint C. Take Area of each member of the truss as 0.1 m^2 and Young's Modulus E as 210 GPa.

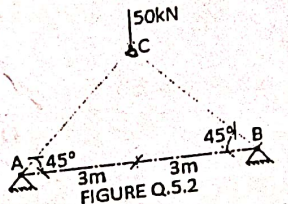


FIGURE Q.5.2

Q.6 On the basis of laboratory experiment, explain the Maxwell's law of reciprocal deflection and derive the necessary relation to prove it.

Q.7 Explain
a. Castigliano's theorem I and II.
b. Classification of Structures.

Total No. of pages : 1 Roll No.----------

B. Tech. IIIrd SEMESTER — V — CIVIL ENGINEERING

MID SEMESTER EXAMINATION SEPTEMBER-2019

CE 303: DESIGN OF RCC STRUCTURES

TIME: 1.5 HOURS MAX. MARKS: 30

NOTE: Answer ALL Questions. Assume any missing data suitably. Marks allotted to questions are written against them. Use of IS code is NOT permitted.

1. What do you understand by a Design mix concrete? Write names of any five factors which affect the design of a concrete mix. Explain the effect of any one in detail. 6

2. Determine the depth of neutral axis of a beam 250 x 400 mm (effective depth). The beam is reinforced with 3 bars of 20 mm diameter of Fe 415 grade. Grade of concrete is M20. Determine the type of section also. 4

3. Draw a neat sketch of representative stress strain curve given in IS 456 for cold worked deformed bars. 4

4. What do you understand by a 'Limit state'? Explain briefly. 4

5. What do you understand by 'Characteristic strength' and 'Characteristic load'? How design strengths and design loads are calculated in Limit state method of design? 4

6. Write short notes on any four of the following topics.
   a) Partial safety factor
   b) Pozzolanic materials
   c) Cements permitted for use as per IS456
   d) Ductility of mild steel
   e) Admixtures in concrete
   f) Ultimate load method 8

FIFTH SEMESTER B.Tech. (CIVIL ENGG)

MID SEMESTER EXAMINATION SEPT 2019

CE-307 ADVANCED GEOTECHNICAL ENGINEERING

Time: 1.5 Hours *Max. Marks : 30*

Note: Attempt all questions of equal marks. Assume suitable missing data, if any. Give a neat sketches wherever required.

1. Explain the concept of macropores. How the velocity and intensity of deposition affect the quantum of macropores. Differentiate the types of macropores. (5)

2. Determine the porosity of a uniformly graded sand of perfectly spherical grains to form a rhombohedral array with angle of orientation of rhombohedron equal to 76^0. (5)

3. Explain how the soil compositions are determined by X ray diffraction technique.

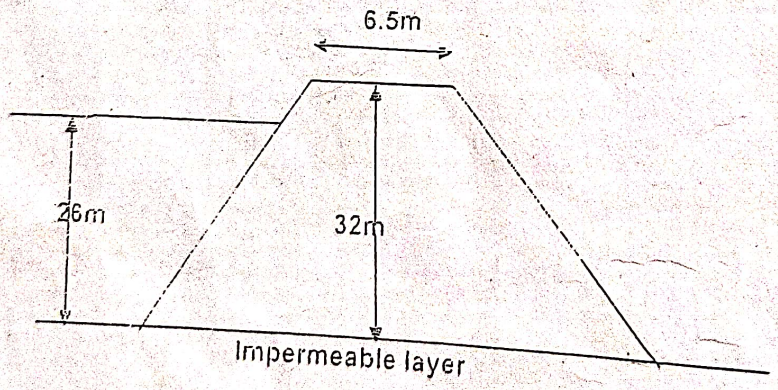
A beam of X rays of wavelength 0.071 nm is diffracted by (110) plane of rock salt with lattice constant 0.28nm. Determine the glancing angle for second order diffraction. (5)

4. What are the uses of electroosmosis process in soil mechanics. Differentiate two school of thoughts for finding the electroosmotic coefficient of permeability. (5)

5. Explain numerical analysis of seepage by Taylor's series. How the head at point A for following conditions-

- Point A is located on the boundary of a pervious and an impervious layer
- Point A is located at the bottom of a piling (5)

6.The cross section of an earth dam is shown below. Find the seepage through dam body by Pavlovsky's method.



The upstream & downstream slopes are 1v:2h.The hydraulic conductivity is 6.1×10^{-4} m/min. (5)

Roll no.....

Total no. of Pages:02 B.Tech.

Fifth Semester Sep-2019

Mid Semester Examination

CE 317: Solid Waste Management and Air Pollution Control

Maximum Marks 30 Time 1.5 hours

Note :Attempt all questions. Make necessary assumptions wherever required and clearly state them.

1. A city has three landfill sites and these sites have to receive waste from seven sub-regional sources of the entire are. The quantity of solid waste, in standard trucks per day, at all sources is given in the following table. The capacity of landfill sites (in standard trucks per day) is also indicated in the table. The unit cost of transportation (in multiple of Rs.1000) is given for each 'solid waste source-landfill site' combination in corresponding shaded cell of the table below. Work out an optimal transportation plan and test for optimality, so as to minimise transportation cost.

sources → landfil sites ⇩	S1	S2	S3	S4	S5	S6	S7	S9
D1	5	6	4	3	7	5	4	70
D2	9	4	3	4	3	2	1	50
D3	8	4	6	5	4	8	3	80
	10	20	45	40	20	35	30	

(12)

2. Write short notes on any four of the following
   a. Engineered Landfill
   b. Composting or Incineration
   c. Management of biomedical waste
   d. Location and relevance of transfer stations
   e. Waste to energy plants

f. sector/pocket wise route planning for waste collection (2.5x4=10)

3. Write short notes on any two of the following
   a. Explain the various sources of solid waste generation. What are the waste components and their relative proportion for a city like Delhi?
   b. Explain and differentiate between the responsibilities of Municipal authority and State Government/UT administration with reference to Municipal Solid Waste (Management and Handling) rules. Also indicate the typical C/N ratio encountered in city waste.
   c. Explain and differentiate between gasification and pyrolysis (2x4=8)

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Total No. of Pages 1

Roll No. .....

7th SEMESTER

B.Tech.(CIVIL)

MID SEMESTER EXAMINATION SEPTEMBER - 2019

CE405 DESIGN OF STEEL STRUCTURES

Time: 1½ Hrs.

Max. Marks: 30

Note :
- Attempt **any two** questions.
- IS: 800-2007 along with its amendments and Steel Table in bound format is permissible.
- Assume suitable missing data, if any.

1. An ISWB350 transfers a shear of 80kN and an end moment of 100kNm to the flange of an ISHB250 column. Design and detail a fully rigid welded connection. Take, $f_y = 250$ MPa and $f_u = 410$ MPa. (15)

2. A minor strut of a truss is subjected to 8.4kN factored compression force under dead and live load condition, while a factored tension of 15.5kN induces in the member under wind load and dead load condition. The length of the member is 125 cm. Design the member considering $f_y = 250$MPa and $f_u = 410$MPa. (15)

3. A beam of ISWB400 together with two flange plates of 250mm x 15mm each has been used on a span of 10m. Determine the maximum moment this beam can carry, if the compression flange is torsionally restrained at the ends only and both the cover plates provided on the compression side. Also, outer one plate has been curtailed at 2m from either end. The flange plates are connected to I-section by two bolts of 22 mm diameter at each section. The property class of the bolts may be taken as 5.6. (15)

Total No. of Pages 03

Roll No.....

SEVENTH SEMESTER

B. Tech. CIVIL

MID SEMESTER EXAMINATION SEPT-2019

CE407 WATER RESURCES ENGINEERING

Time: 1 Hour 30 minutes

Max. Marks : 30

Note : Question One is compulsory. Attempt Three questions from Part A and Three from Part B. Assume suitable missing data, if any.

1 Answer eight parts of the question.

[a] Enlist the causes of inconsistency of rainfall data. How can it be corrected?

[b] Distinguish among flood hydrograph, DRH, UH, IUH and synthetic unit hydrograph.

[c] Compare the terms phi-index, w-index and infiltration rate.

[d] How do you select a suitable unit hydrograph to calculate peak flows for a given catchment area?

[e] Write a brief note on estimation of Consumptive use of water by a crop.

[f] Compare Sprinkler irrigation method with Drip irrigation method.

[g] Write a brief note on: Alluvial soils, Gross command area, Percolation losses and Absorption losses.

[h] How does the magnitude of Duty vary with various places in a canal network? What are other factors affecting duty?

[i] Write a brief note on Irrigation efficiencies.

[j] Compare Lacey's theory with Kennedy's theory applicable for canal design.

[k] Write a brief note on anti-water logging measures. (1.5x8)

PART- A

2 The 3-hour unit hydrograph of a catchment is triangular in shape with a base of 30 hours and a peak of 30m^3/sec at 9 hours from the start. Estimate the flood hydrograph if 5cm effective rainfall occurs in 6 hours. (3)

3 An isolated storm in a catchment produced a runoff of 3.3 cm. The mass curve of the average rainfall depth over the catchment was as below:

Time (hrs)	0	1	2	3	4	5	6
Accum. Rainfall (cm)	0	0.5	1.6	3.6	5.6	5.8	7.8

Obtain the value of phi-index for the catchment. (3)

4 Determine optimal number of rain gauges over a basin with the following data:
Number of existing rain gauges = 6
Allowable percentage error =7%
Average rainfall at the existing rain gauges =90, 100, 85, 65, 55, 45 cm. (3)

5 The maximum annual floods (in million m^3/sec) for 10 years from 2000 to 2009 for a catchment are given below:

Year	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Discharge	1.58	1.30	1.90	1.40	1.65	1.45	1.85	1.75	1.35	1.85

Determine the maximum flood with a recurrence interval 100 years. Use any method of analysis. (3)

OR

Flood-frequency computations for a river by using Gumbel's method, yielded the following results:

Return period T (years)	Peak flood (m^3/sec)
50	40,810
100	46,300

Estimate the flood magnitude in this river with a return period of 1000 years. (3)

PART- B

6 Calculate the balancing depth for a channel section having a bed width equal 17 m and side slopes of 1:1 in cutting and 2:1 in filling. The bank embankments are kept 2.9 m higher than the ground level (berm level) and crest width of banks is kept 2.0 m. (3)

7 A stream of 140 litres per second was diverted from a canal and 105 litres per second were delivered to the field. An area of 1.7 hectare was irrigated in 8 hours.The effective depth of root zone was 1.6 m. The runoff loss in the field was 425 m^3. The depth of water penetration varied linearly from 1.6 m at the head end of the field to 1.1 m at the tail end. Available moisture holding capacity of the soil is 22 cm. per metre depth of the soil. It is required to determine the water storage efficiency. Irrigation was started at a moisture extraction level of 50 % of the available moisture. (3)

8 Determine the field capacity of a soil for the following data:
Root zone depth= 180 cm.
Existing moisture = 10%
Dry density of the soil = 1450 kg/m^3
Quantity of the water applied to soil =640 m^3
Water lost due to deep percolation and evaporation =13%
Area to be irrigated = 1000 m^3 (3)

9 The following table gives the mean monthly flows (m^3/sec) in a river during certain year. Calculate the minimum storage required to maintain a flow rate of 58 m^3/ sec.

Month	1	2	3	4	5	6	7	8	9	10	11	12
Mean flows	72	60	51	26	26	32	60	85	115	100	95	76

(3)

OR

A water course commands an irrigation area of 1050 hectares. The intensity of irrigation of rice in this area is 50%. The transplantation of rice crop takes 15 days and total depth of water required by the crop is 10 cm on field during the transplantation. Calculate the maximum discharge required in the watercourse with respect to the given information. (3)

Total No. of Pages 02 Roll No.....

SEVENTH SEMESTER B.Tech. CIVIL

MID SEMESTER EXAMINATION SEPT-2019

CE413 WATER RESURCES MANAGEMENT

Time: 1 Hour 30 minutes *Max. Marks : 20*

Note : Question 1 is compulsory. Attempt 6 more questions. Assume suitable missing data, if any.

1 Answer eight parts of the question

[a] Explain various forms of soil erosion by runoff in a catchment.

[b] Write a brief note on land capability based on land slope.

[c] Compare various structural methods of soil conservation in river basin management.

[d] Describe the various factors which influence the success of micro level rainwater harvesting program.

[e] Write a brief note on role of vegetative cover in protecting soil from erosion.

[f] Compare Muskinghum method of flood routing with Goodrich method.

[g] Write a brief note on flood discharge estimation by moving boat method.

[h] Write a brief note on methods of flood forecasting.

[i] Compare the utility of stage-discharge curve with flow-duration curve.

[j] How do you select a suitable unit hydrograph to calculate peak flows for a given catchment area? (1*8)

2 A rectangular parking lot is 140 m x 280 m long. The time of overland flow across the pavement to the longitudinal gutter along the centre is 18 minutes and the estimated total time of concentration to the down stream end of the gutter is 24 minutes. The runoff coefficient is 0.9. If rainfall of intensity 6 cm /hr falls on the lot for 24 minutes, determine the magnitude of peak discharge. (2)

3 During a flood the water surface at a section in a river was found to increase at a rate of 10.5 cm/h. The slope of the river is 1/3300 and the normal discharge for the river stage read from a steady rating curve was 150m^3/s. If the velocity of flood wave can be assumed as 2.2 m/s, determine the actual discharge. (2)

4 A factory is proposed to be located on the edge of the 500 year flood plain of a river. If the design life of the factory is 30 years, what is the reliability that it will not be flooded during its design life? (2)

5 An unregulated stream provides the following volumes through each successive 4-day period over 40 day duration at a possible reservoir site. What should be reservoir capacity needed to ensure maintaining 85% of the average flow over these 40 days, if the reservoir is full to start with? (2)

Day	00	4	8	12	16	20	24	28	32	36	40
Runoff volume(Mm^3)	00	10	6	3	4	3	2	1.6	6	16	11

6 A catchment area of 120 ha has a time of concentration of 30 min and runoff coefficient of 0.3. If a storm of duration 45 min results in 3 cm of rain over the catchment estimate the resulting peak flow rate. (2)

7 Flood-frequency computations for a river by using Gumbel's method, yielded the following results:

Return period T (years)	Peak flood (m^3/sec)
50	30,810
100	36,300

Estimate the flood magnitude in this river with a return period of 500 years. (2)

OR

Analysis of annual flood series of a river yielded a sample mean of 1100 m^3/sec and standard deviation of 500 m^3/sec. Estimate the design flood of a structure on this river to provide 90% assurance that the structure will not fail in next 60 years. Use Gumbel's method and assume the sample size to be very large. (2)

8 A drainage basin has 160 km^2 area, 7 hours time of concentration and 9 hours as storage constant with the following information about inter-isochrone area distribution, determine 1 hour unit hydrograph upto its peak value. (2)

Time (h)	0-1	1-2	2-3	3-4	4-5	5-6	6-7
Inter isochrones Area (km^2)	10	36	43	22	35	10	4

Roll No.....

SEVENTH SEMESTER **B.TECH. [Civil Engineering]**
MID SEMESTER EXAMINATION ***(SEPTEMBER 2019)***

CE 415: TRANSPORTATION SAFETY AND ENVIRONMENT

Time: 1:30 Hours ***Max. Marks: 30***

Note: Answer any FIVE questions. All questions carry equal marks. Draw neat sketch wherever required. Missing data may be assumed.

Q.1 What are the causes of road accidents? Discuss them in brief.

Q.2 Differentiate between condition diagram and collision diagram.

Q.3 What are different types of conflict points at an uncontrolled intersection? Show all conflict points on a four-leg intersection formed with crossing of two two-way double lane highways.

Q.4 A vehicle of weight 3.0 tonne skids 45 m before hitting a parked vehicle of 2.0 tonne weight. Both vehicles skid through 15 m distance before stopping. Determine the initial speed of moving vehicle. Average coefficient of friction of road surface is 0.4.

Q.5 Discuss road safety audit. Write different stages of road safety audit.

Q.6 Give minimum six typical recommendations for a typical Road safety audit.

Total No. of Pages 02

Roll No. .....

FIRST SEMESTER **B.Tech.(B Group)**

MID SEMESTER EXAMINATION **September-2019**

CO-101 Programming Fundamentals

Time: 1:30 Hours *Max. Marks: 30*

Note: Answer all five questions. All questions carry equal marks.
Assume suitable missing data, if any.
Give suitable examples wherever applicable

Q1 (a) Draw flow chart to find the sum of the all prime numbers between 235 and 335. What are the characteristics of a good algorithm? 3

(a) What is the relationship between formal arguments and actual arguments? How they can be declared within a function? Give relevant code. 3

(c) Explain tokens in C. main belongs to which token? 2

Q2. (a) What will be the output of the following, justify your answer 2

```
Void main()
{int i=5, j= 6, z
printf("%d", i+++j);
}
```

(b) Write a program in C to get a number from user and to 6
(i) write in words (ii) check for Armstrong (Number equal to sum of the cubes of its digits)
(iii) print reverse (iv) print sum of digits

Q3. (a) What is an operator? What are the different types of operators? What are the steps in solving any expression having different/multiple operators? Solve k = 5 > j > 2. What will be the value of k for j=2,3,4,5? Explain the reasons with steps. 5

(b) What is the relationship between formal arguments and actual arguments? How they can be declared within a function? Give suitable example. 3

Q4. (a) Write the guidelines, explain the syntax with examples to use printf() function in C language. What is the output of the following printf("%6.3f. %13.4f, %-8.6g %7.2e",x,x,x,x) where x = 43.2345 5

(b) convert (show steps used for conversion) 3

(i) (213)10 = (.)8 = (.)16. = (.)2

(ii) (AA)16 = (.)10. = (.)8. =. (.)2.

Q4. (a) Write a C program that accepts n numbers from user, prints square of each number except when input is 5 and exit when entered 0 by the user. 3

(b) explain syntax of switch statement 1

(c) Write short notes 4

(i) static

(ii) Recursion

Total No. of Pages 2
IIIRD SEMESTER
MID SEMESTER EXAMINATION

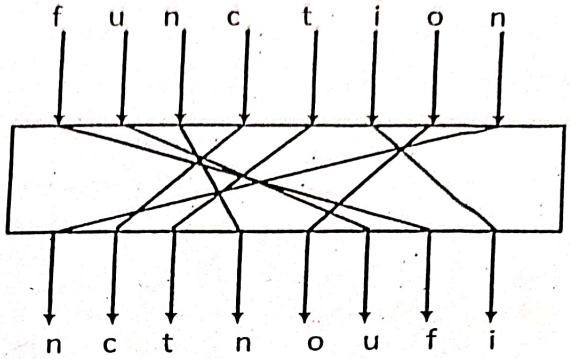
Roll No.....
B.Tech.(Computer Engg.)
(Sept. – 2019)

Paper Code: COE-201
Time: 1:30 Hours

Title of the subject: Data Structures
Max. Marks: 30

Note: Answer all questions.
Assume suitable missing data, if any.

1. Consider following diagram to rearrange characters of 8-char array (e.g. string



"function" is converted to string "nctnoufi".

(a) Design a suitable data structure (say 'X') and write function to perform this conversion.

(b) Write a function to find inverse of data structure 'X' such that string "nctnoufi" is converted back to "function" using this new structure.

(4+4=8 marks)

2. There is a singly linked list containing data sorted in non-decreasing order. There are two elements in this linked list which store similar data values. Write an algorithm to delete first node (out of two-containing equal values) which contains duplicate data value.

(5 marks)

3. Write an algorithm for returning value stored in k^{th} node (from end) of the singly linked list.

(5 marks)

4. Use a stack to test for balanced parentheses, when scanning the following expressions. Only consider the parentheses [,],(,),{,} . Ignore the variables and operators. Example inputs (valid balanced) are:
   (a) [a + { b / (c - d) + e / (f + g) } - h]
   (b) [a { b + [c (d + e) - f] + g }
   Write algorithm to test if given input string contains balanced parentheses.

(6 marks)

5. Let S be a stack of size $n \geq 1$. Starting with the empty stack, suppose we push the first n natural numbers in sequence, and then perform n pop operations. Assume that Push and pop operation take X seconds each, and Y seconds elapse between the end of one such stack operation and the start of the next operation.
   (a) For $m \geq 1$, define the stack-life of m as the time elapsed from the end of Push(m) to the start of the pop operation that removes m from S.
   (b) Compute the average stack-life of an element of this stack.

(6 marks)

Total No. of Pages:01
3RD SEMESTER
MID SEMESTER EXAMINATION

Roll No.....
B.Tech.(CSE)
(Sept – 2019)

CO 203: Object Oriented Programming

Time: 1:30 Hours **Max. Marks: 30**

Note: Answer all questions.
Assume suitable missing data, if any.

Q 1. Differentiate between characteristics of procedure-oriented programing and object-oriented programing languages. (4)

Q 2. List the operators that cannot be overloaded through member function and friend function. (3)

Q 3. What is inline function? Explain situations where inline expansion may not work. (3)

Q 4. Write a C++ program that adds two numbers belonging to different classes. Demonstrate the use of friend function in one class that is a member function of the second class. (5)

Q 5. Write a C++ program to keep a track of number of objects created, number of objects destroyed, and number of active objects in a program. (5)

Q 6. Explain virtual base class with suitable example. (5)

Q 7. Write a C++ program to add two complex numbers using classes and operator overloading. (5)

Total No. of Pages: 02 Roll No.....

THIRD SEMESTER B.Tech.(COE)

MID SEMESTER EXAMINATION SEP-2019

CO 205 Discrete Structures

Time: 1:30 Hours Max. Marks : 25

Note : Answer all questions.
Assume suitable missing data, if any.

Q.1 Let $P(x)$, $Q(x)$, $R(x)$ and $S(x)$ be the statements *"x is a baby", "x is logical", "x is able to manage a crocodile" and "x is despised" respectively.* Suppose that the domain consist of all people. Express each of these statements using quantifiers, logical connectives and $P(x)$, $Q(x)$, $R(x)$ and $S(x)$. (5)

a) Babies are illogical.
b) Nobody is despised who can manage a crocodile.
c) Illogical persons are despised.
d) Babies cannot manage crocodile.
e) Does d) follow from a), b) and c) ? If not, is there a correct conclusion?

Q.2 **[a]** In a class of 100 students, 39 play Tennis, 58 play Cricket, 32 play Hockey, 10 play Cricket and Hockey, 11 play Hockey and Tennis, 13 play Tennis and Cricket. How many students play

i. All 3 games
ii. Just one game
iii. Tennis and cricket and not Hockey?

[b] Find the conjunctive normal form of the function (3+2)

$$f = [x \wedge (y' \vee z)] \vee z'$$

Q.3 Show that $2^n > n^3, n \geq 10$ using mathematical induction. (5)

Q.4 [a] In how many ways can a team of 11 cricketers be chosen from 6 bowlers, 4 wicket keepers and 11 batsmen to give a majority of batsmen if at least 4 bowlers are to be included and there is one wicket keeper.

[b] Give a recursive algorithm for finding reversal of a bit string. (3+2)

Q.5 Find the explicit formula for the given recurrence relation with initial conditions $a_0 = 0, a_1 = 1$. (5)

$$a_r - 7a_{r-1} + 10a_{r-2} = 2r^2 + 2$$

Total No. Of Pages 02 Roll no.....
THIRD SEMESTER B.TECH (CO)
MID SEMESTER EXAMINATION September 2019

CO207 ENGINEERING ANALYSIS AND DESIGN (MODELLING AND SIMULATION)

Time 1:30 hours **Max. Marks: 25**

Note: All Questions are Compulsory. All Questions Carries Equal Marks. Assume suitable missing data ,if any:

Q1. J.M Bakers has to supply only 200 pizzas every day to their outlet situated in city bazaar. The production of pizzas varies due to the availability of raw materials and labour for which the probability distribution of production by observation made is as follows:

Production per day	196	197	198	199	200	201	202	203	204
Probability	0.06	0.09	0.10	0.16	0.20	0.21	0.08	0.07	0.03

Simulate the process for 15 days and find the average number of pizzas produced more than the requirement and the average number of shortage of pizzas supplied to the outlet. Random numbers for production per day for 15 days are 26, 45, 74, 77, 74, 51, 92, 43, 37, 29, 65, 39, 45, 95 and 93. (5)

Q2. Use Linear Congruential method to generate a sequence of 5 random numbers with given seed 27, increment 43, and constant multiplier 17, modulus 100. (5)

Q3. Write an analysis of when you feel simulation is required and when simulation is not required while evaluating real worlds system models giving an appropriate example of each. (5)

P.T.O.

Q4. Differentiate with example
i) Continuous and Discrete system
ii) Deterministic and Stochastic Simulation Models (2.5*2=5)

Q5. Explain Linear Congruential method. Write the different ways of achieving maximal period for different kinds of LCGs. (5)

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Total No. of Pages 2

Roll No. .....

FIFTH SEMESTER
MID SEMESTER EXAMINATION

B.Tech. (CSE)
(September-2019)

CO301 SOFTWARE ENGINEERING

Time: 1 Hour 30 Minutes *Max. Marks: 30*

Note: Answer all questions.
Assume suitable missing data, if any.

1. Answer the following questions briefly:

a) Discuss any two requirements elicitation technique with suitable example.

b) Differentiate between Verification and Validation.

c) As you move outward along the process flow path of the spiral model, what can you say about the software that is being developed or maintained?

d) Explain why incremental development is the most effective approach to developing business software systems. Why is this model less appropriate for real-time systems engineering?

[2+2+3+3=10]

2. Draw ER diagram and Level 1 DFD for automation of hotel management system also mention the requirements, which you have considered for a typical hotel management system.

[3+2=5]

3. Why do we feel that characteristics of requirements play a very significant role in the selection of a life cycle model? Also, discuss the selection process parameters for a life cycle model.

[2.5+2.5=5]

P.T.O. →

4. Can a system ever be "completely decoupled"? Can the degree of coupling be reduced so much that there is no coupling between modules? Also, explain the term cohesion in software. [3+2=5]

5. Discuss the advantage and disadvantage of the prototyping model over the evolutionary model for software development. [5]

----------END----------

Total No. of Pages 1

Roll No.....

V-SEMESTER
MID SEMESTER EXAMINATION

B.Tech.(COE)
Sept– 2019

CO-303 THEORY OF COMPUTATION

Time: 1:30 Hours

Max. Marks: 25

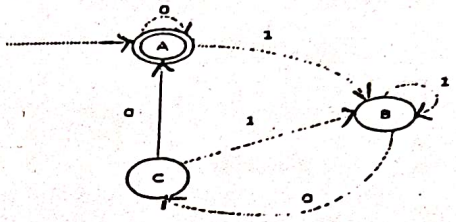
Note: Answer all questions. Assume suitable missing data, if any

Q.No. 1

2X4=08

A) Construct a Finite Automata(FA) for accepting strings o f 0's and 1's that contain equal numbers of 0's and 1's,and no prefix of the string should contain two more 0's than 1's or two more 1's than 0's.

B) What is Arden's theorem? Construct a regular expression(RE) corresponding to the following FA using Arden's theorem



Q.No. 2

2X4.5=09

A) Design Moore machine for input from $(0+1+2)^*$ print the residue mod 7 of the input string treating it as ternary (base 3, with digits 0, 1,2) number.

B) Construct FA for a regular expression $(0(00)^*1 + 01^*0)^*$ with and without null moves.

Q.No. 3

2X4=08

A) What is difference between moore and mealy machine? Construct a Moore Machine equivalent to given Mealy Machine as below

Present State	Next state	O/P	Next state	O/P
	Input=0		Input=1	
→q1	q2	A	q3	A
q2	q2	B	q3	A
q3	q2	A	q3	B

B) What is pumping lemma for regular language? Show that the language $L = \{ a^i b^j | \ i>j \}$ is not regular.

— 64 —

Roll No.....

Total No. of Pages 1

B.Tech. (CO)

5TH SEMESTER

(September – 2019)

MID SEMESTER EXAMINATION

CO 313 Computer Graphics

Max. Marks: 30

Time: 1:30 Hours

Note: Answer all the questions. Assume suitable missing data, if any.

Q1 (a) Discuss the advantages of Bresenham's over DDA line algorithm.

(b) Explain composite transformation.

(c) Discuss the uses of computer graphics. (2X3=6)

Q2 Derive the expression for midpoint circle generation algorithm along with diagram. 6

Q3(a) Digitize the points to draw a line using Bresenham's line drawing algorithm from (1,1) to (8,5).

(b) Derive the basic rotation matrix for both clockwise and anticlockwise direction. (3X2=6)

Q4 Perform a 60° rotation of triangle A(0,0), B(1,1) and C(5,2) (a) about the origin (b) about (-1, -1). 6

Q5 Write short notes: (3X2=6)

a) Random Scan vs. Raster Scan Display

b) Boundary Fill Algorithm

Total No. of Pages :03

5th SEMESTER

Roll No.....

MID TERM EXAMINATION **B.Tech.[ ]**

CO327 Machine Learning **Sept-2019**

Time: 1.5 hrs *Max. Marks: 30*

Note: Assume suitable missing data, if any.

Q.1 Tell whether the following statements are true or false. Justify your opinion.

(i) A classifier trained on less training data is less likely to overfit. (01)

(ii) Clustering is one method of density estimation. (01)

(iii) Deep learning is effective for small and medium sized real life problems. (01)

(iv) Selection of data analysis techniques depend on type of dependent variable. (01)

(v) It is difficult to achieve balance between bias and variance. (01)

Q.2 [a] Researchers looked at the effects of nutrition on reading ability. In Group A, children ate atleast 3 ounces of dark vegetables every day for 1 month. In Group B, children were fed their regular diet. At the end of month, the children took a reading comprehension test. Those who ate the green vegetables everyday for one month (Group A) did not vary in their test scores when compared to Group B. Identify independent variables and dependent variables with their respective measurement scales. (03)

[b] Identify variables as dependent/independent in following examples: (02)

(i) Physical activity and weight loss

(ii) Headache and aspirin

(iii) Muscle mass and weight training

(iv) Cancer and drug intake

Q.3 [a] You are a reviewer for the International Mega-conference on Algorithms for radical Learning of Outrageous Stuff, and you read papers with the following experimental setups. Would you accept or reject each paper? Provide one sentence justification: (03)

(i) "My algorithm is better than yours. Look at the training error rates!"

(ii) "My algorithm is better than yours. Look at the training error rates! (Footnotes: reported results for λ= 1.789489345672120002.)"
(iii) "My algorithm is better than yours. Look at the training error rates! Footnotes: reported results for best value of λ, chosen with 10-fold cross validation.)"
[b] Differentiate between supervised and unsupervised learning with the help of real life examples. (02)

Q.4 [a] Consider the following dataset:

PRICE	MAINTENANCE	CAPACITY	AIRBAG	PROFITABLE
Low	Low	2	No	Yes
Low	Med	4	Yes	No
Low	Low	4	No	Yes
Low	High	4	No	No
Med	Med	4	No	No
Med	Med	4	Yes	Yes
Med	High	2	Yes	No
Med	High	5	No	Yes
High	Med	4	Yes	Yes
High	High	2	Yes	No
High	High	5	Yes	Yes

Suppose we decide to construct a decision tree using binary splits and the Gini index impurity measure. Which among the following feature and split point combinations would be the best to use as the root node assuming that we consider each of the input features to be unordered?

(i) price - {low, med}|{high}
(ii) maintenance - {high}|{med, low}
(iii) maintenance - {high, med}|{low} (03)

[b] Highlight atleast two issues that we face in machine learning with their possible remedies. (02)

Q.5 The following dataset will be used to learn a decision tree for predicting whether a mushroom is edible or not based on its shape, color and odor.

SHAPE	COLOR	ODOR	EDIBLE
C	B	1	Yes
D	B	1	Yes
D	W	1	Yes
D	W	2	Yes
C	B	2	Yes
D	B	2	No
D	G	2	No
C	U	2	No
C	B	3	No
C	W	3	No
D	W	3	No

[a] What is entropy H(Edible|Odor=1 or Odor=3)? (02)
[b] Which attribute would ID3 algorithm choose to use for the root of tree? (02)
[c] Draw the full decision tree for this data (no pruning) using ID3 algorithm. (04)
[d] Suppose we have validation set as follows. What will be the training set error and validation set error of the tree? Express your answer as the number of examples that would be misclassified. (02)

SHAPE	COLOR	ODOR	EDIBLE
C	B	2	No
D	B	2	No
C	W	2	Yes

Total No. of Pages 02

FIFTH SEMESTER

Roll No. .....

B. Tech [University Elective]

MID SEMESTER EXAMINATION

Sept-2019

CO 357: Operating Systems

Time: 1.5 Hours

Max. Marks: 25

Note: 1) Answer all questions.
2) Assume suitable data, if any.

Q.1. a) Discuss the role of operating system in process management, memory management and storage management. [3]

b) Describe multiprocessor systems with its types. List the advantages of multiprocessor systems. [2]

Q2. a) How is interrupt different from a trap? [2]

b) How does multiprogramming increase the utilization of CPU? [3]

OR

b) What is the purpose of system programs? [3]

Q3. Explain process control block. With a neat diagram, show the use of PCB when CPU switch from one process to another. Does the CPU remain idle when it switch form one process to another? [5]

Q4. Consider the set of 6 processes whose arrival time and burst time are given below:-

Process ID	Arrival Time	Burst Time
P1	0	4
P2	1	5
P3	2	2
P4	3	1
P5	4	6
P6	6	3

If the CPU scheduling policy is Round Robin with time quantum = 2, calculate the average waiting time and average turnaround time. [5]

Q5. What is mutual exclusion? Two processes, P1 and P2, need to access a critical section of code. Consider the following synchronization construct used by the processes: Here, wants1 and wants2 are shared variables, which are initialized to false. Does it ensure mutual exclusion? Justify your answer. [5]

```
/* P1 */
while (true) {
 wants1 = true;
 while (wants2 == true);
 /* Critical
  Section */
 wants1=false;
}
/* Remainder section */
```

```
/* P2 */
while (true) {
 wants2 = true;
 while (wants1==true);
 /* Critical
  Section */
 wants2 = false;
}
/* Remainder section */
```

OR

Consider three processes, all arriving at time zero, with total execution time of 10, 20 and 30 units respectively. Each process spends the first 20% of execution time doing I/O, the next 70% of time doing computation, and the last 10% of time doing I/O again. The operating system uses a shortest remaining compute time first scheduling algorithm and schedules a new process either when the running process gets blocked on I/O or when the running process finishes its compute burst. Assume that all I/O operations can be overlapped as much as possible. For what percentage of does the CPU remain idle? [5]

-END-

Total No. of pages:1
FIRST SEMESTER
MID EXAMINATION

Roll No.
B. Tech.[CE]
SEPT-2019

CO 359 INTELLECTUAL PROPERTY RIGHT AND CYBER LAW

Time: 1 and 1/2 Hours **Max. Marks: 20**

Answer ALL Questions
Assume suitable missing data, if any

1. Discuss any three different kinds of intellectual property instruments under the Trade-Related Aspects of Intellectual Property Rights agreed by the WIPO 05

2. (a) Explain why intellectual property needs protection 02
(b) "Patent applications as gold mine of information" and "Patent as an instrument of rights and privileges" Support your answers for the statements 03

3. (a) Enumerate the advantages and disadvantages of Madrid system in India? 03
(b) What are not inventions within the meaning of the article 3? 02

4. (a) State and explain the strategic goals and core tasks of the World Intellectual Property Organization WIPO? 03
(b) Why is the admission criteria for the WIPO? 02

-70-

Total no. of pages 2 Roll No:..... .....

FIFTH SEM B.TECH(OPEN ELECTIVE)

MID SEMESTER EXAMINATION SEPTEMBER 2019

CO-361 DATABASE MANAGEMENT SYSTEM

Time: 1 Hour 30 min. Max. Marks : 25

Note : Answer all questions
Assume suitable missing data, if any.

Q1. (a) What is DBMS? What are the characteristics of DBMS? 3
(b) Explain levels of data abstraction. 2

Q2. (a) Draw E-R diagram "A football club has a name and a ground and is made up of players. A player can play for only one club and a manager, represented by his name manages a club. A footballer has a registration number, name and age. A club manager also buys players. Each club plays against each other club in the league and matches have a date, venue and score." 3
(b) Step by step map above ER model to relational Model. 2

Q.2 (a) Define the terms, with examples 2
(i) Entity Integrity
(iii) cardinality
(b) What is the role of DBA? Explain. 3

Q3. (a) Explain the foreign key concept in detail. 2
(b) Explain different data models. 3

Q4. Differentiate the following 5
(i) Candidate Key and Super key
(ii) weak entity and strong entity
(iii) 2-Tier and 3-Tier architecture
(iv) Schema and instance
(v) Multivalued and derived attribute

Q.5 (a) Define Relational Algebra. 5

Consider following relations

A

SID	PART
S1	P1
S2	P2
S1	P2

B

SID	NAME	CITY
S1	X	Delhi
S2	Y	Agra
S3	Z	Delhi

C

PART
P1
P2

Write the output relation with proper justification

(i) $\Pi_{SID\ (A)} \cap \Pi_{SID\ (B)}$

(ii) $A \div B$

(iii) $B \bowtie A$

(iv) $\Pi_{SID}\ (\sigma_{SID\ (city\ =\ 'DELHI')(B)})\ \cup\ \Pi_{SID(A)}$

Total no. of Pages: 01
Mid Term Examination
Seventh Semester

Roll no.....
Sep-2019
B.Tech.COE

Paper Code: CO405 Information and Network Security

Duration: 1.5 Hrs. **Max Marks: 30**

NOTE: Attempt all the questions. Assume the missing data if any.

Q1. Answer the following questions in brief (*any five*): (5x2=10)

a) What kind of threats exists for a cryptographic system?
b) What is steganography?
c) What are the problems associated with exchange of public keys?
d) What is the real crux of RSA?
e) How many Ex-OR operations are used in DES cipher?
f) Discuss the algorithm for Auto key Cipher.

Q2.a) Alice and Bob want to establish a secret key using the Diffie-Hellman key exchange protocol. Assuming the values as n=11, g=5, x=2 and y=3, find out the values of A, B and the secret key. (2)

b) Describe the Triple Data Encryption Standard with two DES Keys. (8)

Q3. a) Suppose that for a Hill cipher the plaintext is a multiplicative identity matrix (I). Find the relationship between the key and cipher text. Use the result of your finding to launch a chosen plaintext attack on the Hill cipher. (6)

b) Define the Chinese remainder theorem and its applications. (4)

END

Total No of Pages 02 Roll No.....

BTech Second Semester

MID SEMESTER EXAMINATION (Sep 2019)

Time: 1.5 hours Maximum Marks: 30

CO 407 Distributed Computing Systems,

Note: Attempt all Questions, Assume suitable missing data

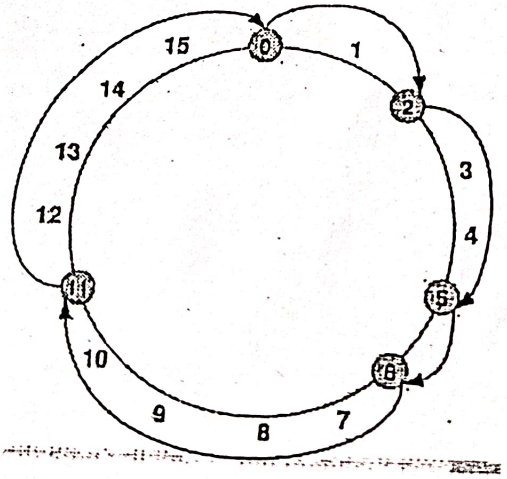
1. (a) What is a distributed system? What is the role of a middleware? How is it different from a parallel system? [3]
   (b) What are sensor networks and justify how they are part of distributed systems. [3]

2 (a) What are the requirements of scalability for distributed systems ? [3]
(b) Explain what is DNS and how it provides scalability with example? [3]

3 (a) Why must distributed applications use RPC? What are the challenges and advantages for RPC. [6]

4 (a) What are BitTorrent Systems? [3]
(b) What is a Application Multicast Tree? What are the metrics to create such a tree? [3]

5(a) Explain what is chord Peer to Peer system. For a chord Distributed system that shares data on the nodes



- H("Fatemeh") = 12
- H("Cosmin") = 2
- H("Seif") = 9
- H("Sarunas") = 14
- H("Tallat") = 4

Shaded nodes are active in the Chord logical ring. If the files have the above hashes generated from the DHT how will the files be stored on the nodes? [3]

(b) What is an endpoint address in a Berkley socket ? What sequence of calls will be initiated to create a TCP connection using Berkeley sockets on client and server? Why is TCP connection oriented? [3]

Total no. of Pages: 01 *Roll no.....*

Mid Term Exam **Sept-2019**
Seventh Semester **B.Tech.COE**
Paper Code:CO423 Swarm and Evolutionary Computing
Duration: 1.5 Hrs. **Max Marks: 25**

NOTE: Attempt all the questions. Assume the missing data if any.

Q1. What do you mean by global optimization? What is the disadvantage of using gradient decent for optimization problems? [2]

Q2. Explain the importance of multi objective optimization. [2]

Q3. Using genetic algorithm maximize $f(x)=x^2$ over {0, 1, 2, .., 31} with initial x values of {13,24,8,16}. Show one crossover and mutation operation. [3]

Q4. Explain GA with the help of an example. [3]

Q5. What is optimization and why is it required. Write the algorithm of Particle Swarm Optimization. What is the role of inertia weight in Particle Swarm Optimization? [5]

Q6. Explain various components of evolutionary algorithms. [5]

Q7. Explain Iterative Rule Learning Approach for Learning Classifier System. [5]

END

Total no. of Pages: 01 *Roll no.....*

Mid Term Exam **Sept-2019**
Seventh Semester **B.Tech.COE**
Paper Code:CO423 Swarm and Evolutionary Computing
Duration: 1.5 Hrs. **Max Marks: 25**

NOTE: Attempt all the questions. Assume the missing data if any.

Q1. What do you mean by global optimization? What is the disadvantage of using gradient decent for optimization problems? [2]

Q2. Explain the importance of multi objective optimization. [2]

Q3. Using genetic algorithm maximize $f(x)=x^2$ over {0, 1, 2, .., 31} with initial x values of {13,24,8,16}. Show one crossover and mutation operation. [3]

Q4. Explain GA with the help of an example. [3]

Q5. What is optimization and why is it required. Write the algorithm of Particle Swarm Optimization. What is the role of inertia weight in Particle Swarm Optimization? [5]

Q6. Explain various components of evolutionary algorithms. [5]

Q7. Explain Iterative Rule Learning Approach for Learning Classifier System. [5]

END

Total No. of Pages: 02

Roll No. .....

II Semester

B. Tech. [MC]

Mid Semester Examination

(Sept-2019)

CS 251 Data Structure

Time 1 h 30 min.

Max. Marks: 30

NOTE: *All questions are compulsory.*
Assume suitable missing data if any.

[6 marks]

Q1.

(a) Let A be a two-dimensional array declared as follows:

A: array[1...10] [1...15] of integer;

Assuming that each integer takes one memory location. The array is sorted in row-major order and the first element of the array is stored at location 100, what is the address of the element A[i][j]?

(b) Convert the given Infix expression into its equivalent Prefix and Postfix expression:

((A+B)^C)*(D-E)^(F/G))

(c) A single array A[1...MAXSIZE] is used to implement two stacks. The two stacks grow from opposite ends of the array. Variables top1 and top2 (top1<top2) point to the location of the topmost element in each of the stacks. What is the condition for "stack full"?

(d)What does the following function do for the given Linked Lists:

```
typedef struct node
{
   int data;
   node* next;
} node;
void join (node* m, node* n)
{
   node* p = n;
   while (p-> next ! = NULL)
   {
         p = p -> next;
   }
   p -> next = m;
}
```

(e) For a circular queue, write the condition for "QUEUE_FULL" and "QUEUE_EMPTY".

(f) What does the following fragment of C-program print:

```
char c[] = "FATE2019";
char *p = c;
printf("%s", p + p[3] - p[1]);
```

[3+3 marks]

Q2.

(a) Suppose you are given an array s[1...n] and a procedure reverse(s,i,j) which reverses the order of elements in between positions i an j (both inclusive). What does the following sequence do, where 1≤k≤n:

```
reverse(s,1,k);
reverse(s,k+1,n);
reverse(s,1,n);
```

Explain with the help of an example.

(b) Consider an array of integers that contains both positive and negative numbers. Write a program to find two elements whose sum is closest to 0.

[3+3 marks]

Q3.

(a) Queue is set up in a circular array A[O...n - 1] with front and rear defined as usual. Assume that n – 1 locations in the array are available for storing the elements (with the other element being used to detect full/empty condition). Compute a formula to find the number of elements in the queue in terms of rear, front, and n.

(b) Implement a Queue using two stacks.

Q4.

[3+3 marks]

(a) Convert following Infix expression into Postfix expression using stacks. Evaluate the resulting postfix expression too using stack.

5*6/2-4^3+8*5+7^2*2

(b) What is Recursion? Which data structure is used to perform recursion?. Explain with the help of an example.

Q5.

[3+3 marks]

(a) Consider a linked list which has a loop in it. Write a pseudocode to check whether this linked list is either NULL-terminated or ends in a cycle (cyclic).

(b) Write an algorithm to insert a node in the middle of a Doubly Linked List.

Total No. of Pages 2 Roll No. .....

THIRD SEMESTER **B.Tech. (EC)**

MID TERM EXAMINATION *Sept-2019*

EC-201 ANALOG ELECTRONICS-I

Time: 1:30 Hours *Max. Marks : 20*

Note: Answer all questions. Assume suitable missing data, if any. All abbreviations have their usual meaning.
Unless otherwise stated, use: kT/q = 25 mV at room temperature (300K), $n_i = 1.5 \times 10^{10}$ / cm^3 for silicon at room temperature and $\varepsilon_{si} = 10^{-12}$ F/cm, Si has 5.0×10^{22} atoms/ cm^3, $\mu_n = 1500$ cm^2/V-s.

Q1. [a] Determine the current flowing through 4 kΩ resistor and the voltage drop across points A and B in the circuit shown in Fig.1. Assume that the diode is represented by $V_F = 0.7V$ and $R_F = 0$. 2

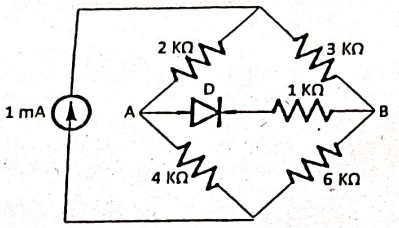


Fig. 1

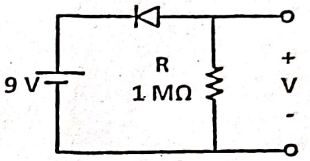


Fig. 2

[b] For the circuit shown in Fig.2 if V=1 V at 20^0 C find the value of V at 40^0 C. 2

Q2. [a] You are given a step graded pn junction diode with heavily doped n-type region as compared to p- type region. The junction area is given as 10^{-4}cm^2. You have access to a capacitance-voltage measurement system and have measured following data:

V	C
-1.0 V	0.68 pF
0 V	1 pF

Using the measured data calculate the built-in potential for this diode and the depletion width at thermal equilibrium. 2

[b] If in a Si substrate donor type impurity is added to the extent of 1 part in 10^8 Si atoms, find the resistivity of the doped Si. 2

Q. 3. For the circuit shown in Fig.3 assume $V_F = 0.7$ V and $R_F = 0$ for the diode.

[a] Obtain the voltage transfer characteristic; 2

[b] Plot the output voltage for Vs = 10 sin ωt. 2

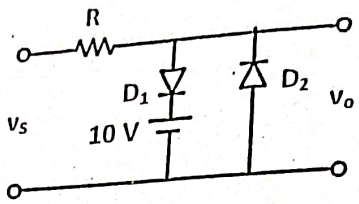


Fig.3

Q. 4. [a] Design a diode clamper circuit to negatively clamp a 20V peak to peak (V_{pp}) symmetrical square wave at 4 V. Determine the average value of the clamped output. 2

[b] A Zener regulator is required to maintain the load voltage at 12V for all load currents between 0 and 200 mA. The unregulated source voltage (V_s) is 16V and the Zener diode provides regulation for $I_Z > 0$. Calculate the source resistance (R_s) needed and the power dissipation rating of Zener diode. 2

Q. 5. A full wave center tapped rectifier is to be designed to provide an average output of 20V when driven by 220V, 50 Hz AC mains. Select a suitable transformer turns ratio and load resistance (R_L) so that the peak current (I_m) does not exceed 31 mA. Draw the voltage wave forms across the diodes and also determine the RMS value of AC component of the load current. 4

Total No. of Pages 02 *Roll No. .....*

THIRD- SEMESTER
MID SEMESTER EXAMINATION

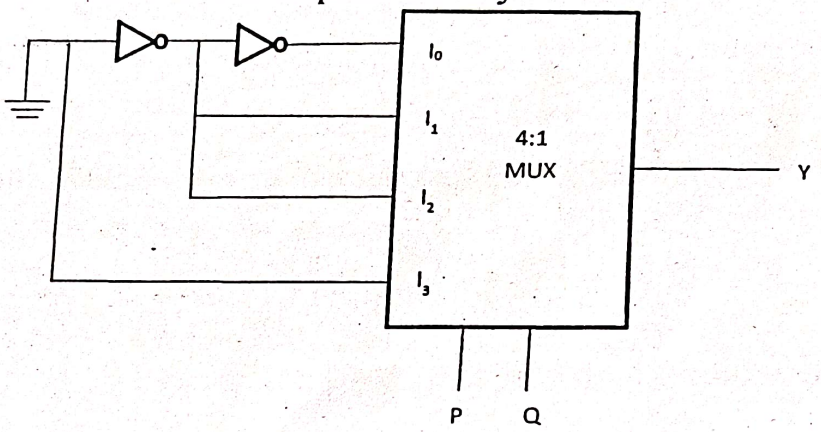
B.Tech(EC)
SEPT-2019

EC203 [DIGITAL DESIGN-1]

TIME: 1.5 Hrs **Maximum Marks:20**

Note: Attempt all questions. Assume suitable missing data if any.

1. Answer the following questions: **(1.5*10=15)**
   a) Consider the operation 24+17=40. Find the correct base of the number so that the operation is correct.
   b) Find 2's complement representation for $(-17)_{10}$, $(-8)_{10}$ using minimum number of bits.
   c) Implement the function F=(X'+Y') (Z+W) using four two input NAND gates.
   d) Implement Z=AB'C using 2 input NAND gates.
   e) Find the function implemented by:



   f) Implement F=AB'C+ABC' using two 2:1MUX.
   g) Minimize Y=A'B'C'+A'BC'+A'BC+A'BC' using Boolean algebra.
   h) In a logic equation if P=[X+Z{Y'+(Z'+XY')}].{X'+Z'(X+Y)}=1 for X=1, then find the values for Y&Z.
   i) If Y=∑m (0,1,2,6,8,10,11), then find out the essential prime implicants.
   j) What is canonical form of SOP & POS for three variables A, B, C.
2. Answer the following questions: **(2.5*2=5)**

P.T.O.

a) Design a combinational circuit using three inputs X, Y, Z and three outputs P, Q, R. If the input XYZ is in the range 000 to 011 the output of the logic circuit is equal to +2 to input three bit binary numbers XYZ and if the input range is 100 to 111 the output is equal to -3 to the input XYZ for the range.

b) Find the minimized POS form for the logic expression $Y=\sum m(0,2,3,6,7,10,11,14,15)$ with m_{12} as don't care using Tabular method.

Total no. of pages: 02 — 82 — Roll No:.....

THIRD SEMESTER B.Tech (ECE)
MID SEMESTER EXAMINATION SEPTEMBER-2019

EC-205 SIGNALS AND SYSTEMS

TIME: 1.5 Hrs. Maximum Marks:20

Note:- Attempt all the questions. All the questions carry equal marks. Assume suitable missing data, if any.

Q1.(i). Determine which of the following properties is followed by the continuous-time system $y(t)$ for an input $x(t)$ [2]

a) Time invariant
b) Linear
c) Causal
d) Stable

where $y(t) = [\cos(3t)]x(t)$

(ii). Find out the energy and power for $x(t)$ and determine whether it is energy signal or a power signal. [2]

$$x(t) = e^{j(2t + \pi/4)}$$

Q2. (i). Determine whether the sequence given by [2]

$$x[n] = \sum_{k=-\infty}^{\infty} \{\delta[n-k] - \delta[n-1-k]\}$$

is periodic or not. If yes, then find out its fundamental period.

(ii). Define the following basic continuous-time signals [2]

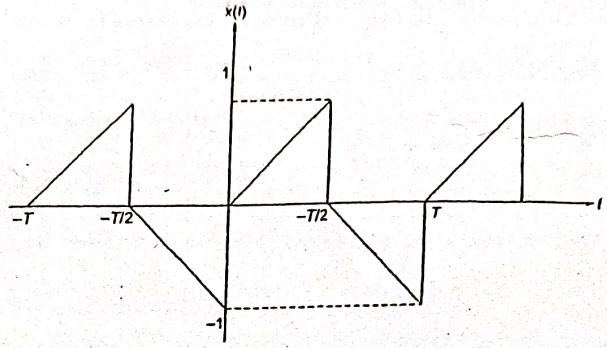
a) Unit Impulse signal
b) Unit step signal

Q3. Let $h(t) = (1-|t|)[u(t+1)-u(t-1)]$ be the impulse response and let $x(t)$ be the input given by $x(t) = \delta_T(t) = \sum_{n=-\infty}^{\infty} \delta(t-nT)$ [2+2]

for an continuous time LTI system.
Determine and sketch $y(t) = x(t) * h(t)$ for the following values of T

a) $T = 3$, b) $T = 1.5$

Q4. Determine the Fourier series of the signal shown in the figure below and let $T = 2$. [4]



Q5. Consider a periodic signal with period $T = 2$. [4]

$$x(t) = \begin{cases} 1, & 0 \le t \le 1 \\ -2, & 1 < t < 2 \end{cases}$$

The derivative of this signal is related to the "impulse train"

$$g(t) = \delta_T(t) = \sum_{k=-\infty}^{\infty} \delta(t-kT)$$

It can be shown that

$$\frac{dx(t)}{dt} = \lambda_1 g(t-t_1) + \lambda_2 g(t-t_2)$$

Determine the values of λ_1, λ_2, t_1 and t_2.

** Good Luck**

Total No. of Pages 2

— 84 —

Roll No. .....

THIRD SEMESTER

B.Tech. (EC)

MID SEMESTER EXAMINATION

September-2019

EC-207 Engineering Analysis and Design

(Network Analysis & Synthesis)

Time: 1 Hour 30 Minutes

Max. Marks: 25

Note: Answer any Five questions. Assume suitable missing data, if any. Use the answer sheet space judiciously.

1[a] Determine v_x in the circuit of Fig.1(a) 3

1[b] Find the Thevenin's equivalent for the network of Fig. 1(b) 2

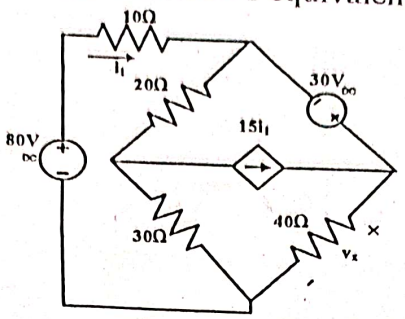


Fig.1(a)

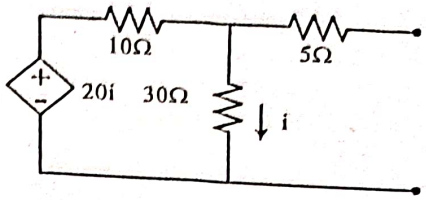


Fig.1(b)

2[a] Find voltage v_1 using superposition in the circuit shown in Fig.2(a). 3

2[b] For the network shown in Fig.2(b), what should be the value of resistance connected between a and b for maximum power to be transferred from the sources? Obtain the maximum power transferred. 2

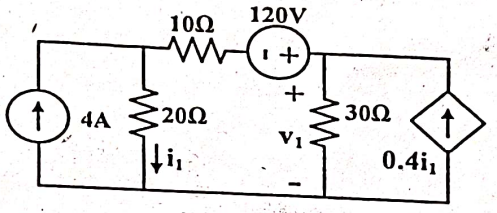


Fig.2(a)

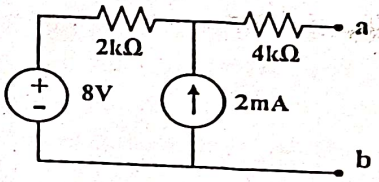


Fig.2(b)

3 For the RL circuit of Fig.3, find an expression for $v_R(t)$ and $i_L(t)$ valid for all time. 5

4 In the Fig.4, the switch K is opened and circuit reaches a steady state. At t=0 the switch K is closed. Evaluate node voltage $v_a(t)$ and inductor current $i_L(t)$ expressions valid for all time. 5

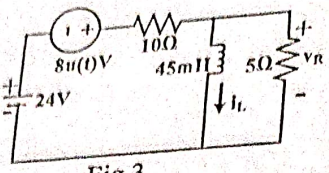


Fig.3

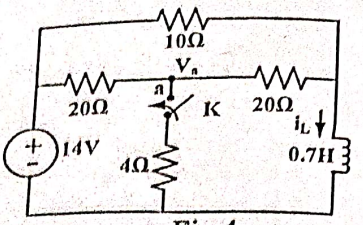


Fig.4

5 In the circuit of Fig.5, switch is changed from position a to b at t=0. Find $v_c(t)$ and i(t) for all time . 5

6 For the circuit of Fig.6, at t=0 the switch K is closed. Find expressions for $v_c(t)$ and $v_L(t)$ for all t. 5

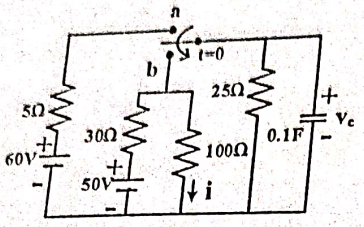


Fig.5

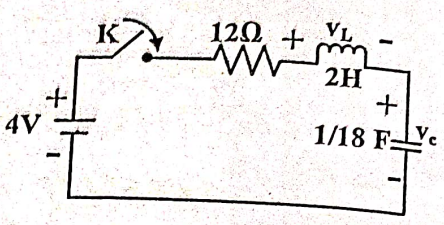


Fig.6

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Total No. of Page-1 *Roll No.....*

3rd Semester B.Tech. (CE)

MID SEMESTER Examination September, 2019

EC 251 Basic Electronics & Instrumentation

Time: 1hr 30min Max. Marks: 30

Note: Answer all Questions. Assume suitable missing data, if any.

1(a). (1) Why is silicon preferred over germanium in the manufacture of semiconductor devices? (5)

(2) What does the arrow head represent in the schematic symbol of a p-n junction?

(3) What are the two mechanisms of breakdown in a p-n junction? .

(4) Name the breakdown mechanism in a lightly doped p-n junction under reverse biased condition.

(5) Is reverse saturation current of a diode is independent of reverse bias voltage?

(b) Create a difference table between p-n diode and Zener diode. (5)

2.(a) Simplify the following Boolean function by using Quine-McCluskey Minimization technique

$F(W,X,Y,Z)=\sum m(0,3,5,6,7,10,12,13)+\sum d(2,9,15)$ [6]

(b) Design Full Adder and Implement it using two half adders. [4]

3. **(a)** Explain in detail hall effect transducer and also derive the expression for calculating the expression for: **Majority carrier concentration** for p-type, n-type and intrinsic semiconductor. [5]

(b) Draw and explain the working of capacitive transducer. [5]

Total No. of Pages:2 — 87 Roll No. .....

B.Tech. (CO/SE/IT)
MID SEMESTER EXAMINATION

THIRD SEMESTER
(September –2019)

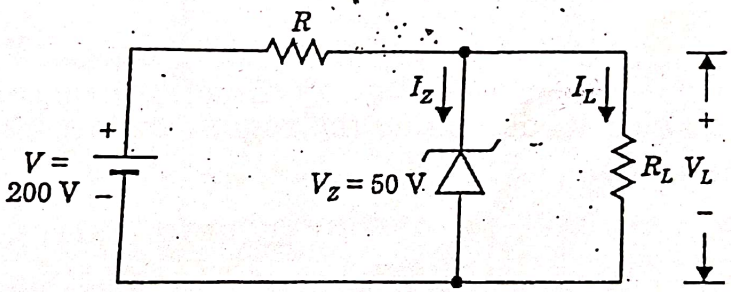
EC-261 Analog Electronics

Time: 1.5 Hours Max. Marks: 30

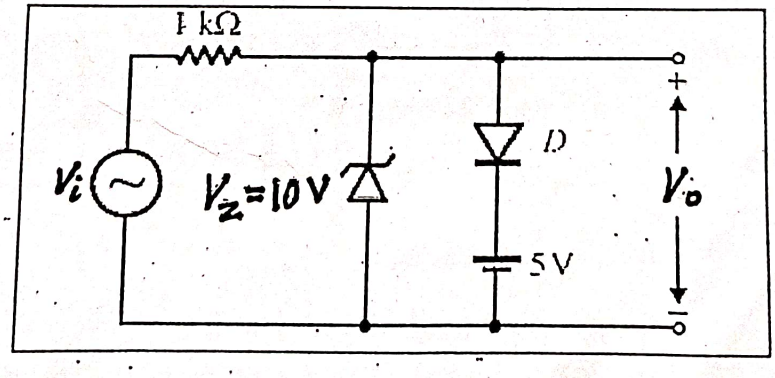
Notes:-
1. Answer *ALL* the questions.
2. Assume suitable missing data, if any.

1[a] Resistivities of the two sides of a step graded Silicon junction are 5 Ω cm (p-side) and 2.5 Ω cm (n-side). Calculate the height of the potential barrier V_o. Assume $\mu_p = 475$ cm^2/Vs and $\mu_n = 1500$ cm^2/Vs at the room temperature of 300 K and $n_i = 1.45 \times 10^{10}$ atoms/cm^3. (3)

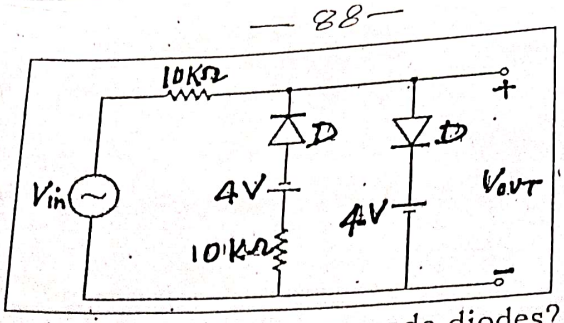
[b] For the given circuit, I_Z range is 5 to 40 mA. Determine (i) the value of R to allow voltage regulation for a load current, $I_L = 0$ to I_{Lmax}. (ii) Now considering values of R and I_Z as from (i) and $I_L = 25$ mA, what are the limits between which V may vary without loss of regulation. (4)



2[a] For the clipper circuit shown below, assuming forward voltage drop of the diodes to be 0.7 V, draw the input-output transfer characteristics. Explain the all steps. (4)

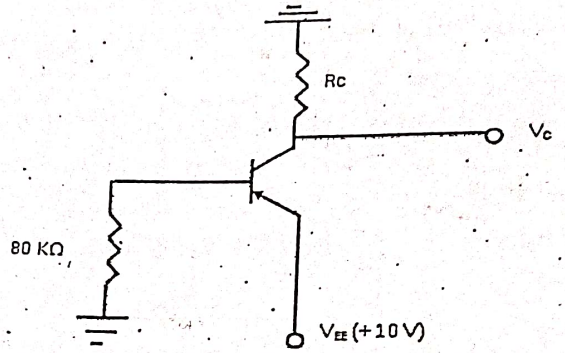


[b] A voltage signal 10sinωt is applied to the circuit with ideal diodes, as shown in figure. Determine the maximum and minimum values of the output waveform V_{out} of the circuit. (3)



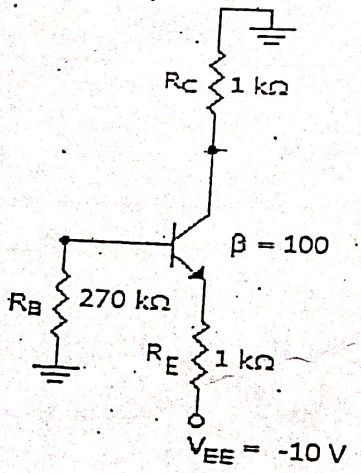
3[a] Why a transistor is not equal to two cascade diodes? Using Ebers Moll Model, find the expressions of I_C and I_E for BJT operating in reverse active mode. (4)

[b] For given circuit $\beta_F = 50$. Find the value of Rc to obtain Vc = + 5 V. What happen if transistor is replaced with another transistor having $\beta_F = 100$?



(4)

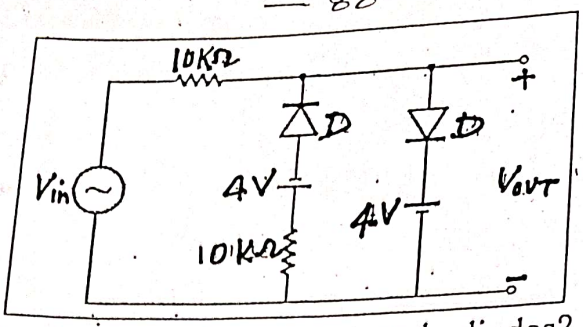
4[a] For the given circuit, determine the region of operation and the values of I_B, I_C, I_E and V_{CE}. (4)



[b] Derive the formula of 'I_{dc}' and 'I_{rms}' for half wave rectifier. A full wave rectifier has a load of 5 KΩ. The AC voltage applied to diode is (240-0-240) volt. If diode resistance is negligible, calculate

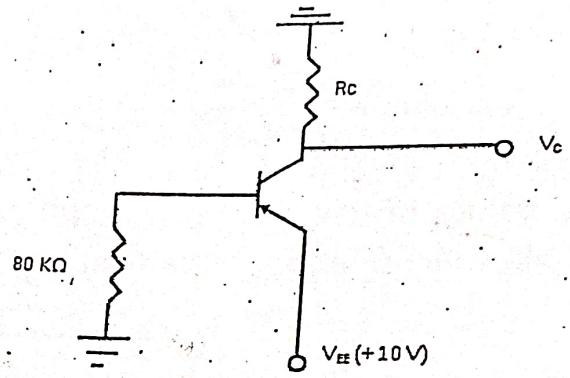
I. RMS value of output current
II. Average value of output current

(4)



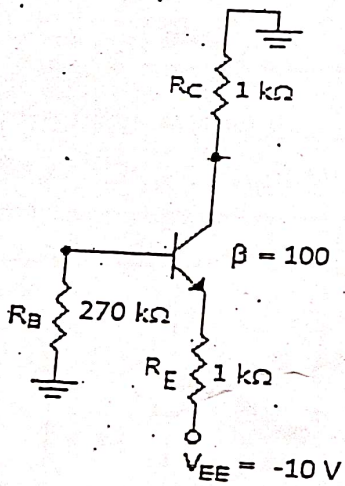
3[a] Why a transistor is not equal to two cascade diodes? Using Ebers Moll Model, find the expressions of I_C and I_E for BJT operating in reverse active mode. (4)

[b] For given circuit $\beta_F = 50$. Find the value of Rc to obtain Vc = + 5 V. What happen if transistor is replaced with another transistor having $\beta_F = 100$?



(4)

4[a] For the given circuit, determine the region of operation and the values of I_B, I_C, I_E and V_{CE}. (4)



[b] Derive the formula of 'I_{dc}' and 'I_{rms}' for half wave rectifier. A full wave rectifier has a load of 5 KΩ. The AC voltage applied to diode is (240-0-240) volt. If diode resistance is negligible, calculate

I. RMS value of output current
II. Average value of output current

(4)

Total No. of Pages: 2 — 89 — Roll No. .....

B.Tech. (PS&CT) THIRD SEMESTER
MID SEMESTER EXAMINATION (September –2019)

EC-271 Basic Electronics Engineering

Time: 1.5 Hours *Max. Marks: 30*

Notes:-

1. Answer *ALL* the questions.
2. Assume suitable missing data, if any.

Q.1

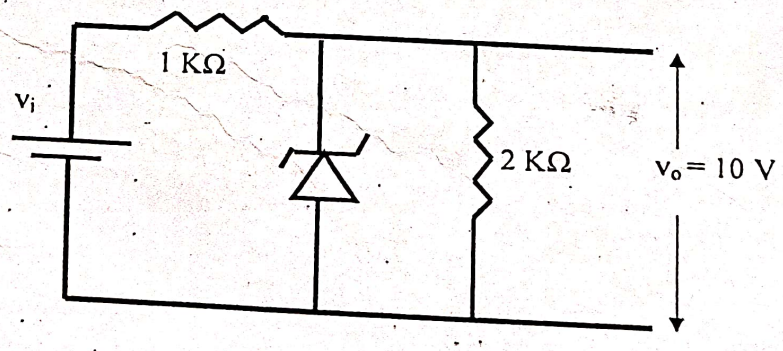
[a] Derive the formulae for electron concentration, hole concentration and barrier potential in step graded p-n junction diode. (4)

[b] Calculate the potential difference of step-graded p-n junction diode at room temperature if it is doped with N_A corresponding to 1 acceptor atom per 10^5 Si atoms and N_D corresponding to 1 donor atom per 10^6 Si atoms (Silicon has 5×10^{22} atoms/cm^3 and $n_i = 1.5 \times 10^{10}$/cm^3). (3)

Q.2

[a] Explain physical mechanism which produces (i) avalanche breakdown (ii) zener breakdown. (4)

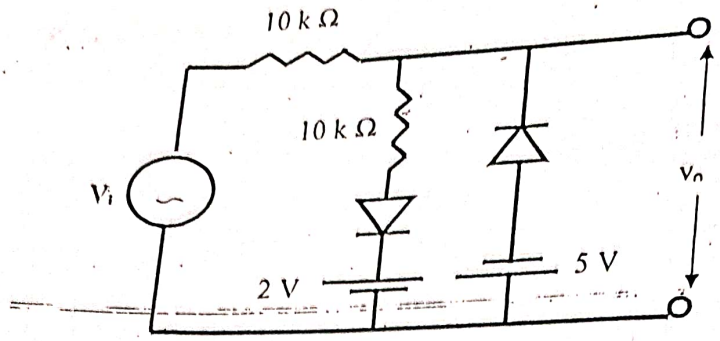
[b] Calculate the range of input voltage 'V_i' for given circuit with constant output voltage and range of zener current = (10-15) mA. (3)



Q.3

[a] Why a transistor is not equal to two cascade diodes? Justify. Explain Ebers Moll Model of BJT. (4)

[b] Find the output voltage for given clipper circuit if $V_i = 10$ Sin (ωt) Volts. (4)

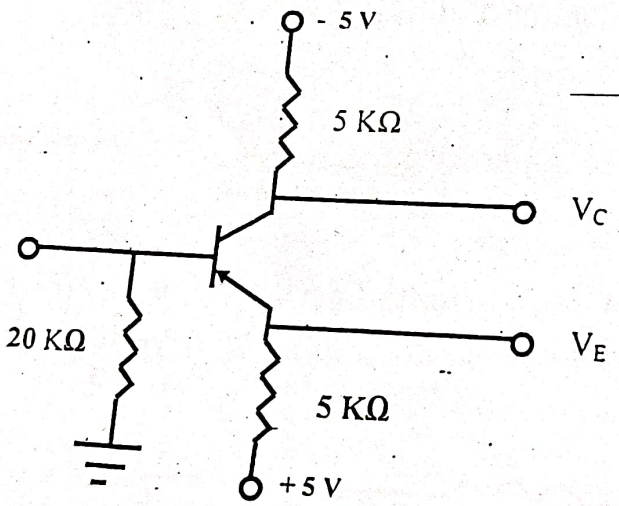


Q.4

[a] Define 'α' and 'β' for transistor. Prove that α is always less than unity and

$$\beta = \frac{\alpha}{1-\alpha} \qquad (3)$$

[b] Calculate V_B, V_C, α and β for given circuit if $V_E = 1$ V and $|V_{BE}| = 0.7$V (5)



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FIFTH SEMESTER

B.Tech. (EC)

MID SEMESTER EXAMINATION
SEPTEMBER (2019)
EC-301 DIGITAL COMMUNICATION

Time: 1.5 Hours

Max. Marks: 20

Note: Answer ALL questions. All questions carry equal marks. Assume suitable missing data, if any.

1(a) Plot the spectrum of a PAM produced by the modulating signal $m(t)=A_m\cos(2\pi f_m t)$ assuming a modulating frequency $f_m=0.25$ Hz, sampling period $T_s=1$s and pulse duration $T=0.45$ s.

(b) Using an ideal reconstruction filter, plot the spectrum of the filter output.

2(a) Draw a DPCM transmitter and receiver diagram and explain.

(b) In a PCM system, the signal to quantization noise ratio is to be held to a minimum of 40 dB. Determine the number of required levels.

3(a) A speech signal has a total duration of 10s. It is sampled at the rate of 8 kHz and then encoded. The signal to quantization noise ratio is required to be 40 dB. Calculate the minimum storage capacity needed to accommodate this digitized speech signal.

(b) Describe TDM system with block diagram,

4. Using n-bit binary PCM, a message signal which is uniformly distributed between $-X_{max}$ and $+X_{max}$ is transmitted. Show that the signal to quantization ratio obtained is 6n dB.

5. A message signal with a dynamic range of -16V to +16V is non uniformly quantized using a μ-law compressor with μ=255 and 64 quantization levels. Assume the quantizer is fully loaded. Determine

a] the interval between two consecutive levels if no compression is used. [1]

b] the minimum interval [smallest step size] and maximum interval [largest step size] between consecutive levels, if compression is used. [3]

Total No. of Pages 2

Roll No. .....

FIFTH SEMESTER

B.Tech. (ECE)

MID SEMESTER EXAMINATION

(SEPT.-2019)

EC303 LINEAR INTEGRATED CIRCUITS

Time: 1 Hour 30 Minutes *Max. Marks: 20*

Note: Answer *ALL* questions. Assume suitable missing data, if any.

Q1.(a) Design an inverting op-amp circuit to form the weighted sum V_0 of two inputs V_1 and V_2. It is required that $V_0 = -(V_1 + 5V_2)$. Choose values for R1, R2 and rf so that for maximum output voltage of 10 V the current in the feedback resistor will not exceed 1 mA. (2.5)

(b) In the Fig.1 shown below, assume diodes and OP-AMP are ideal. Sketch the transfer characteristic curve for the given circuit. (2.5)

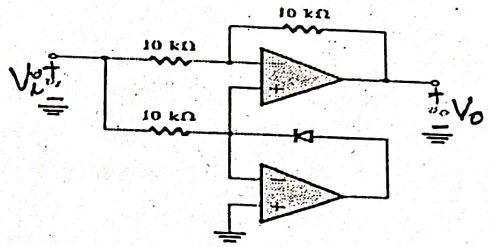

Fig.1

Q2. For the Tow- Thomas biquad circuit shown in Fig.2, design a second order bandpass filter with f_0= 10 KHz, Q=2, and unity center-frequency gain. If R=10kΩ , give the values of C, R_d and R_g. (5)

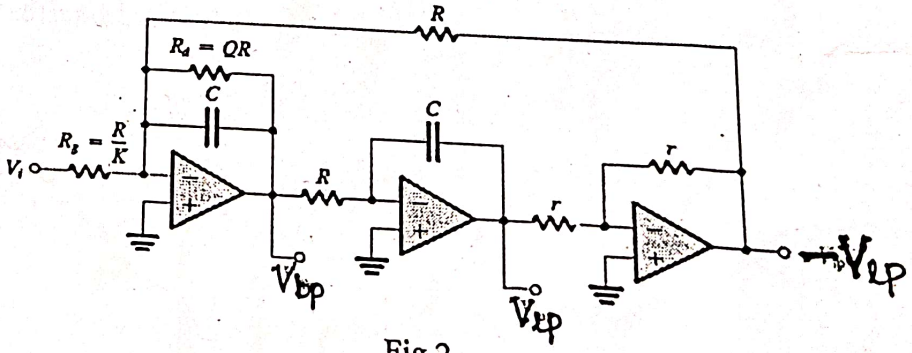

Fig.2

Q3. Design a differentiator to have a time constant of 10^{-2} s and an input capacitance of 0.01μF. What is the gain magnitude and phase of the circuit at 10 rad/s, and at 10^3 rad/s? In order to limit the high frequency gain of the differentiator circuit to 100, a resistor is added in series with the capacitor. Find the required value of the capacitor. (5)

Q4. Determine the operation implemented by the circuit shown in Fig.3 for v_1, $v_2 > 0$. Assume all diodes to be identical, with 700-mV drop at 1-mA current. (5)

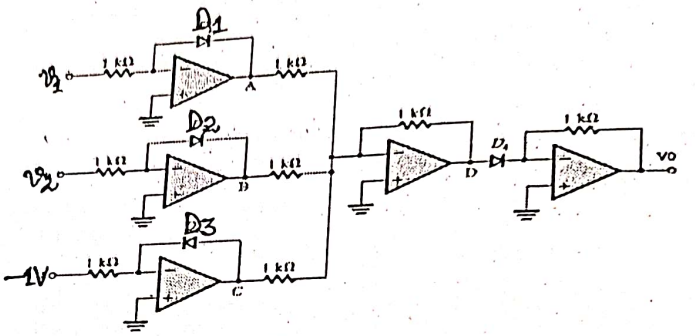

Fig.3

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Total No. of Pages 02 *Roll No. .....*

FIFTH SEMESTER **B.Tech. (EC-313)**

Mid semester Examination ***(SEP-2019)***

EC313 MICROPROCESSOR AND INTERFACING

Time: $1\frac{1}{2}$ Hour **Max. Marks: 20**

Note: Attempt All questions. Assume suitable missing data, if any.

1	a.	Draw the timing diagram of following instruction 5000 H: JMP 7050 H Explain all machine cycles	2
	b.	How many Software and Hardware interrupts are there in 8085 Processor? Name them.	2
2	a.	Design an interfacing circuit to connect 4KB ROM, 2KB ROM and 8KB RAM to 8085 without any fold back memory with address starting from 1000H, 2000H and 8000H respectively	4
3	a.	Name the interfacing pins and its function through which the coprocessor can understand the current operation status and the current segment of 8086 working in maximum mode.	2
	b.	Explain following assembler directives with example i. LENGTH ii. EVEN	2
4		DS = 1000H, SI=5000H, DI = 3000H, ES = 6000H BX = 2050H, CS = 5000H i. MOVS NUMBER Identify addressing mode and calculate the source and destination address of the string 'NUMBER' ii. JMP [BL + 25H] Identify addressing mode and calculate the branch address	4

5 a. Write an assembly language program using 8085 to find largest number among 4 eight bit numbers placed at consecutive locations starting from 2000H 2

b. Write an assembly language program using 8085 to add 5 sixteen-bit numbers placed at location starting from 2000H. Store results at 3000H and 3001H 2

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Total No. of pages: 1 — 96 — Roll No..... .....

Fifth Semester B. Tech. (ECE)

MID SEM EXAM Sep 2019

EC315: COMPUTER COMMUNICATION NETWORKS

Time: 1 Hour 30 min **Max. Marks: 25**

Note: Attempt all questions.

Assume suitable missing data, if any.

1. Explain B2C, B2B, G2C, C2C and P2P with examples. [5]
2. Explain PAN, LAN, MAN, WAN and the Internet. [5]
3. Compare data link layer and network layer of OSI model with respect to their functions / responsibilities. [5]
4. Differentiate between TCP and UDP w.r.t. TCP / IP model. [5]
5. Explain ARP, RARP, ICMP, IGMP and FTAM. [5]

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-97-

Total No. of Pages 2

Fifth SEMESTER

MID SEMESTER EXAMINATION

Roll No. .....

B.Tech. [ECE]

(SEPT.-2019)

EC323 CONTROL SYSTEMS

Time: 1 Hour 30 Mins *Max. Marks: 25*

Note: Answer *ALL* questions. All questions carry equal marks
Assume suitable missing data, if any.

Q1. Obtain the transfer functions C(s)/R(s) of the system shown in Fig.1.

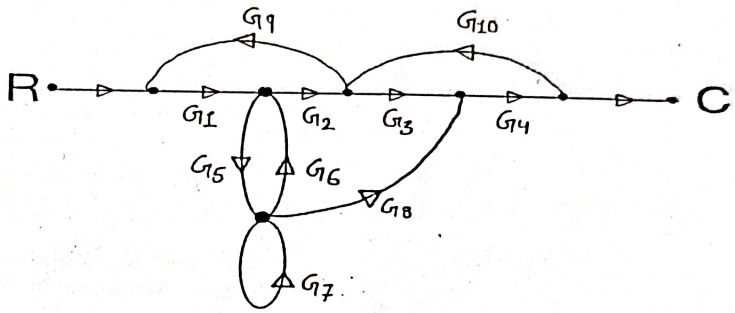

Fig.1

Q2. For the system shown in the block diagram of Fig.2, determine the values of gain K_1 and velocity feedback constant K_2 so that the maximum overshoot with a unit step input is 0.25 and the time to reach the first peak is 0.8 sec. Thus, obtain the rise time and settling time for 5% tolerance band.

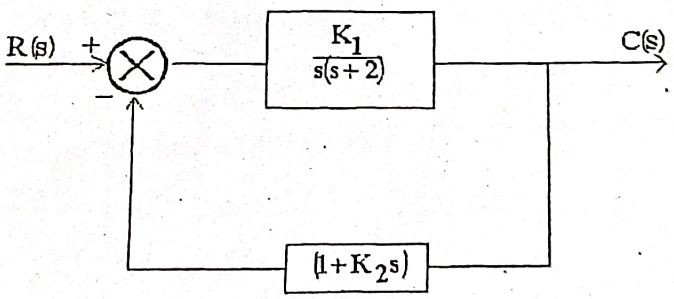

Fig.2

Q3. Discuss the special cases of Routh Hurwitz criteria and determine the number of roots to the right of the vertical axis located at s = -2 for the following characteristic equation

$$s^4 + 10s^3 + 35s^2 + 50s + 24 = 0.$$

Q4. The characteristic equation of a negative unity feedback system is given as :

$$q(s) = 1 + \frac{(s+\alpha)}{(s+4)} \frac{K}{s(s+2)(s+4)} = 0 \; ; \; H(s) = 1 \; ; \; \alpha, K > 0$$

(i) Determine the range of 'K' and 'α' for the system to be stable.

(ii) Suggest suitable values of 'α' and 'K' so that the steady state error e_{ss} for unit ramp input $R(s) = \frac{1}{s^2}$ lies $15\% < e_{ss} < 20\%$.

Q5. The open-loop transfer function of a unity feedback system is given by

$$G(s) = \frac{K}{(s+2)(s+4)(s^2+6s+25))}$$

Find the values of K which will cause sustained oscillations in the closed-loop system. What are the corresponding oscillation frequencies?

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Total No. of Pages :02 Roll No.....

SEMESTER-5TH B.Tech

MID SEMESTER EXAMINATION September-2019

EC-353 Computer Vision

Time: 1.5 Hours Max. Marks : 25

Note : Answer all five questions.
All questions carry equal marks.
Assume suitable missing data, if any.

Q. No. 1 (a) In a binary image, Let the part of image be represented as X= {1,0,1,0,0,1,1,1,1}. Compute the Ensemble Average & Variance if X follows Bernoulli Distribution. Compare it with Ensemble Average & Variance, considering Binomial distribution. (2.5 M)

(b) Write Bayes Law, for two hypothesis H= $\{H_0, H_1\} = \{-1, +1\}$. Let the given video sequence be corrupted by White Gaussian noise. Y is the noisy signal and X is original signal. Write the expression for log [p (Y /H_1)] and log[p(Y/H_0)]. (2.5 M)

Q. No. 2 (a) Let a video sequence frame be corrupted by the blur having Gaussian impulse response, having zero mean & σ^2 as variance. Assume camera and other noises to be equal to zero. Draw block diagram & derive the expression for the blurred image. (2.5M)

(b) Let s(n) be the original signal, d(n) is the desired signal and w(n) is noise. Write the design concept of Wiener filter. Also compute the impulse response of the wiener-optimum filter when (2.5M)

d(n) = s(n+D) & d(n) = s(n-D). (1 M)

Q. No. 3 (a) Where can we use convex-hull algorithm.

(b) Is it true/ false: - (1.5 M)

(i) erode (dilate(s)) = S

(ii) if erode(s) ≠ Null

(c) Let

$$A = \begin{bmatrix} 1 & 1 & 1 \\ 0 & 1 & 0 \\ 1 & 1 & 1 \end{bmatrix} \qquad S = \begin{bmatrix} 2 & 0 & 0 \\ 0 & 2 & 0 \\ 0 & 0 & 2 \end{bmatrix}$$

Compute the y=S(A) where S is a scaling operator. (2.5M)

Q. No. 4 (a) Let N=4, compute the kernel matrix of Cosine Transform for u = {0,1,2,3} & x = {0,1,2,3}; x is input variable & u is the transformation variable. (2.5M)

(b) Let $x = \begin{bmatrix} x_1 \\ | \\ x_N \end{bmatrix}$, A be transformation matrix, Compute H_y (Hotelling transform) of x where all values of vector x are uncorrelated. (1.5M)

(c) Write about the few applications of Histogram equalisation. (1M)

Q. No. 5(a) What is Lateral histogram. Compare the time complexity of lateral histogram with sub-Image. Comment on it. (2.5M)

(b) Assume any 6x6 image gray level matrix. Apply Sobel & prewitt edge operators to compute output. (2.5M)

Total No. of Pages 01 *Roll no .....*

V^th Semester B.Tech.

Mid Term Examination Sep- 2019

EC357 Digital Image Processing

Time: 1½ Hours **M. Marks: 25**

Note: Attempt all questions.

I. (a) Define the following
(i) Image Enhancement and Restoration
(ii) Spatial and Intensity Resolution
(iii) Sampling and Quantization
(iv) Smoothing and Sharpening
(v) Correlation and Convolution [5]

(b) Determine the energy corresponding to visible spectrum ($\lambda = 0.4\times10^{-6}$ *to* 0.7×10^{-6} *meters*). [2]

II. (a) Derive the expression for Histogram Equalization Transformation. [4]

(b) You are given an image with three bits per pixel. Obtain the equalized histogram for the image with the following histogram;
The image has 0,1,2,3,4,5,6, and 7 gray-level values and the corresponding number of pixels are 10,8,9,2,14,1,5, and 2 respectively. Show both the histograms also. [6]

III.(a) Write short notes on (i) Contrast Stretching (ii) Bit Plane Slicing [4]

(b) Show that subtracting the Laplacian from an image is proportional to unsharp masking. [4]

-102-

Total No. of Pages 2 Roll No. .....

FIFTH SEMESTER **B.Tech.**

MID TERM EXAMINATION **Sept-2019**

EC361 ANALOG CIRCUITS-DESIGN TO LAYOUT

Time: 1:30 Hours *Max. Marks: 15*

Note: Answer all questions. Assume suitable missing data, if any. All abbreviations have their usual meaning.

Q1. [a] An NMOS device operating in saturation with $\lambda = 0$ must provide a transconductance of 1/(50Ω). If $\mu_n C_{ox} = 200\mu A/V^2$, determine:

i. W/L if $I_D = 0.5mA$, 2

ii. I_D if $V_{GS} - V_{TH} = 0.5$ V.

[b] For the circuit shown in Fig.1 determine the value of voltage V_{ref}. Assume M2 and M4 to be in saturation. 2

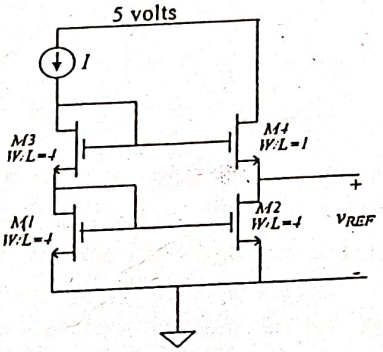

Fig. 1

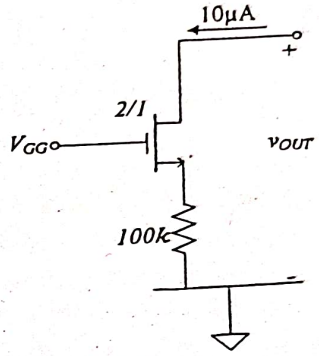

Fig. 2

Q2. [a] For the current source circuit shown in Fig. 2, ignoring the body effect, derive expression for output resistance and calculate its value at the given bias current assuming $\mu_n C_{ox} = 100\mu A/V^2$, $\lambda = 0.04\ V^{-1}$. Also calculate the minimum output voltage required to keep the device in saturation. 4

Q3. [b] For an NMOS CS amplifier (W/L =16/1) with diode connected NMOS load (W/L = 4/1) draw the transfer characteristic (V_o versus V_i) and derive the relation for voltage gain (A_v) using large signal analysis. You may ignore the body effect. Also determine the value of A_v. 4

Q4. Determine the current I_{OUT} ignoring channel length modulation. Assume $\mu_p C_{ox} = 100\mu A/V^2$, $|V_{tp}| = 0.4$ V, $V_{DD} = 1.8$ V and R = 380k. Assume a suitable value of V_{GS} for diode connected transistor. 3

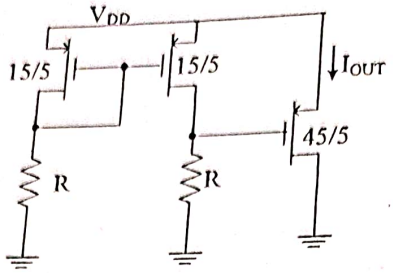

Fig.3

Total No. of Pages: 1

VII (Seventh) SEMESTER — 104 — **B.Tech. (ECE)**

MID-TERM EXAMINATION

EC 407 (Optical Communication)

September, 2019

Time: 1:30 Hours *Max. Marks: 20*

1. What are Graded Index Fibers and why are they used in optical communication? Explain briefly with the help of a diagram. [4]

2. Explain the macrobending losses in an optical fiber. What is the critical bend radius of a fiber? [4]

3. Consider a step index bare silica fiber, kept in air, for which $n_1 = 1.46$ and $n_2 = 1.0$. If the radius of the fiber is 25 μm, find
   (a) Acceptance Angle
   (b) Numerical Aperture
   (c) Number of reflections/ km of fiber length (corresponding to the Acceptance Angle)

   [4]

4. What is the V number of an optical fiber? How does the propagation and cut off of modes depend on the V number? [4]

5. Estimate the maximum core diameter for an optical fiber with the relative refractive index difference 1.25% and core refractive index is 1.46, in order that it may be suitable for single mode operation. It may be assumed that the fiber is operating at 0.95μm wavelength. Further estimate the new maximum core diameter for single mode operation when the relative refractive index difference is reduced by a factor of 8. [4]

-105-

Roll No. .....

Total No. of Pages: 1

B. Tech (E&C)
SEP. 2019

SEVENTH- SEMESTER
MID SEMESTER EXAMINATION

EC405 MICROWAVE ENGG

TIME: 1.5 Hrs

Maximum Marks: 20

Note:
1) **All questions are compulsory.**
2) **Assume suitable missing data.**

1[a]. Explain the operation of a Magic tee junction and one of its applications. (3+2)

[b] Derive the unity and phase shift property of S-matrix. (2+2)

[c] Why a matched load has tapped absorber inside it? (1)

2[a] The input power to a 20 dB attenuator is 75mW. Find the output power and the power absorbed by the attenuator. (2)

[b] Derive the s matrix of directional coupler and the input power in a two hole directional coupler is 10mW. The coupler has a coupling coefficient of 20dB and directivity of 60 dB. Calculate the power at all the ports. (4)

[c] Write short note on (2+2)

i). Irises

ii). Attenuator

Total No. of Pages: 1

VII (Seventh) SEMESTER — 106 — B.Tech. (ECE)

MID-TERM EXAMINATION

EC 407 (Optical Communication)

September, 2019

Time: 1:30 Hours *Max. Marks: 20*

1. What are Graded Index Fibers and why are they used in optical communication? Explain briefly with the help of a diagram. [4]

2. Explain the macrobending losses in an optical fiber. What is the critical bend radius of a fiber? [4]

3. Consider a step index bare silica fiber, kept in air, for which $n_1 = 1.46$ and $n_2 = 1.0$. If the radius of the fiber is 25 μm, find
   (a) Acceptance Angle
   (b) Numerical Aperture
   (c) Number of reflections/ km of fiber length (corresponding to the Acceptance Angle)
   [4]

4. What is the V number of an optical fiber? How does the propagation and cut off of modes depend on the V number? [4]

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Roll No. .....

B.Tech. (

Total No. of Pages 1

SEVENTH SEMESTER

MID SEMESTER EXAMINATION SEPTEMBER(2019)

EC427 INFORMATION THEORY & CODING

Time: 1.5 Hours Max. Marks :20

Note : Answer ALL questions. Assume suitable missing data, if any.

1 (a) Define the following using appropriate mathematical conditions: (i) Lossless channel (ii) Deterministic channel (iii) Noiseless channel (iv) Useless channel.

(b) Prove that (i) $H(X,Y) \leq H(X) + H(Y)$ (ii) $H(Y/X) < H(Y)$.

2 State and prove Kraft inequality.

3 Calculate the capacity of a discrete channel shown in Fig 1. Choose P and Q to find capacity to the constraint $2P + 2Q = 1$. Let $\alpha = -[p \log p + q \log q]$.

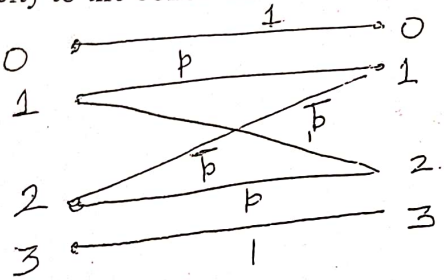


Fig. 1.

4. Three BSC's each with error probability=0.1 are cascaded as shown in Fig 2 and $p(0) = 1/4$ and $p(1) = 3/4$. Calculate H(Y), H(Z), H(U). I(X,Y) and I(X,U).

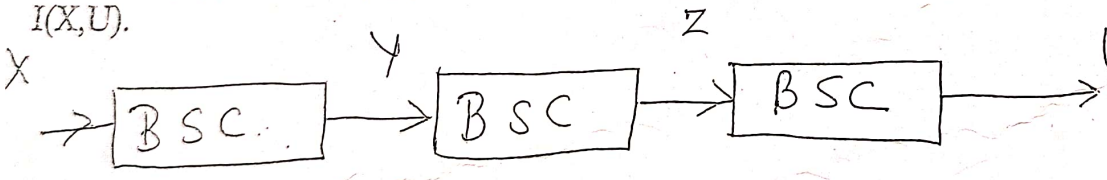


Fig. 2

. Find out the channel capacity for the following channel matrix.

$$\begin{bmatrix} .5 & .25 & .25 & 0 \\ .25 & .25 & .25 & .25 \\ 0 & 0 & 1 & 0 \\ 0.5 & 0 & 0 & 0.5 \end{bmatrix}$$

Total No. of Pages 03

Roll No.....

Third Semester

B. Tech.(EE)

Mid Semester Examination

Sept-2019

Time: 1:30 Hours

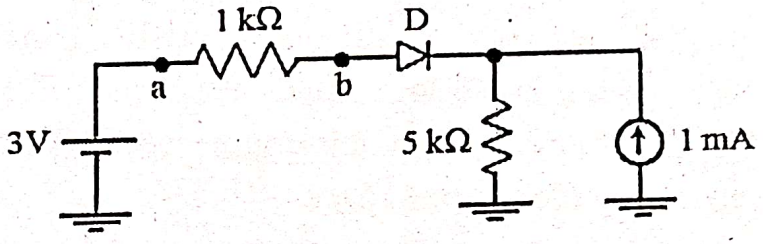
Maximum Marks: 20

EE203 ELECTRONIC DEVICES AND CIRCUITS

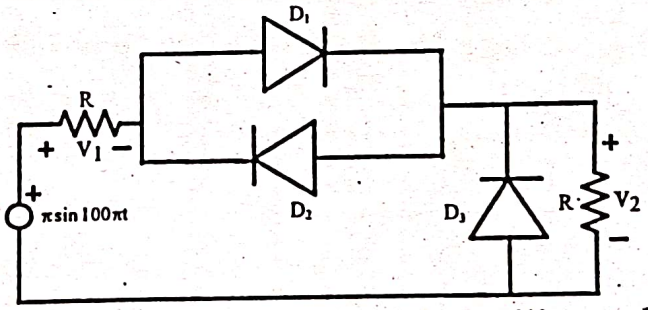
Note: Answer **ALL** questions.
Assume suitable value for missing data (if any).

1 Fill up the blanks with suitable answers

(i) For the circuit given below, the voltage drop v_{ab} assuming the diode D to be ideal, is __Volts. **0.5**



(ii) Average value of the voltage v_1 and v_2 in the circuit shown below, if the diodes are assumed to be ideal, ___V and ____V respectively. **1.0**



(iii) The change in the diode current for a silicon diode must be ___times to have 500mV change in the voltage across it at room temperature. **0.5**

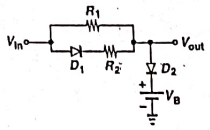
(iv) A transconductance amplifier with R_{in} = 2kΩ, transconductance g = 60mA/V and R_{out} = 20kΩ is fed with a voltage source of 1kΩ and is loaded with 1kΩ resistance. The overall voltage gain realized is ____V/V. **1.0**

(v) The small signal resistance of a silicon diode which is reverse biased should ideally be ____ **0.5**

-108-

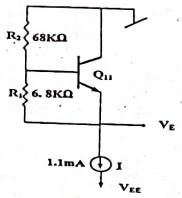
(vi) The saturation current I_S gets ____ when the area of the pn junction is halved. **0.5**

2 Plot the input/output characteristics of the circuit shown below assuming a constant voltage drop model for all the three diodes and $V_B = 1.0V$. **3.0**



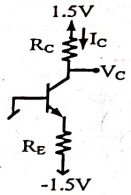
3 A 3-V adaptor using a half-wave rectifier must supply a current of 0.5mA with a maximum ripple of 300mV. For an input frequency of 50Hz, compute the minimum required smoothing capacitor. Also derive the formula used. **3.0**

4 In the circuit shown below, the current source I is 1.1mA and at 25^0C, $V_{BE} = 680$ mV at $i_E = 1$mA. Determine the value of current flowing through the resistors R_1 and R_2 at 25^0C if $\beta = 100$. Also find the voltage V_E at the emitter. What is the maximum possible value of V_{EE}? **2.5**

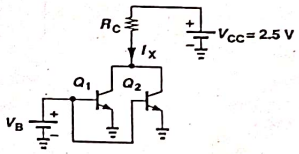


5 For an npn transistor operating at a V_{BE} of 650mV and I_C of 1mA, the i_C-V_{CE} characteristics has a slope of 0.8×10^{-5} A/V. If the transistor is being operated at a collector current of 10 mA, determine the value of its output resistance. **1.0**

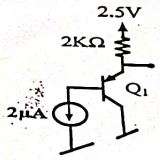
6 Determine the values of R_C and R_E in the circuit shown below so that $I_C = 0.2$ mA and $V_C = 0.5V$ if the transistor has a $\beta = 100$ and exhibits a base emitter voltage of 0.8V at a collector current of 1 mA. **2.5**



7 For the circuit shown below, determine the value of V_B such that $I_X = 1.2$ mA if $I_{S1} = 2I_{S2} = 5 \times 10^{-16}$ A. What value of R_C places the transistors at the edge of active region? **2.5**



8 Show that the transistor Q_1 is operating in active region and thus determine the small signal model parameters. Take $I_S = 5 \times 10^{-16}$A, $V_A = \infty$ and $\beta = 100$. **1.5**



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Total no. of pages :2 Roll No:

IIIrd SEMESTER B.Tech (EE)

MID SEMESTER EXAMINATION Sep 2019

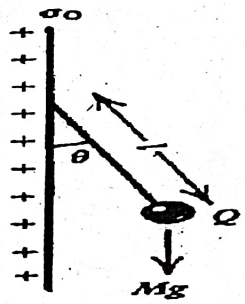
EE-207 Electromagnetic Field Theory

Time : 1:30 Hrs Max.Marks: 25

Note: Attempt all questions. Assume missing data , if any

1. (a) Livinia, the housefly, finds herself caught in the oven at the point (0, 0, 1). The temperature at points in the oven is given by the function $T(x,y,z) = 10(xe^{-y^2} + ze^{-x^2})$, where the units are in degrees Celsius. [3]
   (i) If Livinia begins to move toward the point (2, 3, 1), at what rate (in deg/cm) does she find the temperature changing?
   (ii) In what direction should she move in order to cool off as rapidly as possible?

   (b) Which of the following fields are solenoidal or rotational? [2]
   (i) $\vec{A} = 2\rho\cos\varphi\vec{a}_\rho - 4\rho\sin\varphi\,\vec{a}_\varphi + 3\vec{a}_z$
   (ii) $\vec{B} = \sin\theta\,\vec{a}_r + r\sin\theta\,\vec{a}_\varphi$.
2. (a) State Divergence theorem. Use divergence theorem to obtain point form of Gauss law. [2]
   (b) Verify Stoke's theorem for the vector field $\vec{H} = \frac{10^4}{\rho}\left(\frac{1}{a^2}\sin a\rho - \frac{\rho}{a}\cos a\rho\right)\vec{a}_\varphi$, where $a = \frac{\pi}{2\rho_o}$, around the circle $\rho = \rho_o$ and $z = 0$. [3]
3. (a) A small sphere of mass M in a gravity field g carrying a charge Q is connected by a massless string to a sheet of surface charge of the same polarity with density σ_o. What is the angle θ between the sheet and charge? [2]



   (b) Find $\vec{E}$ at the origin if the following charge distributions are present in free space: point charge, 12 nC, at P(2, 0, 6); uniform line charge density, 3 nC/m, at x = −2, y = 3; uniform surface charge density, 0.2 nC/m^2 at x = 2. [3]
4. (a) Show that an electric dipole located at the origin produces an electric field at some external point given by the expression [3]

$$\vec{E} = \frac{3(\vec{p}.\vec{r})\vec{r} - r^2\vec{p}}{4\pi\varepsilon_o r^5}$$

(b) Show that for rectangular coordinates $\nabla\left(\frac{1}{R}\right) = -\frac{\vec{R}}{R^3}$, where $\vec{R}$ is the distance vector from the source point to the point of observation. [2]

5. (a) Two uniform line charges, 8 nC/m each, are located at $x = 1$, $z = 2$, and at $x = -1$, $y = 2$ in free space. If the potential at the origin is 100 V, find V at $P(4, 1, 3)$. [2.5]

(b) A point charge $+Q$ is located at $(0,0,h)$ above a conducting plane located at $z = 0$. Show that the total charge induced at the conducting plane is $-Q$. [2.5]

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Total No. of pages-2

Roll no:.....

3rd Semester

B. Tech. (EC)

MID SEMESTER EXAMINATION

September, 2019

EE 251 Electronics Instrumentation & Measurements

Time: 1hr 30min

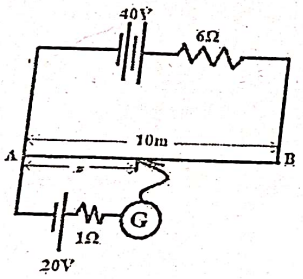
Max marks: 20

Note: Answer all questions. Assume suitable missing data if any.

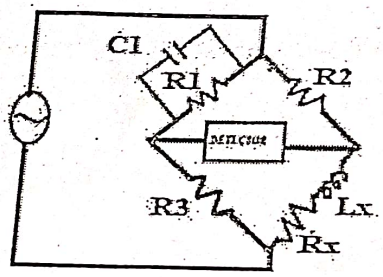
1. Define the following terms with an example or graph. 5
   (a) Accuracy (b) Precision
   (c) Resolution (d) Measurement
   (e) Crosstalk

2. For the given values 5
   x1 = 49.7 x2 = 50.1 x3 = 50.2
   x4 = 49.6 x5 = 49.7
   Calculate:
   a) Arithmetic Mean b) Deviation of each value
   c) Algebraic sum of the deviation d) Average deviation

3. For the given Potentiometer below, find the 'x' where Galvanometer shows no deflection. Internal resistance of the wire AB is 4 ohm. 5



Q3



Q4

P.T.O.

5

4. For the given Maxwell's Bridge above, find

a) Derive the expression for Rx and Lx.

b) For the given value
C1 = 0.01 uf, R1 = 5.1 kohm, R2 =5.1 kohm and R3 = 100 kohm. Calculate the series equivalent of the unknown impedance.

c) Calculate Quality factor (Q) where, f = 1 kohm.

Total No. of Pages 01

Roll No. .....

FIFTH SEMESTER

B.Tech.(EE)

MID SEMESTER EXAMINATION Sept 2019

EE-315 DIGITAL CONTROL & STATE VARIABLE ANALYSIS

Time: 1:30 Hours Max. Marks :25

Note: Attempt all questions. Assume suitable missing data, if any.

1. Derive the shifting property of Z-transform for shifting a sequence (a) one interval left(advanced) and (b) one interval right (delayed). 5
2. For the sampled-data control system shown in Fig. 1, find output of y(k) for u(t)= unit step. 5

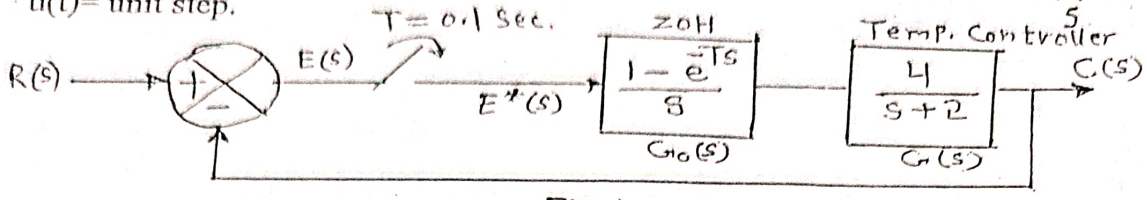


Fig. 1

3. Solve the difference equation.

$$y(k+2) + 3y(k+1) + 2y(k) = u(k)$$

$$y(0) = 1, y(k) = 0 \ \ for\ k < 0$$

Where u(k) is a unit step input. 5

4. Obtain the state space (State Model) representation for the mechanical system shown in figure 2. 5

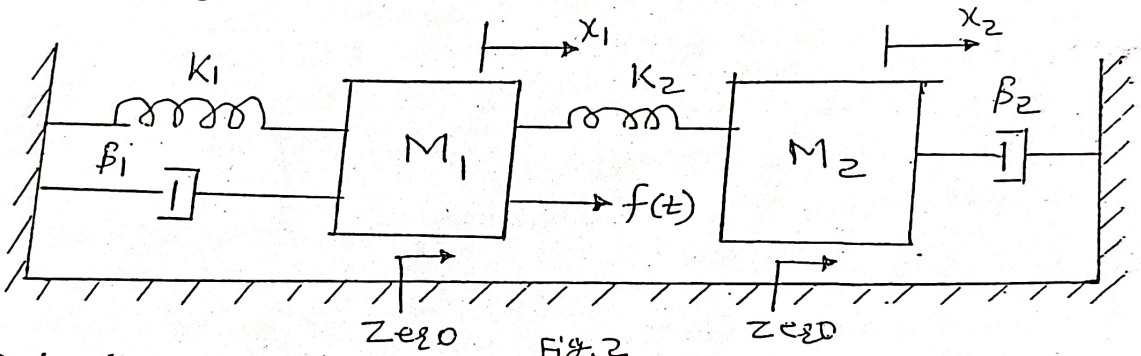


Fig. 2

5. Derive the state equation and output equation in matrix form for a separately excited dc motor when excited at armature side, while maintaining field current constant. 5

Roll no.....

Total no. of Pages:1

B.Tech. (EE)

FIFTH SEMESTER

September 2019

MID SEMESTER EXAMINATION

EE317 RENEWABLE ENERGY SYSTEMS

Max. Mark: 25

Time: 1 Hour 30 Mins

Note: Answer all questions. Each question carries equal marks. Assume the missing data suitably (if any).

1. Describe the major renewable energy sources and its potential for electricity generation in India. Give the future targets to harnessing RESs in potential countries, including India.

2. RES based power generation are rapidly growing - explain the reasons thereof, and the merits and demerits for using the RESs. State the power balancing mechanisms in grid while sizable RES based generation (must) is available in the grid?

3. Define solar irradiance, solar insolation and the characteristic of solar irradiation falling on earth. Discuss the working of a solar PV-cell. Draw the V-I characteristics of a PV cell under different solar irradiation and temperature, and draw the characteristics when (i) two similar PV-models are connected in series and parallel and (ii) two dissimilar models connected also in series and parallel.

4. State the major parameters of a solar cell and the factors influencing the performance of a PV cell. What is the standard test conditions (STC) for PV cell.

5. Write short notes on any two of the following:
   (i) MPPT phenomenon
   (ii) Design considerations of an off-grid battery based solar roof top system
   (iii) Bypass Diode and Blocking Diode

Total No. of Pages: 02 — 116 — Roll No. .....

FIFTH SEMESTER B.Tech (UEC)

MID SEMESTER EXAMINATION (SEPTEMBER 2019)

EE-355 : Instrumentation Systems

Time: 1:30 Hours *Max. Marks: 25*

Note: Attempt all questions, Assume suitable missing data, if any. Answers should be precise.

Q.1 (a) Derive the Bridge Sensitivity relation for voltage sensitive DC Bridge.
(b) Explain Ultrasonic Flow measurement method. **(3+2)**

Q.2 (a) Explain about Capacitive Level Sensor along with diagram.
(b) Write short note on Photo emissive Light Sensor. **(3+2)**

Q.3 Describe Input, Transfer and Output characteristics of Transducers and also list the parameters for selection of a Transducer. **(4)**

Q.4 In order to measure strain in a cantilever beam, a single strain gauge of resistance 1 KΩ and gauge factor 2 and a temperature coefficient 10×10^{-6} /°C is mounted on the beam and connected in one arm of a bridge circuit. The other three arms of the bridge have a resistance of 100Ω each. The bridge detector resistance is 100Ω and its sensitivity is 10 mm/μA. calculate the detector deflection for 0.1 % strain and also calculate the change in effective strain indicated when the room temperature increases by 10°C. **(4)**

Q.5 (a) For a certain thermistor β=3100 K and its resistance at 20°C is known to be 1050Ω. The thermistor is used for temperature measurement and the resistance measured is 2300Ω. Find the measured temperature if the temperature resistance characteristics of the thermistor is given by

$R = R_o exp\left[\beta\left(\frac{1}{T} - \frac{1}{T_o}\right)\right]$ Where T is in Kelvin.

(b) A strain gauge has a gauge factor of 4. If the strain gauge is attached to a metal bar that stretches from 0.25 m to 0.255 m when strained, what is the percentage change in resistance? If the unstrained value of gauge is 120 Ω, what is the resistance value of gauge after application of strain? **(2+2)**

Q.6 The output of an LVDT is connected to a 5 V voltmeter through an amplifier of amplification factor 250. The voltmeter scales has 100 divisions

and the scale can be read to 1/5th of a division. An output of 2mV appear across the terminals of LVDT when the core is displaced through a distance of 0.5 mm. Calculate (a) sensitivity of LVDT (b) sensitivity of whole setup and (c) the resolution of the instrument in mm. (3)

Total No. of Pages: 1 Roll No. .....

FIFTH SEMESTER **B.TECH (EE) Evening**

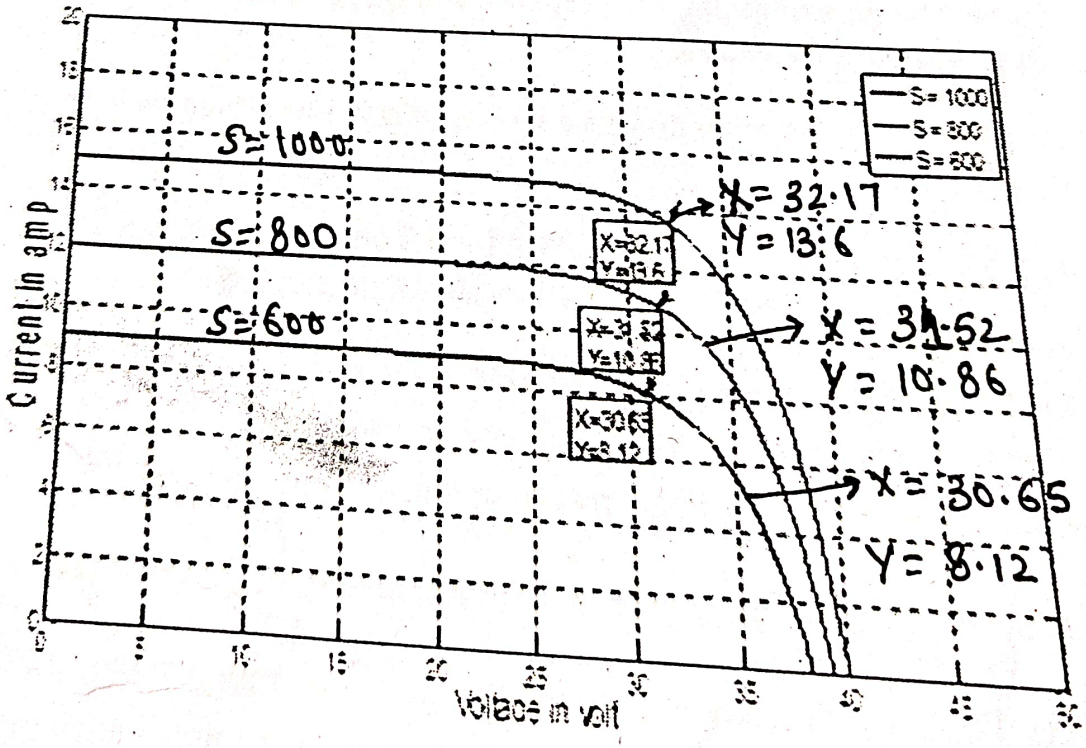
MID SEMESTER EXAMINATION (SEPT. 2019)

EE-359 NON CONVENTIONAL ENERGY SYSTEMS

Time: 1:30 hours *Max. Marks: 20*

Note: Attempt any two questions. Each question carries equal marks.
Assume suitable missing data, if any.

1. Discuss the potential of Nonconventional energy sources in India. Also give their merits and de-merits in comparison to conventional power generation.
2. (a) What do you mean by solar radiant energy. Give the energy spectrum diagram at different wavelengths of rays emitted by sun.
   (b) Discuss the basic physics of solar photovoltaic cell and give the brief explanation about the factors affecting the performance of solar cell.
3. (a) Explain the working of solar thermal power plant while mentioning the role of each and every component with help of neat and clean diagram.
   (b) The MPPT curves of a solar cell at different irradiation levels are shown in figure as given opposite. Determine the maximum output power w.r.t. each curve in case the solar cell is connected to a load resistance of 5Ω.



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SEVENTH SEMESTER

B.Tech.(EE)

MID SEMESTER EXAMINATION (Sept-2019)

EE408 SWITCH GEAR AND PROTECTION

Time:1:30 Hours

Maximum Marks:20

Note: Answer all the questions.

Assume suitable missing data, if any.

Write True or False and justify your statement.

1.[a] Ratio of reset to pickup should be very high. (1)

[b] If the neutral of generator is solidly grounded the LG fault current should be more than the 3 Phase fault current. (1)

[c] Effect of DC offset component is very prominent in the selection of protective devices . (1)

[d] Adjoining protective zones are made to overlap in interconnected network. (1)

[e] Timing of relays should be properly coordinated for current operation of relay in the context of Times-PSM curve. (1)

[f] Depending upon the type of faults, the sequence voltages and currents are to be constrained leading to particular type sequence networks. (1)

2(a) Show that the positive, negative and zero sequence currents are equal in magnitude but out of phase by 180° in line-to-line fault. (3)

(b) Using symmetrical component transformation for a 3 phase fully transposed line. Find the sequence impedances of line and show that circuit equations are in decoupled form. (3)

3. A synchronous generator is rated 25MVA,11.5KV. It is star-connected with the neutral point solidly grounded. The generator is operating at no load at rated voltage. Its reactances are $X''=X_2=0.20$ and $X_o=0.08$ pu. Calculate the symmetrical sub transient line currents for:

(i)single line-to-ground fault, (ii)line-to-line fault, (iii)double line-to-ground fault . (4)

4. A delta connected balanced resistive load is connected across an unbalanced three –phase supply as shown in Fig. 1. With currents in line A and B specified, find the symmetrical components of delta currents. Also find the symmetrical component of delta currents . Do you notice any relationship between symmetrical component of line and delta currents .Comment (4)

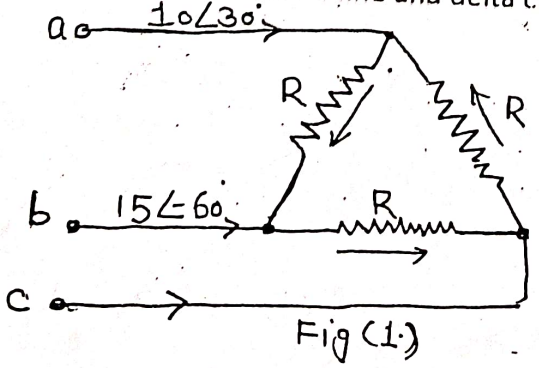


Fig (1.)

Total No. of Pages:03 Roll No.....

Third Semester B.Tech.[EE/EL]

MID-SEMESTER EXAMINATION(SEPT-2019) 24.09.2019

EE/EL-201 Network Analysis & Synthesis/Circuits and System

Time: 1hr 30 mins *Max. Marks: 25*

Note: All Questions are compulsory.
Assume any data if missing and clearly mention the assumption.

Q1. a) Determine the value of A, the gain of the dependent source. The node voltages v_a, v_b, v_o are 8.67 V, 2 V and 10 V respectively in the Figure.1(a) [2]

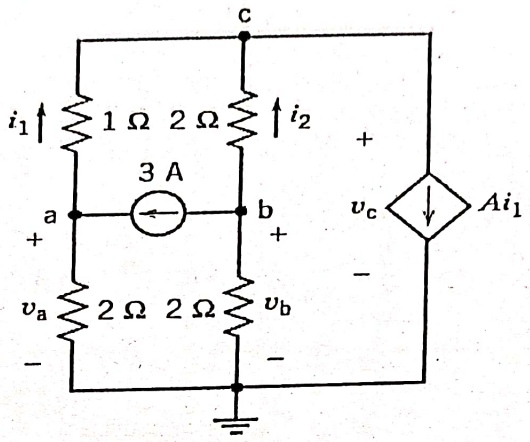


Figure.1(a)

(b) In the circuit as shown in Figure.1(b), Sketch v_o and also express it in standard test signals. Both the inputs are current source in the circuit. [2]

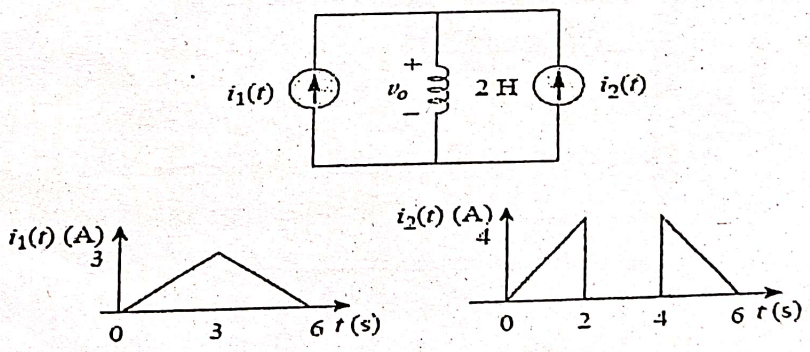


Figure.1(b)

(c) In the circuit as shown in Figure.1(c), Determine the following: [3]

i. $i_L(0^+)$, $v_C(0^+)$, $v_R(0^+)$

ii. $di_L(0^+)/dt, dv_C(0^+)/dt, dv_R(0^+)/dt$

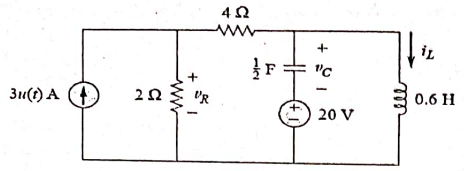


Figure.1(c)

Q.2 (a) Security alarm for an office building door is modelled by the circuit of Figure.2(a). The switch represents the door interlock, and v is the alarm indicator voltage. Find v(t) for t >0 for the circuit of Figure.2(a). The switch has been closed for a long time at t= (0⁻). (All Resistances are in ohms) [3]

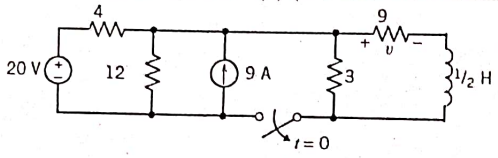
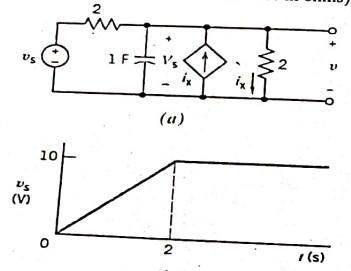


Figure.2(a)

(b) Determine v(t) for t >0 in the circuit shown in Figure (a). Forcing function $v_s(t)$ (input) to the circuit is shown in Figure (b). For t <0 capacitor is uncharged. (Resistances in the circuit are in ohms) [3]



(a)

(b)

Figure.2(b)

Q.3 Determine i(t) for t >0 for the circuit shown in Figure.3 [6]

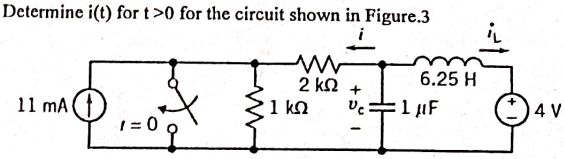


Figure.3

Q.4 (a) Find $v_o(t)$ for t >0 using Laplace transform approach [3]

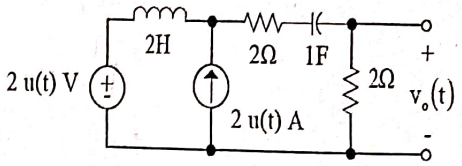


Figure.4(a)

(b) The circuit shown in Figure.4(b) is at steady state before the switch closes at time t = 0. The switch remains closed for 1.5 s and then opens. Determine the inductor current i(t) for t > 0. (All resistances are in ohms) [3]

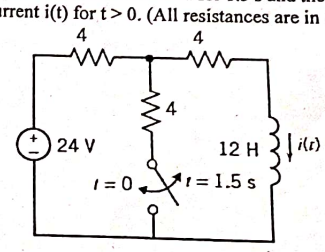


Figure.4(b)

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-122-

Total No. of Pages: 1 *Roll No.*.....

THIRD SEMESTER **B.Tech.(EE/EL)**

MID TERM EXAMINATION *SEPT-2019*

EE/EL-205 Electromechanical Energy Conversion and Transformers

Time: 1:30 Hours *Max. Marks: 20*

Note: Answer *ANY FOUR* questions. All carry equal marks. Use graph paper if necessary. Assume suitable missing data, if any.

Q (1) Define field energy and co-energy? The following Fig.1 shows an actuator consisting of an infinitely-permeable yoke and plunger, excited by a section of neodymium-iron-boron magnet and an excitation winding of $N_1 = 1500$ turns. The dimensions are: W=4.0cm W_1=4.5cm D=3.5cm d=8mm $g_0 = 1$ mm Find (a) the x-directed force on the plunger when the current in the excitation winding is zero and x = 3 mm. (b) Calculate the current in the excitation winding required to reduce the plunger force to zero.

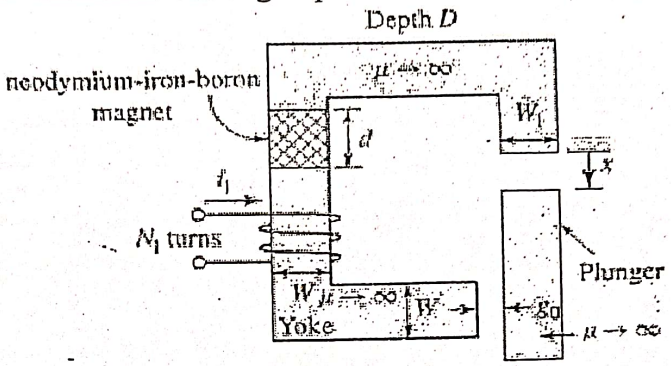


Fig.1

(2+3=5M)

Q(2) Derive an expression for the electric stored energy $W_{fld} = (q, x)$ analogous to that for the magnetic stored energy as $W_{fld}(\lambda_0, x_0) = \int_0^{\lambda_0} i(\lambda, x_0) d\lambda$ (5M)

Q(3) Which type of armature winding is selected for low voltage high current DC machines? Design and develop a simplex lap winding along with different pitches, winding table and development diagram by indicating poles and commutator segments for a 12 slot, 4pole DC armature with 12 commutator segments (1+1+1+2=5M)

Q(4) Derive generalized emf equation and electromagnetic torque equation from first principles. A 4 pole generator supplies a current of 143A.it has 492 armature conductors which are series connected. When delivering full load, the brushes are given an actual lead of 10°. calculate the demagnetising ampere turn per pole. The field winding is shunt connected and takes 10A.find the number of extra shunt filed turns per pole necessary to neutralise this demagnetisation. (1+1+3=5M)

Q(5) Derive the circuital analysis of separately excited generator with neat circuit diagram. The following table gives the open circuit voltages for different values of field current of a separately excited generator driven at rated speed.

Open circuit voltage (V)	60	120	220	300	350	400
Field current (A)	0.5	1.0	1.5	2.0	2.5	3.0

Express these values graphically and determine there from the generated e.m.f when the field circuit has a resistance of 150Ω. Find also the critical resistance of the field circuit and critical speed of the generator. The effects of armature resistance and brush volt drop may be neglected. (1+4=5M)

Total No. of Pages

Roll No. .....

~~FIRST~~ SEMESTER – III

B.Tech. (FT)

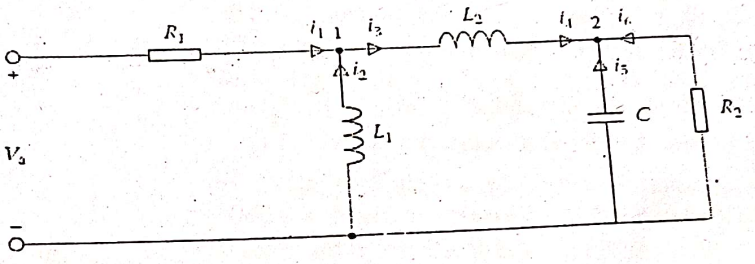
MID SEMESTER EXAMINATION SEPT-2019

EE/EL-207 ENGINEERING ANALYSIS AND DESIGN

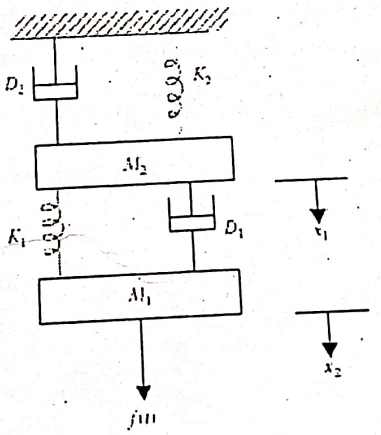
Time: 1.30 Hours *Max. Marks: 20*

Note: Answer any four questions. Assume suitable missing data, if any.

Q1. An electrical circuit consisting of two inductors, two resistors and a capacitor. Voltage inputs V_a (unit step and sinusoidal=10sint) is applied to the circuit. Derive a mathematical model and Solve for the system



Q2. Determine the state model for the mechanical system.



Q3 Use modified Euler's method to integrate.

a) $f(x,y)=-5x^2+3x^2-2x+8$ from x=0 to x= 1 with step size of 0.2

b) $y'=x+y$ with $x_0=0$ and $y_0=1$

QNO.4) Using RK method for order 4 find y, x =1.1 and 1.2 by solving $3x' = 2x^2 + y^2$,

$y(1) = 2.3$

QNo.5)

Approximate $\int_2^3 \frac{dx}{x+1}$ using Simpson's Rule with $n = 4$.

-125-

Total No. of Page – 02
V Semester EE
MID Term Examination

Roll No. .....
B.Tech (EE)
Sept 2019

EE/EL301 Power Electronics

Time: 1:30 Hours

Max. Marks: 20

Note: Attempt ALL questions. Assume suitable missing data, if any.

Q1. Write / draw the specified values for the following power semiconductor devices as per format given below (5)

Sl. No	Device Name	Symbol	Switching frequency	Typical ON state voltage drop	Ideal VI characteristics	Actual VI characteristics
a)	MOSFET					
b)	SCR					
c)	TRIAC					
d)	Power Diode					
e)	BJT					

Q2. a) Draw the basic structure of IGBT and explain the turn on process. (2)

b) Sketch the profile of voltage and current during turn on process of a MOSFET with an RL load and derive an expression for energy loss during turn on. (2)

c) Why are $\frac{di}{dt}$ and $\frac{dv}{dt}$ specifications important in power semiconductor devices? (1)

Q3. a) A power MOSFET modulates power from a dc supply voltage, with V_S = 100V, feeding a resistive load, with R= 5Ω. For a gate voltage, V_{GS} = 10V, the ON state resistance is 0.06Ω. If the MOSFET is kept ON for a long time, determine: - (2)

(i) the power dissipated in the MOSFET due to conduction.
(ii) the efficiency of operation, if the supply is considered ideal.

b) A single diode is used to rectify the current from an ac source of voltage 1000V at 2 kHz to a resistive load of value 1Ω. For the conditions prevailing and the diode specifications the reverse recovery charge is Q_{RR} = 10μC and the softness factor s= 0.6, find : - (2)

(i) the reverse recovery time t_{RR} of the diode and
(ii) the peak reverse current I_{RR} during commutation.

c) A thyristor has a thermal resistance of 2°C/W and is mounted on a heat sink of thermal resistance 2°C/W. Calculate the power loss of the thyristor if the junction temperature does not exceed 120° C at the ambient temperature of 40 ° C. (1)

P.T.O.

4. a) With the help of neat voltage and current wave forms, explain the turn on and turn off characteristics of SCR. (3)

b) Explain the turn on process in SCR using two transistor analogy. (2)

Total No. of Pages 2 — 127 — Roll No. .....

Vth SEMESTER B.Tech.[EE/EL]

MID TERM EXAMINATION Sept-2019

EE/EL 503 POWER TRANSMISSION AND DISTRIBUTION

Time: 1:30 Hour Max. Marks : 20

Note : Answer all questions, Assume suitable missing data, if any.

Q.1 [a] Write the advantages of using bundled conductors for overhead transmission line. [1]

[b] Why resistance of conductor is more for ac transmission than dc transmission? [1]

[c] How is the effect of earth considered for line capacitance calculations. [1]

[d] Draw a single line diagram of transmission network. [2]

Q.2 [a] Find the most economical cross-section of a 3-core distributor cable 250m long supplying a load of 80kW at 400V and 0.8pf lagging for 4000 hours per annum and open circuited for the remainder of the year. The cost of the cable including installation is Rs (15a+25) per meter, where 'a' is area of each conductor in sq. cm. The interest and depreciation charges are 10% and cost of energy wasted is 10p per unit. The resistance per km of conductor of $1cm^2$ cross-section is 0.173ohms. [3]

[b] Compare single phase ac and 3 phase 3 wire ac overhead transmission system on the basis of the conductor volume. Assume equal power transmitted over equal length of line with equal power losses in the lines and the neutral as half the section of outers. [2]

Q.3 [a] Derive expression for the inductance/phase of a 3 phase line with unsymmetrical spacings. Assume regular transposition. [3]

[b] In a 3 phase transmission line, the three conductors are placed at the corners of a triangle of sides 1.5m, 3m and 2.6m. If the

diameter of each conductor is 1.4cm and the conductors are regularly transposed, calculate inductance per phase per km length of line. [2]

Q.4 [a] A 3 phase, 50 Hz overhead transmission line 16km long has the following parameters. (3)

Resistance/km/phase = 0.03 Ω,

Line inductance/km/phase =0.7mH. (2)

When it supplies a balanced load of 1000kW at 11kV, 0.8 pf lagging, find sending end voltage, voltage regulation and Transmission efficiency of the system. Also draw corresponding phasor diagram. [3]

[b] A single phase 25km long overhead line consists of 2 conductors 1.8m apart. If the diameter of each conductor is 6mm, line voltage is 33kV, 50Hz, determine the capacitance of the line and charging current of the open circuited line. [2]

Total No. of Pages: 02

Roll No. .....

FIFTH SEMESTER

B.Tech.[EE]

MID-SEMESTER EXAMINATION

(Sept.-2019)

EE/EL305 SIGNALS AND SYSTEMS

Time: 1 Hour 30 Min

Max. Marks:25

Note: Attempt All Questions.
Assume any data if missing and clearly mention the assumption

Q1. a) Let $x(t)$ be a continuous-time periodic signal with fundamental period T and Fourier Series (FS) coefficients a_k. Find the FS coefficients of $y(t) = x(1-2t) + 2x(2t-4)$ in terms of a_k. [2]

b) Consider a continuous-time system $x(t)$ whose input and output $y(t)$ are related as : [2]

$$y(t) = 2tx(t-1) + \cos(t)x(2-t)$$

Determine whether the system is Time-Invariant and Stable. Justify your answers.

c) Determine whether the signal $x(n) = \cos\left(\frac{\pi n}{2}\right)\cos\left(\frac{\pi n}{4}\right)$ is periodic. If the signal is periodic determine the fundamental period.

d) Evaluate the following integral:

$$\int_{-\infty}^{+\infty} \exp(-t)\delta(2t-2)dt$$

e) Sketch the convolution of the following two signals:

$$x(n) = 2\delta(n+1) + \delta(n) - 2\delta(n-1)$$
$$h(n) = \delta(n-1)$$

diameter of each conductor is 1.4cm and the conductors are regularly transposed, calculate inductance per phase per km length of line. [2]

Q.4 [a] A 3 phase, 50 Hz overhead transmission line 16km long has the following parameters.

Resistance/km/phase = 0.03 Ω,

Line inductance/km/phase =0.7mH.

When it supplies a balanced load of 1000kW at 11kV, 0.8 pf lagging, find sending end voltage, voltage regulation and Transmission efficiency of the system. Also draw corresponding phasor diagram. [3]

[b] A single phase 25km long overhead line consists of 2 conductors 1.8m apart. If the diameter of each conductor is 6mm, line voltage is 33kV, 50Hz, determine the capacitance of the line and charging current of the open circuited line. [2]

Total No. of Pages: 02 Roll No. .....

FIFTH SEMESTER B.Tech.[EE]

MID-SEMESTER EXAMINATION (Sept.-2019)

EE/EL305 SIGNALS AND SYSTEMS

Time: 1 Hour 30 Min *Max. Marks:25*

Note: Attempt All Questions.
Assume any data if missing and clearly mention the assumption

Q1. a) Let $x(t)$ be a continuous-time periodic signal with fundamental period T and Fourier Series (FS) coefficients a_k. Find the FS coefficients of $y(t) = x(1-2t) + 2x(2t-4)$ in terms of a_k. [2]

b) Consider a continuous-time system $x(t)$ whose input and output $y(t)$ are related as : [2]

$$y(t) = 2tx(t-1) + \cos(t)x(2-t)$$

Determine whether the system is Time-Invariant and Stable. Justify your answers.

c) Determine whether the signal $x(n) = \cos\left(\frac{\pi n}{2}\right)\cos\left(\frac{\pi n}{4}\right)$ is periodic. If the signal is periodic determine the fundamental period. [2]

d) Evaluate the following integral: [2

$$\int_{-\infty}^{+\infty} \exp(-t)\delta(2t-2)dt$$

e) Sketch the convolution of the following two signals: [

$$x(n) = 2\delta(n+1) + \delta(n) - 2\delta(n-1)$$

$$h(n) = \delta(n-1)$$

Q2. Consider an LTI system with impulse response $h(t)$. The frequency domain characteristics of $h(t)$ is given in Figure 1. Determine the output of this system for the following two inputs: [5]

a) $x_1(t) = \cos(50t)$ (3)

b) $x_2(t) = \cos(50t)\cos(100t)$ (2)

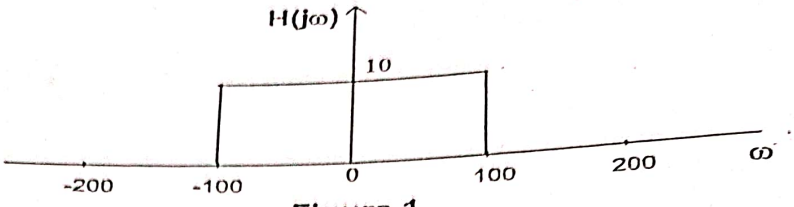


Figure 1

Q3. Consider the difference equation $y(n) - 0.5y(n-1) = x(n)$ [5]

and input $x(n) = \left(\frac{1}{3}\right)^n u(n)$. Determine the homogenous soultion and the particular soultion for the difference equation.

Q4. A periodic square wave $x(t)$ is sketched in Figure 2. Determine the Fourier series coefficients. [5]

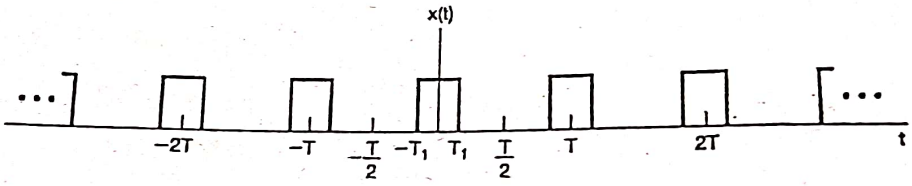


Figure 2

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SEVENTH SEMESTER B.Tech.[EE/EL-405]

MID-SEMESTER EXAMINATION (Sept.-2019)

EE/EL-405 DIGITAL SIGNAL PROCESSING

Time: 1 Hour 30 Min *Max. Marks:20*

Note: Attempt All Questions.
Assume any data if missing and clearly mention the assumption

Q1. a) Graphically explain the difference between the relation : [2]
$x(n)\delta(n-n_o) = x(n_o)\delta(n-n_o)$ and $x(n) * \delta(n-n_o) = x(n-n_o)$
(Here * is the convolution operator)

b) National Instruments Corporation produces an analog-to-digital (A/D) converter (Model #NI-5154) that can sample and digitize an analog signal at a sampling rate of f_s = 4 GHz. Each A/D output sample is an 16-bit binary word (byte) and the converter is able to store 25×10^6 samples. What is the maximum time interval over which the converter can continuously sample an analog signal at this sampling rate. [2]

c) Evaluate the integral [2]

$$\int_0^{-\infty} \exp(-10t)\,\delta(t+10)\,dt$$

d) Determine whether the following signal is periodic and if periodic determine the period [2]

$$x(n) = \cos\left(\frac{\pi n}{4}\right)\cos\left(\frac{\pi n}{8}\right)$$

e) The output of an Linear Time Invariant (LTI) system is [2]
$y(n) = x(n) * h(n)$, where $x(n) = \left(\frac{1}{2}\right)^n u(n)$ and $h(n) = (4^{-n})u(n)$. **Prove/Disprove** that the LTI system is Bounded-Input-Bounded-Output **stable/unstable.**

Q2. Determine the particular solution of the difference equation [4]
$y(n)=0.6y(n-1)-y(n-1)+x(n)$
when the forcing function $x(n)=2^n$, $n>0$ and zero elsewhere.

Q3. Find the transfer function of control to output voltage of a buck converter in z domain. [3]

Q4. A single pole system is implemented in Figure 1 with a fixed-point arithmetic based on four bits for the magnitude plus a sign bit. The quantization Q[ ] takes place after multiplication is assumed to round the resulting product upward. For $x(n) = \frac{15}{16}\delta(n)$ and $a = -\frac{3}{4}$ determine the output for n=3. Assume that y(-1)=0.5 and y(n)=0 for all n<-1. [3]

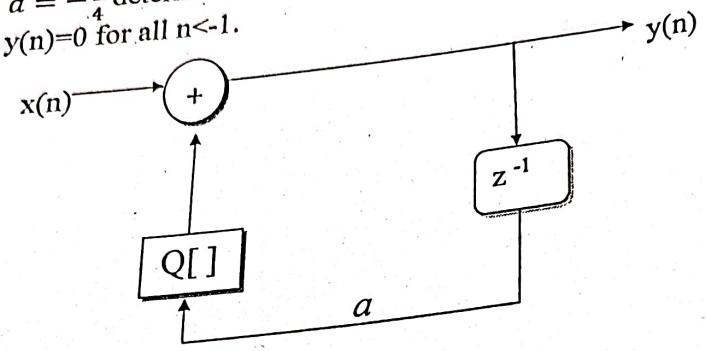

Figure 1

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SEVENTH SEMESTER B.Tech.(EE and EEE)

MID SEMESTER EXAM SEPTEMBER 2019

EE/EL-407 INSTRUMENTATION AND MEASUREMENT

Time: 1.5 Hours Max. Marks: 20

Note: Answer any four questions. All questions carry equal marks. Assume suitable missing data if any.

1. Write true or false and justify your answer: (5)
   (a) Absolute error is preferred over relative error. (1)
   (b) Range of full scale instruments does not have any significance in selection of these types of instruments. (2)
   (c) There is no difference between accuracy and sensitivity. (2)
2. What are the various types of errors in measurements?. Explain. (5)
3. Two resistors having the following ratings: $R_1 = 200\,\Omega \pm 10\%$, $R_2 = 500\,\Omega \pm 5\%$ and $R_3 = 400\,\Omega \pm 2\%$. Calculate: (5)
   (a) limiting error in ohms when the resistors are connected in series.
   (b) limiting error in ohms when the resistors are connected in parallel.
4. (a) What are various types of external interference signals? Explain Capacitive interference and its elimination. (2)

(b) If the capacitive coupling C_c between a noise source and measurement system is 0.2pF, the noise frequency is 1 kHz., the amplitude of the noise signal is 15V, and the input impedance of the measuring instrument is 10 MΩ, find the magnitude of the capacitively coupled noise signal in the measuring system. (3)

5. (a) Derive the expression for Wheatstone bridge sensitivity. Determine the condition for maximum bridge sensitivity? (3)

(b) The four arms of a Wheatstone bridge are as follows: AB= 100 Ω, BC=10 Ω, CD= 4 Ω and DA= 50 Ω The galvanometer has a resistance of 20 Ω and is connected across BD. A source of 10 V DC is connected across AC. Find the current through the galvanometer. What should be the resistance in arm DA for no current through the galvanometer? (2)

-END-

-134-A-

Total no. of pages 1

Roll No.....

1st SEMESTER

B.Tech.

MID SEMESTER EXAMINATION

Sep. 2019

EN FEC7 Introduction to Environmental Sciences

Time: 1:00 hours

Max. Marks: 25

Note: Answer ALL questions.
Assume suitable missing data, if any

1. Explain with the help of a neat sketch how temperature varies with the altitude in atmosphere. Also, clearly mention the reasons for the temperature pattern in atmosphere. 4

2. Why there is such a sharp decrease in energy in usable energy as energy flows through a food chain or food web. Doesn't an energy loss at each step violate the first law of thermodynamics? Explain. 4

3. Categorize the living and non-living components of an ecosystem? 4

4. What is biodiversity? Write as short note on conservation of biodiversity. 4

5. Write short notes on:

[a] Prominent threats to biodiversity. 2

[b] Multidisciplinary nature of Environmental Studies. 2

[c] The part of the earth and its atmosphere in which organisms live is known as ---- 1

[d] "Biosphere is made of atmosphere, hydrosphere and lithosphere". Whether this statement is True or False. Explain with an example. 2

[e] "The pyramid of total biomass must resemble the pyramid of energy flow". Comment 2

Total No. of pages : 1

Roll No.----------

THIRD SEMESTER

B. Tech. (Environment Engineering)

MID SEMESTER EXAMINATION

(SEPTEMBER-2019)

EN-201: Strength of Materials

TIME: 1.30 HOURS

MAX. MARKS: 20

NOTE: Answer ALL Questions
Assume suitable missing data, if any

1. (a) Explain the principle of superposition and free body diagrams. 2

   (b) What do you understand by the Principal plane and principal stresses. 2

   (c) Describe the stress-strain curve of the ductile mild steel and salient points on the curve. 2

2. A conical bar tapers uniformly from a diameter of 20 mm to a diameter of 50 mm in a length of 600 mm. Determine the elongation of the bar under an axial tensile load of 200 KN. Take $E = 2 \times 10^5$ N/mm^2. 2

3. The modulus of rigidity for a material is 0.8×10^5 N/mm^2. A 10 mm diameter rod of the material was subjected to an axial pull of 10 KN and the change in diameter was observed to be 3.6×10^{-3} mm. Calculate Poisson's ratio and modulus of the elasticity. 4

4. Draw the shear force and bending moment diagrams of cantilever beam carrying a uniformly distributes load w per unit length of whole span L. 4

5. A steel wire of 10 mm diameter and length 150 m is used to lift a weight of 2.5 KN at its lowest end. Calculate the total elongation of the wire if the unit mass of the wire is 7.95 Kg/m^3 and $E = 2.04 \times 10^5$ N/mm^2. 4

Total Number of pages 1

Roll No. .....

THIRD SEMESTER

B.Tech. (ENE)

MID SEMESTER EXAMINATION

(SEPTEMBER-2019)

ENE-203 Engineering & Environmental Surveying

Time : 1 Hour 30 Minutes

Max. Marks : 20

Note : Answer all questions.
Assume suitable missing data, if any.

Q 1(a) The following bearing were taken with a compass for a closed traverse ABCDE. Calculate the interior angles. 3

Line	AB	BC	CD	DE	EA
Fore Bearing	$60^0 30'$	$122^0 0'$	$46^0 0'$	$205^0 30'$	$300^0 0'$

(b) Write short notes on the following :- 2
(i) Bearing (ii) Declination

Q 2 The following staff readings were observed successively with a level, the instrument having been moved after third, fifth and ninth readings : 4
3.227 ; 1.706 ; 0.988 ; 2.198 ; 1.364 ; 2.162 ; 1.612 ; 1.972 ; 1.034 ; 2.584; 3.016; 2.031 metres.
Enter the above readings in a page of a level book and calculate the R. L. of points if the first reading was taken with a staff held on a bench mark of 280.055 m.

Q 3 Explain the difference between prismatic compass and surveyor compass. 2

Q 4 (a) The length f a survey line was measured with a 30 m chain and was found to be equal to 1760 m. As a check, the length was again measured with a 20 m chain and was found to be 1755m. On comparing the 20 m chain with the test gauge, it was found to be 1 decimetre too long. Find the actual length of 30 m chain used. 2

(b) Explain the term "Balancing of traverse". 3

Q 5 A closed traverse was conducted round an obstacle and the following observations were made. Work out the missing quantities: 4

Side	Length (m)	Azimuth
AB	202.0	87° 30'
BC	225.5	30° 20'
CD	187.0	298° 30'
DE	192.5	230° 0'
EA	?	?

Roll No.....

Total No. of Pages: 1

B.TECH. (ENE)
SEPT. – 2019

THIRD SEMESTER
MID SEMESTER EXAMINATION
EN- 205 ENVIRONMENTAL CHEMISTRY & MICROBIOLOGY

Time: 1 hour 30 minutes
Max. Marks: 20

Note: Attempt any five questions
Assume suitable missing data if any

1. Briefly discuss unique properties of water and their environmental significance.
2. Define heavy metals. What are the environmental problems associated with mercury. Discuss.
3. The pH of a water sample is 7.6. What is the OH^- ion concentration of water which contributes to its alkalinity?
4. Describe the interrelationship of pH and inorganic carbon in an aquatic system.
5. Calculate the equilibrium concentration (mg/L) of dissolved oxygen in water at 25°C and 1 atm pressure at an altitude of 2 kilometres. The value of Henry's law coefficient is 0.0012630 mol/L.atm.
6. Discuss the environmental effects of nutrient enrichment in a lake.

Total No. of Pages 01 *Roll No. .....*

THIRD SEMESTER B.Tech. ENE

MID SEMESTER EXAMINATION (September-2019)

EN 207 ENGINEERING ANALYSIS AND DESIGN

Time: 1:30 Hours *Max. Marks: 20*

Note: Answer all questions, All questions carry equal marks
Use of IS 456:2000 is allowed
Assume suitable missing data, if any

1. What is admixture? Explain the role of super plasticizer for manufacturing good quality pumpable concrete.
2. Explain the assumptions in Limit State of collapse for flexural member.
3. Design a rectangular RCC beam to carry a service moment of 350kN-m. Due to architectural consideration the size of beam is restricted to 300mm x 500mm, use M30 concrete and Fe 415, the site for construction is situated near the sea cost.
4. Design a reinforced concrete slab 6.3m x 4.5m simply supported on all the four sides. It has to carry a characteristic live load of 10kN/m2 in addition to its dead weight. Use M25 concrete and Fe415 steel also consider the exposure condition to environment as Mild.
5. Explain briefly:
   (a). Stress strain curve of HYSD bar with the help of suitable figure
   (b). Durability of concrete
   (c). Characteristic strength of material and Characteristic Load
   (d). Modular ratio
   (e). Factor of safety

Roll No. .....

Total No. of Pages 1 -139-

B.Tech.

V SEMESTER

Sept-2019

MID SEMESTER EXAMINATION

PAPER CODE: EN-301 Wastewater Engineering: Design and Applications

Max. Marks: 20

Time: 1:30 Hours

Note : Answer all questions
All questions carry equal marks.
Assume suitable data required, if any.

Q1. Discuss the need and financing of the sewerage projects. Also discuss design and planning of a sewerage system.

Q2. (a) What is the design period Explain the design periods for different components of a sewage scheme.

(b) Differentiate between combined and separate sewerage systems of sewage with their relative merits and demerits.

Q3. (a) Explain self purification of streams and indicate how sunlight helps in such purification.

(b) The 5 day 30°C BOD of sewage is 110mg/l. Calculate its 5 days 20°C BOD. Assume the deoxygenation constant at 20°C, K_{20} as 0.1.

Q4. Design a sewer to serve a population of 36000. The daily water supply to the city is 135 lpcd and channel bottom slope is 1:625. Sewer is designed to carry 4 times the average discharge. What will be the velocity generated if N is constant and is equal to 0.01.
Assume depth of flow $3/4^{th}$ full

Q5 Write a short note on any two

(a) Egg shaped sewers

(b) Self-cleansing velocity

(c) Functions of Manholes and drop holes

(d) BOD and COD

Total No. of Pages: 02
B. Tech. [ENV-Engg.]
Mid Semester Examination

Roll No. ... .
Fifth Semester
(Sep -2019)

EN-303 INSTRUMENTATION TECHNIQUES FOR ENVIRONMENTAL MONITORING

Time: 01:30 Hours

Max. Marks: 20

Note: Attempt all questions.
Assume missing data, if any.

Q.1 (a) Write down the principle of Electrical resistance pressure gauge. Name the material used for this purposes with their advantages and disadvantages (2)

(b) How U Tube manometer can be modified to increase the sensitivity and accuracy? (1.5)

(c) Write in brief the method used to measure the level of molten metal. (1)

(d) How SO_2 is measured by gravimetric method? (1.5)

Q.2 (a)With neat block diagram discuss the basic components of an instruments with example. (3 .5)

(b) With example classified the different flow measurement instruments. (1.5)

Q.3 (a) Describe with neat sketch the principle, working, application, and limitation of total radiation pyrometer. (4)

P.T.O

(b) A Mc Leod gauge has volume of bulb, capacity and tube down to its opening equal to 90 cm^3 and capillary diameter of 1 mm. Calculate the pressure indicated by reading of 3 cm. (1)

Q.4 Write shorts notes in any two: (2X2=4)

(a) Electroanalytical method

(b) Mc Leod gauge.

(c) Electromagnetic flow meter.

-End-

Total No. of Pages 1 —142— Roll No: _____
V SEMESTER B. Tech. (Environment)
MID TERM EXAM SEPT -2019

EN 307 PLANNING AND DESIGN OF ENVIRONMENTAL ENGINEERING WORKS

Time: 1:30 Hours Max. Marks: 25

Note: Answer all questions.

Q. 1 Write short notes on [4]

[a] Role and types of planning in engineering works.

[b] Remedial measures to threats to energy resources.

Q. 2 Answer the following: [6]

[a] Write notes on Land-use Management.

[b] Discuss the impact of land-use change on hydrological systems.

Q. 3 Answer the following: [15]

[a] Write a note on Environmental Management System.

[b] Define pollutant. Describe the causes, effects, and control measures of water pollution.

[c] In three consecutive decades the population of a town is 40,000; 100,000 and 130,000. Determine: (a) Saturation population; (b) Equation for logistic curve; (c) Expected population in next decade.

-143-

Total no. of pages 02 Roll No.....

~~III~~ SEMESTER – V B.Tech.

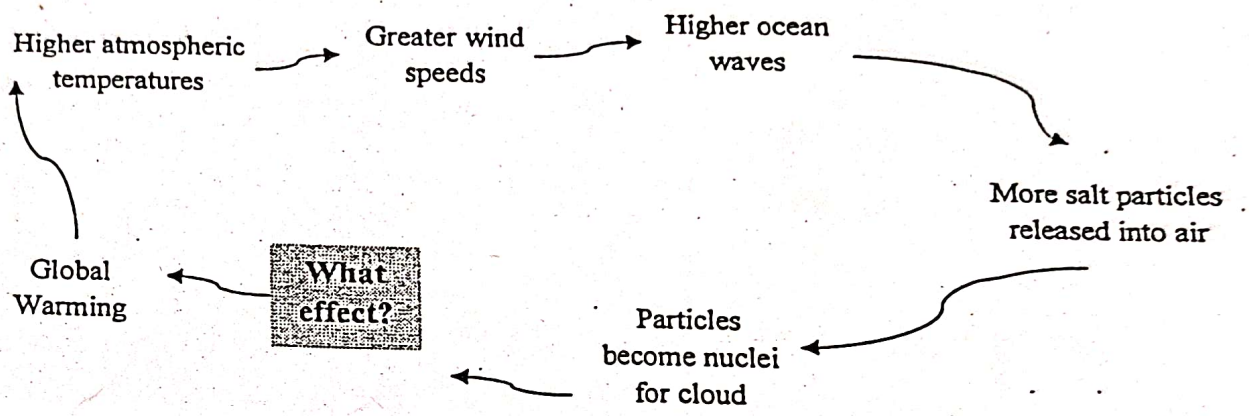
MID SEMESTER EXAMINATION September 2019

ENE 311 Climate Change and CDM

Time: 1:30 hours Max. Marks: 25

Note: Answer ALL questions.
Assume suitable missing data, if any

1. [a]As per the diagram given below, analyse how this particular feedback mechanism might influence global warming?



3

[b] What do you understand by the term "Emission Ceiling" as mentioned in Kyoto Protocol?

2

2. [a] Briefly explain the mechanisms that have been introduced under Kyoto Protocol to combat Global Warming?

3

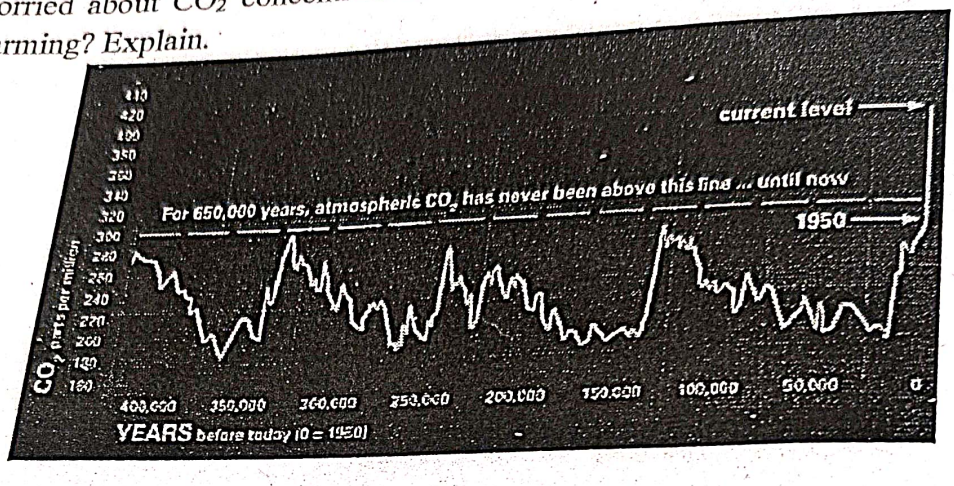
[b] "Sun emits relatively shorter wavelengths with maximum in the visible region whereas earth emits at longer wavelengths in the infrared region of spectrum". Enumerate the reasons for this statement using two fundamental laws.

2

3. Name the most important Green house gases in the atmosphere which result in "Enhanced Greenhouse Gas Effect" and list the anthropogenic activities which are responsible for their increasing concentration in the atmosphere. 5

4. What is Greenhouse Gas Effect. Differentiate between "Natural Greenhouse Gas Effect" and "Enhanced Greenhouse Gas Effect". 5

5. NASA in 2009 came out with the below graph which shows that CO_2 concentration (presented on the y-axis) has always varied in the last 400,000 years (presented on the x-axis). Given this graph, should we actually be worried about CO_2 concentrations in atmosphere, the main cause of global warming? Explain. 5



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-145-

Total No. of Page 1

Roll No. .....

Fifth Semester

B.Tech.

MID SEMESTER EXAMINATION

September 2019

EN-353 Occupational Health and Safety Management

Time: 1 Hour 30 Minutes *Maximum Marks: 25*

Note: Answer all questions.
All the questions carry equal marks.
Assume suitable missing data, if any.

1. What do you mean by occupational health services? Discuss various aim and objectives of occupational health services. (5)
2. Define occupational diseases along with various methods to prevent these diseases. (5)
3. Discuss various elements for good health and safety management systems. Also throw some light on different occupational health management services at workplace. (5)
4. Define Industrial Hygiene along with special contro measures. (5
5. Write short notes on (5

   (a) Chemical Hazards
   (b) Asbestosis

Total no. of pages 02 *Roll No.....*

~~SIXTH~~ SEMESTER EXAMINATION — VII B.Tech.(Env. Engg.)

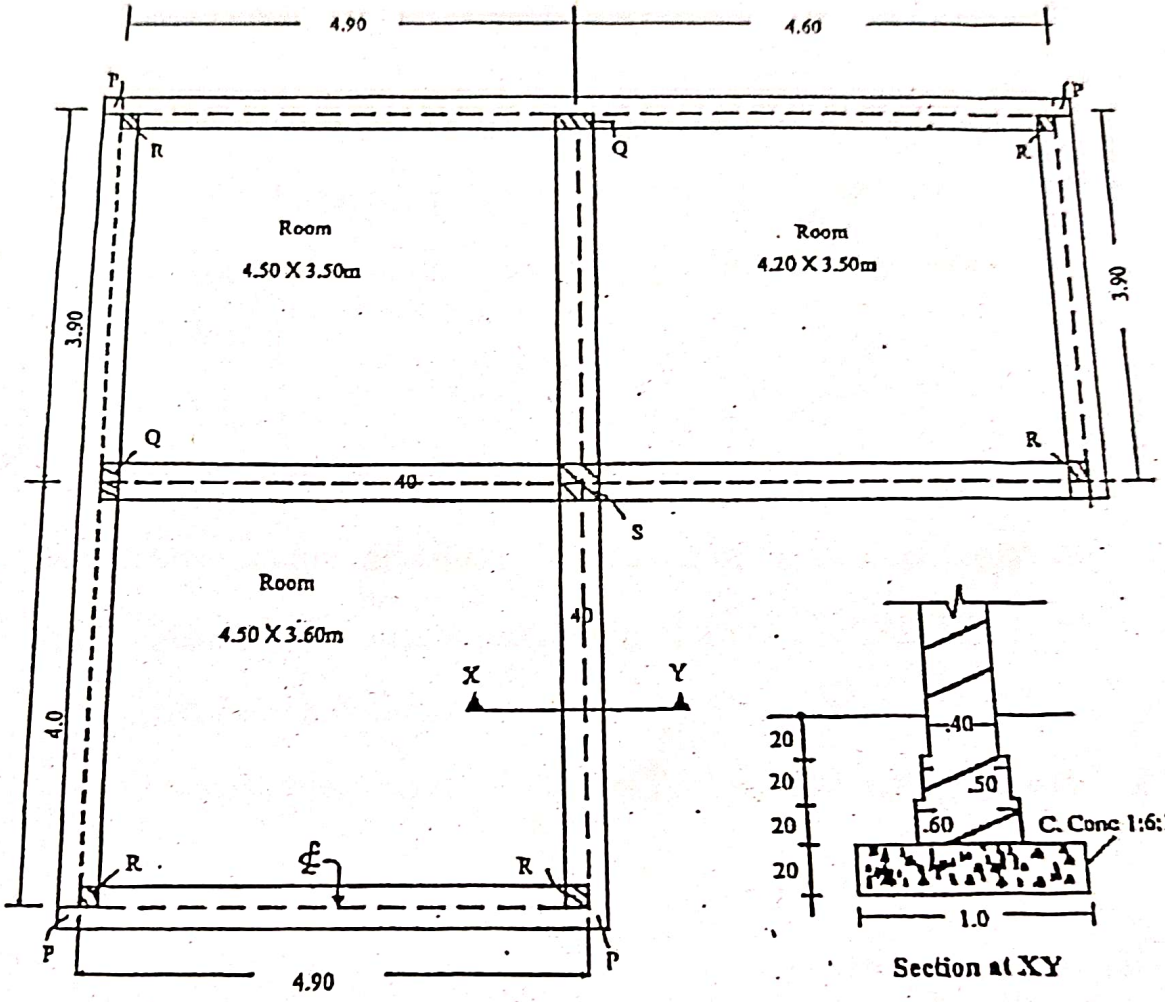
MID SEMESTER EXAMINATION Sep 2019

EN-405 PROJECT MANAGEMENT

Time : 1 .5 Hours Max. Marks :

Note: Attempt all questions. Draw neat labelled diagrams wherever necessary. Ass suitable missing data if any.

Q.1 For the construction work having Plan and section as mentioned in the fi below, calculate the quantities of (i) cement concrete in foundation, centre line method. [4



Q.2 Explain different types of estimates, the approach to be followed for getting the same, and the documents required to be enclosed with such estimates. [4]

Q.3 Discuss various factors affecting valuation of a building/structure? Describe the various methods of valuation of a building/structure. [4]

Q.4 What do you understand by the term 'Analysis of Rates'? How is it carried out. What is the purpose of rate analysis. Prepare a rate analysis of plain cement concrete of quantity 10 cu.m. having proportion of 1:2:4 [4]

Q.5 Define salvage value, scrap value, capitalized value, and sinking fund [4]

Total No. of Pages 1 — 148 — Roll No: _____

VII SEMESTER — B. Tech. (Environment)

MID TERM EXAM — SEPT.-2019

EN 409 INDUSTRIAL WASTE MANAGEMENT

Time: 1:30 Hours — *Max. Marks: 20*

Note: Answer all questions.

Q. 1 Answer the following [5]

[a] Write short notes on (i) Elutriation, and (ii) Proportioning

[b] Inline and Offline Equalization

[c] Enlist industrial sources of (i) Cadmium, and (ii) Lead.

Q. 2 Answer the following [6]

[a] Industrial Waste Characterization Study

[b] Good House Keeping Practices.

[c] Suggest treatment methodology for wastes from the cotton textile industry.

Q. 3 Answer the following [9]

[a] Discuss the methods of treatment of wool scouring waste.

[b] Indicate the wastes generated at a cotton textile industry using industrial process flow diagram.

[c] Discuss the Activated Sludge Process for industrial wastewater treatment.

Total No. of Page 1

Seven Semester

—149—

Roll No. .....

B.Tech.

MID SEMESTER EXAMINATION
SEPTEMBER 2019

EN – 407 Analysis of Vibration and Control of Noise Pollution

Time: 1:30 Hours *Maximum Marks: 25*

Note: Attempt ALL questions.
Assume suitable missing data, if any.

1. What is difference between dB and dBA? Mention the ambient noise standards prescribed by CPCB. (5)
2. Define L10 and L50. A certain jet flying overhead a residential area at a height of 400m has a SPL of 100 dB. Find the total SPL of eight of such jets flying overhead at that height. (5)
3. What do you mean by NRC value? Calculate the sound intensity level, if the given sound intensity is 10 W/m^2. (5)
4. Describe the adverse human health impact due to noise pollution in urban cities. (5)
5. Define the followings: (5)

(a) Octave band
(b) White noise
(c) Lw
(d) Factors Affecting Transportation Noise Propagation
(e) Broadband Noise

– 150 –

Total No. of Pages:2 Roll No. .....

THIRD SEMESTER B.Tech. [EP]

MID SEMESTER EXAMINATION (SEPT.-2019)

EP-201 INTRODUCTION TO COMPUTING

Time: 1 Hour 30 Mins Max. Marks: 30

Note: Attempt all the questions. Use comment line in each program to write the script/function file name.

Q1. **2×5=10**

(a) Write any three significant advantages of using Matlab over C/Fortran language.

(b). Write a Matlab program to show the use null matrix to store the output.

(c) Explain the differences between Matrix and Array Operation with the help of suitable examples.

(d) What care should be taken while writing a file name in Matlab?

(e) Explain the working of 'continue' statement to control the 'for loop'.

Q2. **5×2=10**

(a).Refractive index variation of pure silica can be given by following equation $n(\lambda) = C_0 + C_1\lambda^2 + C_2\lambda^4 + \frac{C_3}{(\lambda^2 - l)} + \frac{C_4}{(\lambda^2 - l)^2} + \frac{C_5}{(\lambda^2 - l)^3}$; Where C's constants having values:

$C_0 = 1.4508554$, $C_1 = -0.0031268$, $C_2 = -0.0000381$,

$C_3 = 0.0030270$, $C_4 = -0.0000779$, $C_5 = 0.0000018$, $l = 0.035$

Write a Matlab program to plot the variation of refractive index of pure silica, $n(\lambda)$ in wavelength range 1.0 to 2.0 in the step of 0.05. The value of refractive index at various wavelengths should also be tabulated in the tabular form (one column for wavelength and next column for corresponding refractive index of silica).

(b). A particular structure's displacement is described by

$$y(t) = \frac{1}{f_1^2 - f_2^2}[\cos(f_2 t) - \cos(f_1 t)]$$

where y is the displacement in the inches and t is the time in seconds. Write a Matlab program to show the effect of parameter f_1 (say for f_1 = 1,2,3,4,5 rad/sec) on displacement y during the time $0 \leq t \leq 20$. Given: $f_2 = 8$ rad/sec.

5×2=10

Q3.

(a) What will be the OUTPUT in the command window?

(i) A = [2 1 4 3; 2 3 8 9; 2 3 8 9; 91 77 27 44]; tril(A)

(ii) clear all; i=1; A=[2 2*i; 4 4+5*i]; B=A'

(iii) A= ones(3); u = [7; 8; 9]; A = [u A]

(iv) x=['ab' ; 'cd'] ; x'

(v) x=ceil(3.2+1)+1.2

(b) Write a script file to show the I-V characteristics of a diode (an electrical device) for $0 < V < 20\ mV$ given that

$I = I_0(e^{kV} - 1)$ for $V \geq V_R$

$I = -I_0(e^{-kV} - 1)$ for $V < V_R$

where I_0, V_R and k are constants and should be given from the command prompt.

Total No. of Pages:1 — 152 — Roll No. .....

THIRD SEMESTER B.Tech. [EP]

MID SEMESTER EXAMINATION September-2019

EP-203: MATHEMATICAL PHYSICS

Time: 1.5 Hours Max. Marks: 25

Note : Answer any ALL questions.
Assume suitable missing data, if any.

1. Define strain and show that strain tensor (e_{ij}) can be expressed as a sum of a symmetric and an antisymmetric tensor. (5)
2. Show that inner product of tensors A_r^{pq} *and* B_t^s is tensor of rank 3 (5)
3. Define Kronecker delta and discuss the properties of Kronecker delta (5)
4. Verify Stoke's theorem for the vector field $A = (2x - y)\hat{\imath} - yz^2\hat{\jmath} - y^2z\,\hat{k}$ over the upper half surface of the sphere $x^2 + y^2 + z^2 =$ bounded by its projection on xy-plane. (5)
5. Explain: (1.5 + 1.5 +2 = 5)
   (a) Physical significance of curl of a vector function
   (b) Einstein's summation convention with example
   (c) Piezoelectirc effect and converse piezoelectric effect

Total No. of Pages: 2 Roll No. ... .

THIRD SEMESTER B.Tech. [EP]

MID SEMESTER EXAMINATION (September- 2019)

EP 205 CLASSICAL & QUANTUM MECHANICS

Time: 1.5 Hours Max. Marks : 25

Note : Answer ALL questions. Assume suitable missing data, if any.

1. a) Explain 'If equations of transformation do not involve time, the kinetic energy can be expressed as a homogenous quadratic function of generalized velocities'.
2. b) Explain orthogonality and orthonormality of a wave function. Prove that $\int_{-\infty}^{+\infty} \psi_m^* \psi_n \, dx = 0$, where ψ_m and ψ_n are the solutions of one dimensional time independent Schrodinger wave equation for energy values E_m and E_n ($E_m \neq E_n$). (3+4)

2. a) (b) Deduce the commutation relations:
   i) $[L_y, L_z]$ ii) $[\hat{H}, \hat{p_x}]$
   b) The wave function of a particle of mass m moving in a potential V(x) is $\Psi(x,t) = A\, e^{\left(-ikt - \frac{kmx^2}{\hbar}\right)}$, where A and k are constants. Find the explicit form of the potential V(x). (4+2)

3. a) The waves on the surface of water travel with a phase velocity $v_p = \sqrt{g\lambda/2\pi}$, where g is the acceleration due to gravity and λ is the wavelength of the wave. Show that the

group velocity of a wave packet comprised of these waves is $v_p/2$.

b) State Ehrenfest theorem. Show that the average motion of a wave packet corresponding to a particle of mass m satisfies the equation

$$\frac{d}{dt}\langle x\rangle = \frac{\langle p_x\rangle}{m}$$ (2+4)

4. a) A particle is moving in 1-D potential given by

$V(x) = 0$ for $x<0$

$= V_0$ for $x\geq 0$

Assuming that total energy E of the incident particle is greater than V_0, show that the sum of fluxes of the transmitted and reflected particles is equal to the flux of incident particles.

b) An electron having energy E = 1 eV is incident upon a rectangular barrier of potential energy V_0 = 2 eV. How wide must the barrier be so that the transmission probability is 10^{-3}?

(3+3)

END

Total No. of Page 01

Roll No. .....

THIRD SEMESTER

B.Tech. (EP)

MID SEMESTER EXAMINATION September-2019

EP207: Digital Electronics (Engineering Analysis and Design)

Time: 1:30 Hours

Max. Marks : 30

Note : **All questions are compulsory.** Assume suitable missing data, if any.

Q.1. Reduce the function: $F=\sum(1,3,5,7,8,9,11,13,14)$ using K-Map and implement the circuit using NAND-NAND logic. 5

Q.2. An 8x1 multiplexer has inputs A, B and C connected to the selection inputs S_2, S_1 and S_0 respectively. The data inputs I_0 to I_7 are as follows:

(a) $I_2=0$; $I_0 = I_1 = I_3 = 1$; $I_4=I_6=I_7=D$ and $I_5=D'$.

Determine the Boolean function that the multiplexer implements. 5

Q.3. Design a combinational circuit that compares two 4-bit numbers to check if they are equal. The circuit output is equal to 1 if the two numbers are equal and 0 otherwise. 5

Q.4. Using the postulates of Boolean algebra, simplify the following Boolean expression: $F = x'y'z + xyz + x'yz + xy'z$ 5

Q.5. Design and discuss with an example the 4-bit ADDER with a BCD detection and correction logic. 5

Q.6. Design a BCD to XS-3 Code Converter using the unuse combinations of the BCD code as don't care conditions.

END

Roll No. .....

Total No. of Pages: 1

B.Tech. (E.P)

FIFTH SEMESTER

MID SEMESTER EXAMINATION (September - 2019)

EP-301-Semiconductor Devices

Time: 1:30 Hours Max. Marks: 25

Note: Answer *all the* questions
Assume suitable missing data, if any.

---

1 (a). Define density of states function and deduce an expression it. (3 M)

(b). Calculate density of states per unit volume with energies between zero and 1eV. (2 M)

2. (a). Derive the expression for thermal equilibrium electron concentration in conduction band of an intrinsic semiconductor. (3 M)

(b).For an intrinsic semiconductor with a band gap of 0.7 eV, calculate the concentration of intrinsic charge carriers at 300 K assuming that effective mass of electron is equal to rest of the electron. (Boltzmann Constant K = $1.380X10^{-23}$ $m^2Kgs^{-2}K^{-1}$). (2M)

3. (a). Deduce an expression for thermal equilibrium hole concentrations in valance band of a semiconductor. (3 M)

(b). Calculate thermal equilibrium hole concentration in silicon at T=400K. (Fermi energy level is 0.27eV above the valance band and effective density of state function in valance band for silicon at T=300K is $1.04 X 10^{19}/cm^3$.) (2 M)

4. (a). Deduce the expressions for the electrical conductivity of a semiconductor and show that the conductivity of an intrinsic semiconductor increases with increase in temperature. (3 M)

(b).The resistivity of an intrinsic semiconductor is 4.5 Ωm at 200C and 2.0Ωm at 320C. What is the energy band gap? (2 M)

5. (a). State and explain Hall Effect. Deduce an expression for carrier concentration in a semiconductor using Hall Effect phenomenon. (4 M)

(b). The Hall coefficient of certain Silicon specimen was found to be $-7.35X10^{-5}$ m^3c^{-1}. Determine the nature of the semiconductor. If the conductivity was found to be 200/mΩ, calculate density of the charge carriers and their mobility. (1 M)

Total No. of Pages 1
FIFTH SEMESTER
MID TERM EXAMINATION

Roll No .....
B.Tech. (Engineering Physics)
September-2019

EP 303 : ELECTROMAGNETIC THEORY, ANTENNAS AND PROPAGATION

Time: 1 Hour 30 Minutes **Max. Marks: 30**

Note : Attempt any three Questions
Assume suitable missing data, if any

1(a) Show that equation of continuity $div\bar{J}+\frac{\partial \rho}{\partial t}=0$ is contained in Maxwell's equations. (2)

(b) Using Maxwell's equations derive the electric and magnetic wave equations $\nabla^2\bar{E}=\gamma^2\bar{E}$ and $\nabla^2\bar{H}=\gamma^2\bar{H}$, where $\gamma=\sqrt{j\omega\mu(\sigma+j\omega\varepsilon)}=\alpha+j\beta$ is the intrinsic propagation constant of a medium. (3)

(c) Calculate the ratio of the cross-section of a circular waveguide to that of a rectangular one if each is to have the same cutoff wavelength for its dominant mode. (3)

(d) Show that TEM wave can not exist inside a waveguide. (2)

2. Show that the dispersion relation for surface plasma waves (10)

$$k_z=\frac{\omega}{c}\left[\frac{2\varepsilon_r\varepsilon_{eff}}{\varepsilon_r+\varepsilon_{eff}}\right]^{1/2}.$$

3. Explain with schematic diagram. (10)
(i) Reflection Coefficient (ii) Transmission Coefficient (iii) Standing Wave Ratio.

4 (a) Using the method of distributed circuit theory, obtains the one-dimensional transmission line equations (7)

$$\frac{d^2V}{dz^2}=-\omega^2LCV$$

$$\frac{d^2I}{dz^2}=-\omega^2LCI$$

(b) Compare waveguides with two wire transmission lines. (3)

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Total No. of Pages: 1
5th SEMESTER
MID SEMESTER EXAMINATION

Roll No.....

B. Tech. (EP)
(September -2019)

EP 309: Quantum Information and Computing

Time: 1.5 Hours

Max. Marks: 25

Note: All questions are compulsory.
Assume suitable missing data, if any.

1. (a) Define Turing Machine and explain its various components. Differentiate between probabilistic and deterministic Turing machine. (4)

   (b) Write a program to compute the constant function $f(x) = 1$ on a Turing Machi which has three internal states and set of symbols $\Gamma = \{0, 1, b, \triangleright\}$. (3)

   (c) How might we recognize that a process in Nature computes a function not computable by Turing machine? Explain in view of computational complexit (3)

2. (a) The following matrices, written in the *computational basis* $\{|0\rangle,|1\rangle\}$, are calle the *Pauli matrices*:

$$X=\begin{pmatrix}0 & 1\\ 1 & 0\end{pmatrix} \qquad Y=\begin{pmatrix}0 & -i\\ i & 0\end{pmatrix} \qquad Z=\begin{pmatrix}1 & 0\\ 0 & -1\end{pmatrix}.$$

   Show that the Pauli matrices are all Hermitian, unitary, square to the identity and different Pauli matrices anticommute. (5)

   (b) What are the *distinguishing quantum states*? Prove that non-orthogonal stat can't be reliably distinguished. (3)

   (c) Prove that the matrix

$$\begin{pmatrix}1 & 0\\ 1 & 1\end{pmatrix}$$

   is not diagonalizable. (2

3. Differentiate between a qubit and a classical bit. Discuss the Bloch sphere representation of a qubit. (

Total No. of Pages 01
FIFTH SEMESTER
MID SEMESTER EXAMINATION

Roll No.....
B.TECH. [ALL]
(Sep- 2019)

EP311 COMPUTER NETWORKS

Time: 1:30 Hours **Max. Marks: 25**

Note: All questions are compulsory
Assume suitable missing data, if any.

Q.1 With the help of a suitable diagram explain concept of OSI model of computer network architecture . (5)

Q.2 Discuss and compare the various network topologies. (5)

Q.3 Draw the Transmission Control Protocol (TCP) header format explaining the functionality of each field. (5)

Q.4 Write a short note on : (5)
a) FTP
b) HTTP

Q.5 What are transmission media? Give characteristics, advantages and disadvantages of the various media used at the physical layer (5)

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Roll No. .....

-160-

Total No. of Pages:1

B.Tech. [EP]

FIFTH SEMESTER

MID SEMESTER EXAMINATION September-2019

EP-351: PHYSICS OF ENGINEERING MATERIALS

Time: 1.5 Hours Max. Marks:

Note : Answer any ALL questions.
Assume suitable missing data, if any.

1. What is coordination number? Obtain coordination number for SC, BCC and FCC lattices.
2. Explain the different types of interatomic bonds in crystals with their salient features. (5)
3. A beam of X-rays $\lambda = 0.842$ Å is incident on a crystal at a glancing angle of $8°35'$ when the first order diffraction occurs. Calculate the glancing angle for 3rd order diffraction.
4. Explain the powder method for crystal structure analysis. (5)
5. Derive London's equations and discuss how its solution leads to Meissner effect.

—161—

Total No. of Page 01

Roll No. .....

SEVENTH SEMESTER

B.Tech. (EP)

MID SEMESTER EXAMINATION ***September-2019***

EP405: VLSI and FPGA Design

Time: 1:30 Hours *Max. Marks : 30*

Note : **All questions are compulsory.** Assume suitable missing data, if any.

Q.1. Design a CMOS based AND gate thereby explaining the circuit operation. 5

Q.2. Derive the expressions for drain current in linear and saturation regimes of operation in an n-channel enhancement mode MOSFET. Also obtain its transconductance. 5

Q.3. Draw the circuit diagrams for different type of Super-Buffers. Also highlight the need of a super buffer. 5

Q.4. How sub-threshold current and interconnect spacing puts a limit on the device scaling? 5

Q.5. Give the I_{ds}-V_{gs} characteristics for PMOS and NMOS in both depletion mode and enhancement mode. 5

Q.6. If the constant field scaling model is applied, by what factor will the following parameters scale down:

a) Current Density
b) Power-Speed Product
c) Supply Voltage
d) Channel Resistance
e) Switching Energy. 5

END

Total No. of Pages 02 Roll No.....

SEVENTH SEMESTER **B.Tech. (EP)**

MID SEMESTER EXAMINATION *September-2019*

EP-407 MOBILE AND SATELLITE COMMUNICATION

Time: 1:30 Hours *Max. Marks: 30*

Note: Answer ALL questions.
Assume suitable missing data, if any.

Q1: (i) Explain the Base station, interference, system capacity and Roamer in wireless communication system? (3)

(ii) Emphasize various mobile radio transmission systems and differentiate between Half and Full duplex systems with the examples? Explain the evolution of mobile communication along with trends in cellular radio communications? (3)

Q2: (i) What is the role of Frequency Division Duplexing (FDD) and Time Division Duplexing (TDD) in wireless communications? Write down the importance of Mobile Switching Center (MSC) along with subscriber and transceiver? (3)

(ii) Give an illustration of cellular system with pictorial presentation and describe "how a cellular telephone call is made"? (3)

Q3: (i) Define Noise? What are the possible sources of Noises in wireless communications? (2)

(ii) Explain Common Air Interface (CAI)? Write the importance of bandwidth requirement in mobile communication? (2)

(3.5x4=14)

Q4: Discuss any ***FOUR*** from the following:

(a) Forward and Reverse control Channels

(b) Handoff and frequency reuse

(c) Limitations of Wireless communication systems

(d) Mobile Identification Number (MIN), Public Switched Telephone Network (PSTN)

(e) Electronic Serial Number (ESN) and Station Class Mark (SCM)

Total No. of Pages 1

—221— Roll no.....

—164—

Total number of pages: 2

Roll No.....

Mid Semester Examination September 2019

EP-415 Nanoscience and Technology

Time: 1.5 hours Max. Marks: 25

Note: Answer **ALL** questions.

I. Wurtzite/Zinc blende superlattices in InP nanowires

InP nanowires are obtained by catalyst growth also called vapor-liquid-solid growth or VLS growth. Depending on the growth conditions, the nanowires have usually a zinc blende (ZB) or a wurtzite (WZ) structure with a growth axis along [111] (c axis in the case of wurtzite). A particular growth mode exists (R. Algra *et al*, Nature, 456, 369 (2008)) where periodic structures appear along the growth axis of InP nanowires (See figure 1.b and 1.c).

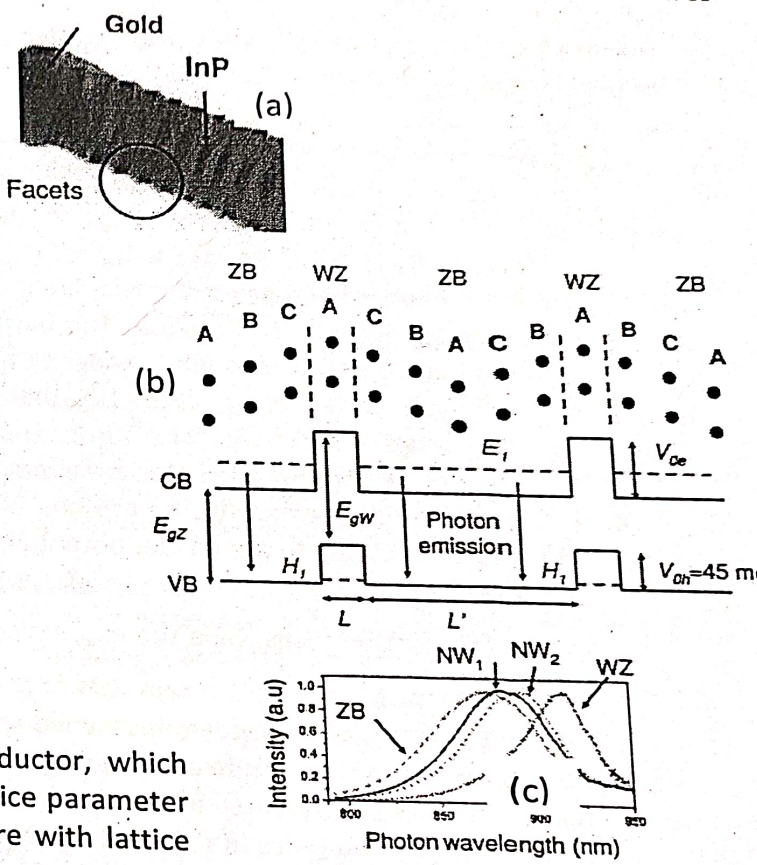

Figure 1 (a) Transmission electron microscopy (TEM) image of an InP nanowire showing a periodic modulation of the structural properties along the [111] growth axis; (b) (top) scheme of the packing sequence of a nanowire containing periodic insertions of wurtzite phase (along its [111] growth axis. (bottom) Corresponding band structure assuming a type 2 alignment of the system InP(wurtzite)/InP (zinc blende); (c) Emission spectra of 4 InP nanowires. 2 reference nanowires with pure zinc blende (λ = 917 nm) and wurtzite structures (λ = 870 nm) (labelled ZB and WZ) and 2 zinc blende nanowires with periodic insertions of wurtzite phase (labelled NW_1 and NW_2).

I.1 Structural properties

I.1.1 Preliminary study: InP is a III-V semiconductor, which crystallizes in a zinc blende structure with a lattice parameter a_0^{ZB} = 0.58687 nm and in the wurtzite structure with lattice parameters a_0^{WZ} = 0.41423 nm and c = 0.6801 nm.

1. Describe a nanowire while considering its dimensions of confinement. Calculate the energy density of states for a nanowire where the k-space volume of a single state cube is given by π/D and the k-space volume of sphere is given by k for the case of nanowires. (1+1)
2. Recall the unit cell of the zinc blende structure and indicate the number and position of atoms inside the unit cell. (1)
3. ...ibe a phonon within the picture of harmonic approximation and phonon gas representation. Brie... outline its characteristic length scales. (2+2)
4. Describe the various phonon scattering mechanisms possible in InP nanowires (consider intrinsic and structure dependent scattering mechanisms). (3)
5. Considering WZ phase favoured growth conditions on ZB phase structure for InP NWs, calculate the lattice mismatch for the growth of a wurtzite structure on a zinc blende structure. What will be the lattice constant of the first atomic layer of WZ favoured InP? Suppose a change in the stacking from A/B/C/A/B/C... to A/C/A/C.. is observed through energy relaxation after 20 nm growth of WZ

favoured layer, describe the imperfections present in the growth layer before and after the change in the structure. (1+0.5+1)

I.2 Electronic properties: Nanowires with a periodic structure-
Let us consider the optical properties of isolated nanowires with a diameter (D) of 40 nm, which have a periodic structure ZB/WZ with a period **d**. The band gap of the zinc blende phase is noted **EgZ** and the one of the wurtzite phase **EgW**. At room temperature, **EgZ = 1.35eV** and **EgW = 1.42eV** . We take the same effective masses for both phases : $m^*_e = 0.07m_0$ for electrons and $m^*hh = 0.6m_0$ for heavy holes. We model the band structure along the growth axis by taking into account the periodic wurtzite/zinc blende structure. The thickness of the wurtzite part, noted L is taken equal to the distance between the two stacking planes (i.e. $L = a_0\sqrt{3}/3 = 0.34$ nm). The thickness of the zinc blende part is noted L'. The period of the structure is then $d = L + L'$. The bands of the wurtzite phase are shifted upwards of 45 meV from the corresponding ones of the zinc blende phase (see figure 1.b)

1. **Lateral confinement:** Estimate the lateral confinement energies for electrons and holes related to the nanowire diameter (D) of 40 nm. The cross section of the nanowire could be model as a square of size D. Infinite barriers potential and quantum well like confinement could be used as a first approximation. (1)
2. **Hole confinement along growth axis:** Are the holes confined in wurtzite or zinc blende part ? (0.5)
3. **Confinement in growth direction:** The barrier potential for the holes is noted V_{0h} = 45meV . We assume that L' is large enough in order to neglect the coupling between the different wells. Show using the infinite barrier approximation that the confinement energy exceeds the barrier height V_{0h}. Justify qualitatively with the finite barrier approximation that the confinement energy is almost equal to V_{0h} = 45meV and that the holes are almost free along the growth axis. (2)
4. **Electron confinement along the growth axis :** Are the electrons confined in the wurtzite or zinc blende part ? Calculate the barrier potential V_{0e} for the electrons. (1)
5. We adopt again the approximation of infinite barrier and we neglect the coupling between the different quantum wells. Give the expression of the electron confinement energy E_1^{∞} as function as L'. (1+1+1+2)

   Figure 1.c shows the photoluminescence spectra of 4 isolated nanowires. There are 2 reference nanowires with a zinc blende and a wurtzite structure and 2 nanowires with a periodic structure. The measurements are obtained as follows : each nanowire is excited by a laser, which inject electrons on the level E_1 and holes in the level H_1 (here H_1 is almost at the same energy of the maximum of the zinc blende valence band). The emission spectra (number of emitted photons as function as their wavelength) induced by the recombination of electron-hole pairs is recorded. The maximum of the emission spectra occurs at a wavelength λ such as the photon energy $E = hc/\lambda$ is equal to the difference between the energy levels E_1 and H_1. Calculate the emission energy (eV) of the 2 reference nanowires. Is it in agreement with the expected values ? Deduce the transition energy (eV) for the nanowires NW_1 (λ = 883 nm) and NW_2 (λ = 895 nm) and the confinement energy E_1^{∞}.
6. Deduce for both nanowires (NW_1 & NW_2) the value of the thickness L', the period d and the ratio d/D. (1+1+1)

Free electron mass : $m_0 = 9.1 \times 10^{-31}$ kg ; Planck constant : $\hbar = 1.054 \times 10^{-34}$ J.s; electron charge : $e = 1.6 \times 10^{-19}$ C ; Boltzmann constant : $k_B = 1.38 \times 10^{-23}$ JK^{-1} ; Light speed in vacuum $c = 3 \times 10^8$ $m.s^{-1}$

Total no. of page: 1 Roll no.:.....

7th SEMESTER, B.TECH. (Engineering Physics/Elective)
MID-SEMESTER EXAMINATION, SEPTEMBER-2019
EP-419 (Introduction to Automation and Motion Control)

Time: 1hr 30 min. **Max. Marks: 25**

Note: Attempt all questions. All questions carry equal marks. Assume suitable missing data, if any.

1. (a) Discuss in detail the motion subsystem of a robot along with its functions. (3)
   (b) Define "Robot" as per definitions by RIA and JIRA. (2)

2. (a) Distinguish between polar arm robot and articulated arm configuration? (3)
   (b) An end-effector attached to a robot makes the robot "specialized" for a particular task. Explain the statement. (2)

3. (a) Discuss in details about various types of non-contact sensors used in Robots. (3)
   (b) For each type of the following tasks, mention which type of gripper is suitable: (gripper/tooling) (2)
   (i) Welding on some joint
   (ii) Nut-bolt assembly

4. (a) Explain the following types of sensors with neat sketches (3)
   (i) LVDT (ii) Encoders
   (b) A resistance wire strain gauge with a GF of 2.5 is bonded to a steel structural member subjected to a stress of 120 MN/m^2. The modulus of elasticity of steel is 250 GPa. Find the % change in the value of the gauge resistance due to applied stress. (2)

5. (a) Distinguish between hydraulic and electrical actuators. (2)
   (b) A hydraulic rotary servo actuator is to be used for a twist joint with a hydraulic power system. The outer and inner radii of the vane are 80 mm and 20 mm, respectively. The width of each vane is 10 mm. Determine the angular velocity and torque generated if the supply pressure is 50 bar and the flow rate is 8 cm^3/min. (3)

Roll No. ... .

Total No. of Pages: 1

B.Tech. [E P]

VII- SEMESTER

MID SEMESTER EXAMINATION (September - 2019)

EP 423 Space and Atmospheric Science-I

Time: 1:30 Hours Max. Marks: 25

Note: Answer *all the* questions
Assume suitable missing data, if any.

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1. What is a black body? Mention Planks hypothesis and hence derive the expression for Planks radiation law. Deduce Wein's and Rayleigh Jeans' law from Planks radiation law. (5 M)

2. Explain variation of temperature and pressure with altitude with suitable reasons. (5 M)

3. Discuss in details composition of the atmosphere in different layers of the atmosphere. (5 M)

4. Describe different layers of atmosphere in details with suitable reasons. (5 M)

5. Define climate and describe the physical factors affecting the earth's climate. (5 M)

Roll No. .....

Total No. of Pages 1

B.Tech

3rd SEMESTER

SEP-2019

MID SEMESTER EXAMINATION

FEC 6

CORPORATE SOCIAL RESPONSIBILITY

Max. Marks:25

Time: 1:00 Hours

Note :Answer any five questions
All questions carry five marks.

Q.1 Explain the key differences between agency and stewardship theory.

Q.2 What are the obligations to society and customers of a corporation under good corporate governance practices?

Q.3 Explain Carroll's Corporate Social Responsibility (CSR) pyramid.

Q.4 Briefly explain the CSR regulation in India.

Q.5 What are the various issues needs to be handled under corporate governance by a corporation?

Q.6 Bad corporate governance policies can impact the long term sustainability of organisation. Explain with examples

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Total No. ...

— 169 —

Total no. of pages 1

Roll No.....

1st SEMESTER

B.Tech.

MID SEMESTER EXAMINATION

Sep. 2019

FEC7 Introduction to Environmental Sciences

Time: 1:00 hours

Max. Marks: 25

Note:	Answer ALL questions. Assume suitable missing data, if any

1. Explain with the help of a neat sketch how temperature varies with the altitude in atmosphere. Also, clearly mention the reasons for the temperature pattern in atmosphere. 4

2. Why there is such a sharp decrease in energy in usable energy as energy flows through a food chain or food web. Doesn't an energy loss at each step violate the first law of thermodynamics? Explain. 4

3. Categorize the living and non-living components of an ecosystem? 4

4. What is biodiversity? Write as short note on conservation of biodiversity. 4

5. Write short notes on:

[a] Prominent threats to biodiversity. 2

[b] Multidisciplinary nature of Environmental Studies. 2

[c] The part of the earth and its atmosphere in which organisms live is known as ---- 1

[d] "Biosphere is made of atmosphere, hydrosphere and lithosphere". Whether this statement is True or False. Explain with an example. 2

[e] "The pyramid of total biomass must resemble the pyramid of energy flow". Comment 2

— 170 —

Roll No.....

Total no. of pages: 1

B. Tech.

FIRST SEMESTER

September- 2019

MID SEMESTER EXAMINATION

FEC10 Communication Skills

Max. Marks: 25

Time: 1:00 Hours

Answer the following questions:

1. Define communication as a bi-polar process. Explain the implication of 'skill' in communication skill. (12.5)

OR

Bring out the essential features of effective communication. Illustrate your answer.

2. What are the major barriers to effective communication? Suggest the remedial measures to overcome the barriers. (12.5)

OR

Express your views on "Technology and Human Life".

Roll no.....

Total No. of Pages 01

B.Tech.

1st &3rd SEMESTER

SEP.2019

MID SEM EXAMINATION

FEC-12 Business Communication and Presentation Skills

Max. Marks :25

Time: 1:00 Hours

Note:Attempt all questions.Assume suitable missing data, if any.

Q1. Write short notes on any two of the following: 10

a) Presentations Skills
b) Non verbal communication
c) Resume

Q2. Express your views as a part of a Group discussion on any one of the following topics: 10

i) Rise of Artificial intelligence
ii) Mental health issues among young adults

Q4. Write a formal introduction for a job interview. (Imagine details) 5

-END-

Roll No.....

Total no. of pages: 1

B. Tech.

FIRST SEMESTER

MID SEMESTER EXAMINATION

September- 2019

FEC 14 Appreciation of Short Stories

Max. Marks: 25

Time: 1:00 Hours

Answer the following questions:

1. Discuss short story as a creative genre of literature. (12.5)

OR

Evaluate William Carlos Williams as a short story teller.

2. What are the major concerns of the story, "The Use of Force"? Illustrate your answer. (12.5)

OR

Critically examine the character of the doctor in the story, "The Use of Force".

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-173-

Roll No.....

Total no. of pages: 1

B. Tech.

FIRST SEMESTER

September- 2019

MID SEMESTER EXAMINATION

FEC15 APPRECIATION OF POETRY & PROSE

Time: 1:30 Hours

Max. Marks: 25

Note: Attempt all questions. Marks allotted to questions are given against them.

Q1. Explain with reference to context any two of the following extracts: add your critical remarks wherever necessary. 5+5=10

(a) And ther-on heng a broche of gold ful shene,
On which ther was first write a crowned A,
And after, *Amor vincit omnia.*

(b) His existence ruled by ours should__by crossing at a breath
Into safe and shielded death,
By the merely taking hence
Of his insignificance.

(c) It was useless to try to do anything. One could only watch the extraordinary efforts made by those tiny legs against an oncoming doom which could, had it chosen, have submerged an entire city, not merely a city, but masses of human beings.

Q2. What does the poet wish to convey through the poem 'The Emperor of Ice-cream'? Discuss. 5

Q3. What is a 'dramatic-monologue'? Discuss Browning's poem 'My Last Dutchess' as a dramatic-monologue. 10

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Total no. of pages: 1

Roll No.....

FIRST & THIRD SEMESTER

B. Tech.

MID SEMESTER EXAMINATION

September– 2019

FEC16 APPRECIATION OF FICTION

Time: 1:00 Hours

Max. Marks: 25

Note: Answer the following questions:

1. Discuss fiction as a creative genre of literature. (12.5)

OR

Critically evaluate D.H. Lawrence as a novelist with special reference to his novella, *The Man Who Died*.

2. Discuss the major thematic ideas contained in *The Man Who Died*. (12.5)

OR

"*The Man Who Died* is a demythologization of Jesus Christ's resurrection". Comment.

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17. A financial document that indicates the success or failure of a business trading over a period of time is called?
a) A cash flow statement
b) A retained earnings statement
c) An income statement
d) A bank statement

18. How is the balance sheet linked to the other financial statements?
a) The beginning retained earnings balance on the statement of retained earnings becomes the amount of retained earnings reported on the balance sheet
b) Retained earnings is added to total assets and reported on the balance sheet
c) Net income increases retained earnings on the statement of retained earnings, which ultimately increases retained earnings on the balance sheet
d) There is no link between the balance sheet and the other statements

19. Which of the following business has the burden of unlimited liability?
a) Sole-proprietorship
b) Single member company
c) Public limited company
d) Private limited company

20. Ali Khan Company experienced the following at end of year, December 2017:
Issued preferred stock for Rs. 250,000
Repurchased Rs. 140,000 of its own common stock
Borrowed Rs. 200,000 from a bank issuing a 5 year note
Retired bonds by paying Rs. 55,000
Declared dividends of Rs. 135,000 payable on March 1, 2018
The financing section of the statement of cash flows will show:
a) 2,50,000
b) 2,55,000
c) 1,20,000
d) 1,25,000

II. Differentiate briefly the following: **(5 marks)**
a) Cash flow statement and Income statement
b) Non Current assets and Non Current Liabilities
c) Accrued Income and accrued expenses
d) Liabilities and provisions
e) Sole proprietorship and One Person Company.

Total No. of Pages 4 *Roll No. .....*

Ist/IIIrd /Semester **B.Tech (Elective)**

MID- SEMESTER EXAMINATION **Sept -2019**

FEC- 18 Financial Statement Analysis

Time: 01:00 Hours ***Max. Marks: 25***

Note: Answer all questions. Assume suitable missing data, if any.

I. MCQ (20 marks)

1. According to accrual concept of accounting, financial or business transaction is recorded:
a) when cash is received or paid
b) when transaction occurs
c) when profit is computed
d) when balance sheet is prepared

2. The XYZ Marketing Company provides advertising services to an investment company in year A but receives advertising fee in year B. The XYZ Marketing Company recognizes this revenue in year A. This action of John Marketing Company is justified by:
a) business entity concept
b) revenue recognition principle
c) economic entity concept
d) going concern concept

3. A company is a going concern if:
a) its balance sheet shows a strong financial position
b) its income statement for the current year shows huge profit
c) there is no evidence that it will or will have to cease operations within foreseeable future.
d) it is a public limited company

4. Which of the following states that a transaction is not recorded in the books of accounts unless it is measurable in terms of money?
a) Matching principle
b) Revenue recognition principle
c) Monetary unit assumption
d) Time period assumption

5. Which one of the following states that the life of a business can be divided into equal time periods?
a) Time period assumption
b) Revenue recognition principle

-175-

c) Economic entity concept
d) Accrual concept

6. Sony, a multinational electronics corporation, rounds dollar amounts in its financial statements to the nearest $1,000. Which accounting principle/concept justifies this action?
a) Realization concept
b) Economic entity concept
c) Materiality concept
d) historical concept

7. The auditor noticed that the financial statements of Meta Company were missing some footnotes important for users for decision making. This action of the management is a violation of:
a) materiality concept
b) going concern concept
c) economic entity concept
d) full disclosure concept

8. A fixed asset costing Rs.30,000,000 is depreciated over its estimated useful life of 15 years. This action is related to:
a) matching principle
b) monetary unit assumption
c) full disclosure concept
d) None of the above

9. In certain situations, companies might recognize losses but not gains. This action belongs to:
a) revenue recognition principle
b) monetary unit assumption
c) conservatism principle
d) matching principle

10. The Modern Enterprises reported all assets in the balance sheet at current market value. This action is a violation of:
a) materiality concept
b) conservatism concept
c) full disclosure concept
d) cost principle or historical cost concept

11. The accounting process in which the financial statements of a parent company and its subsidiaries are added together to yield a unified set of financial statements is called —
a) translation
b) amortization
c) amalgamation
d) consolidation

12. Accounting in India is governed by the —
a) Reserve Bank of India
b) Income Tax Department
c) Institute of Chartered Accountants of India
d) Company Law Board

13. AS-6 on Depreciation Accounting applies to all depreciable assets except.
a) Building
b) Furniture
c) Goodwill
d) Plant

14. Accounting standard 9 on Revenue Recognition.
a) Is recommendatory
b) Is originally mandatory
c) was recommendatory but now it has been made mandatory
d) was mandatory but now it has been made recommendatory

15. Accounting principles given in Accounting standards are of great importance as it provides basis for:
a) Recognition of an item as income and expense, asset or liability
b) Guide entitities in preparation and presentation of financial statements
c) Reduces the incosistencies
d) All of above

16. A financial statement to show what a business owns and owes at a particular point in time?
a) A cash flow statement
b) The bank statement for the business
c) A balance sheet
d) A statement of retained earnings

Total No. of Pages :2 *Roll No. .....*

FIRST & THIRD SEMESTER B.Tech.

MID- SEMESTER EXAMINATION SEP-2019

FEC 27 Professional Ethics &Human Values

Time: 1:00 Hour *Max. Marks : 25*

Note:There are two sections in this question paper.
Section-A is a compulsory question.
Attempt any three questions from Section-B.

SECTION-A

Q.1.Study the given case carefully and answer the following question: (7 Marks)

Mr.Rajesh, a reputed structural engineer, is in charge of design, construction and positioning of pillars of metro flyover. A junior engineer in his team tells him that there is a major flaw in the positioning of pillars and they should be replaced at any cost. Otherwise, it would cause a major accident in future. Moreover in few days, it is to be inaugurated for trail runs. Also, replacing with pillars would unflate the cost for the company and would further delay the project. In this situation, what would be legal and ethical consequences, if Mr.Rajesh ignores the advice of his junior engineer? What should Mr.Rajesh ideally do?

SECTION-B

(Attempt any three questions)

(6x3=18 Marks)

Q.2. What is professionalism? Explain the characteristics and responsibilities of a professional?

Q.3. Explain the various dimensions of harmony in life (personal, social, family, nature)?

Q.4. Write short notes on any two of the following:

a) Deontology b) Utilitarianism c) Virtue Ethics

Q.5. Why ethical codes and conduct are important in a profession? Name few professional associations and codes of conduct prescribed by them.

Q.6. What do you mean by ethics? What is the need and importance of value education in society?

-END-

Total No. of Pages 1 —177— *Roll No. .....*

First & Third Semester **B.Tech.**

MID TERM EXAMINATION **SEP-2019**

FEC 32 Logical Reasoning

Time: 1:00 Hour *Max. Marks : 25*

Note : Answer all questions.

Q.1 Answer any *two* of the following: **(6+6=12Marks)**

1a) Explain the traditional square of oppostion.

1b)What is a term? Elaborate distribution of term with reference to all four categorical proposition.

1c) Explain with examples the differences between deductive and inductive argument.

1d) Not all sentence are propositions. Discuss the distinction between sentence and proposition.

Q.2. If 'Some circles are not physical objects' is true, what can be inferred about the truth/falsity of its opposites (Traditional Square of Opposition) **(3 Marks)**

Q.3. Give conversion and contraposition of any *two* of the following : **(2x2=4Marks)**

a) Some cats are not black.
b) All scientists are philosophers.
c) No dishonest person is brave being.

Q.4. Reduce the following into logical form. (Any *two*) **(1+1=2Marks)**

a) Many politicians are not socialists.
b) Only ladies are allowed in this bus.
c) Not all roses are red.
d) Birds all have wings.

Q.5. If "No scientists are philosophers" is given as true then what can be inferre about the truth or falsity of any *two* the following: **(2x 2 =4Mark**

a) No non-philosophers are scientists.

b) No scientist are non-philosophers.

c) Some non-philosophers are not non-scientists.

-END-

Roll No.....

Total no. of pages: 1

B. Tech.

FIRST & THIRD SEMESTER

September- 2019

MID SEMESTER EXAMINATION

FEC 37 French

Time: 1:00 Hours

Max. Marks: 25

Note: Attempt all questions. Marks allotted to questions are given against them.

Q 1 Clear the concept & relationship of Language & Communication . 5+5=10

Q 2 How French is associated with Hindi & English? 10

Q 3 Write a one short communication in French at Classe/Bibliotheque/Cantine. 5

END

Roll no.....

Total No of Pages: 2
1ST & 3rd SEMESSTER
MID-TERM EXAMINATION

B. Tech.
Se pt. 2019

[FEC-39] JAPANESE LANGUAGE

Max. Mark: 25

Time: 1:00 Hour

Note: Answer all questions.

I. Write into Hiragana. (5)

Example: koko - ここ

1. Chikatestu
2. Ashita
3. Seifu
4. Kimono
5. Kabuki
6. Nihon
7. Akai
8. Hokkaidou
9. Toukyou
10. Sapporo

II. Write into Katakana. (5)

Example: sāchi -search- サーチ

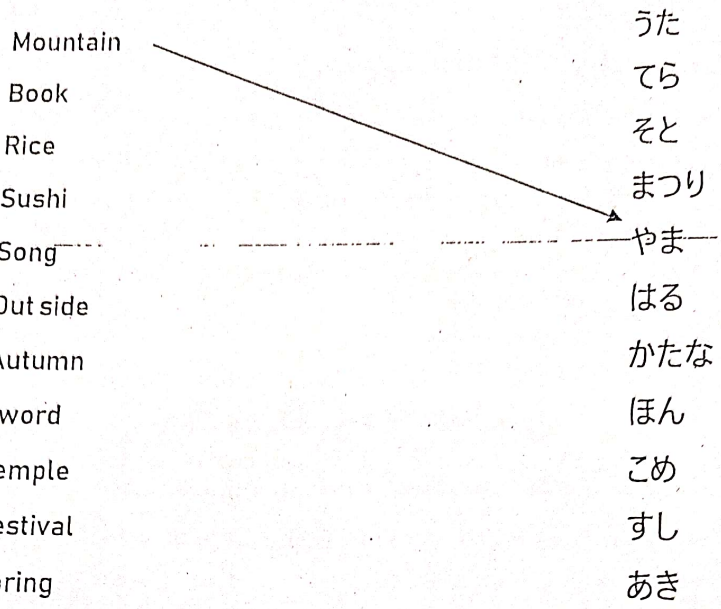
1. aisu - ice
2. kēki - cake
3. tesuto - test
4. sōsu -sauce
5. takushi -taxi
6. kōto - coat
7. miruku - milk
8. naifu- knife
9. Nōto - notebook
10. kamera - camera

III. Write into English. (5)

Example: スケート - skate

1. アウト
2. アメリカ
3. イギリス
4. インド
5. ネクタイ
6. ゴルフ
7. ビル
8. ダンス
9. バス
10. ゲーム

IV. Match the followings. (5)



V. Fill in the blanks with the appropriate Hiragana, such as..は、の、も..... (3)

Example: わたし（ は ）がくせいです。

1) わたし（ ） Amit です。
2) これは にほんご（ ） ほんです。
3) Sumit さん（ ）がくせいです。Kriti さん（ ）がくせいです。
4) それ（ ）あなた（ ） ほん ですか。

VI. Answer the following questions. (Hiragana / Romaji) (2)

1) あなたは がくせい ですか。Anatawa gakusei desuka.

2) あなたは イギリスの がくせい ですか。Anatawa igirisu no gakusei desuka.

—181—

Total No. of Pages 2

Roll No. .....

1st SEMESTER

B.Tech

MID SEMESTER EXAMINATION (September – 2019)

FEC40 GERMAN

Time: 1:00 Hour *Maximum Marks : 25*

Note : Answer all the questions.
Assume suitable missing data, if any.

1) Lesen Sie den Text und beantworten Sie die folgenden Fragen: (2 ½)

Arnold Alois Schwarzeneger (geb. 1947) – seine Freunde sagen Arnie – kommt aus Österreich, aus Thal in der Steiermark. Sein Hobby und sein Beruf in Österreich war Body building. Er lebt seit 21 Jahren in Amerika. Er hat in Los Angeles Ökonomie studiert. Er spricht Deutsch, Englisch und ein bisschen Spanisch: Hasta la vista Baby – ein Satz aus dem Film „ Terminator 2 “. Arnold Schwarzneger ist verheiratet mit Maria Schriver. Sie haben vier Kinder. Die Familie wohnt in Kalifornien. Er war Filmstar, jetzt ist er Politiker: Gouverneur von Kalifornien. Eine fantastische Karriere.

1) Woher kommt Arnold Alois Schwarzeneger?
2) Was ist er von Beruf in Kalifornien.?
3) Was war sein Hobby in Österreich?
4) Wo wohnt er jetzt?
5) Spricht er zwei Sprachen?

2) Ergänzen Sie die folgenden Verben in der richtigen Form (2 ½)

spielen, kommen, lernen, surfen, hören,

1. _____ du Fussbball?
2. Wir _____ Deutsch an der DTU.
3. Maria _____ aus Italien.
4. Ich _____ Rock Musik.
5. Martin und Ronald _____ gern im Internet.

3) Übersetzen Sie ins Deutsche: (Translate in German) (2)

1. Diwali is in october.
2. Paul lives in Germany.
3. We are studying B.Tech.
4. We have a class on Tuesday.

4) Formulieren Sie die Sätze? (form the sentences) (2)

1. Martin / Informatik / studiert / Berlin/ in.
2. Abend / trinkst / am / du /was?
3. arbeite / gern / ich / Computer / am.
4. Onkel / ist / Ingenieur / mein / arbeitet / Volkswagen / bei / und.

5)Schreiben Sie die folgenden Zahlnummer ins Deutsche?(Write following numbers in German) (1)

1. Zwanzig plus sechs = _____.
2. Vierundsiebzig minus neun = _____.

(2 ½)

6) Ergänzen Sie!
wo, was, woher, wie, wer

1) _____ alt sind Sie?
2) _____ ist nicht in der Klasse?
3) _____ trinken Sie morgens?
4) _____ kommt der neue Professor? Aus England oder Polen
5) _____ wohnen Sie?

7) Schreiben Sie die Gegenteile: (Write the opposites (2 ½
gross, schlecht, teuer, kalt, alt

8) Übersetzen Sie ins Englische: (Translate in English) (
1. Die Schweiz ist sehr schön.
2. Am Wochenende gehe ich ins Theater.
3. Ich komme aus Frankreich und spreche Französisch.
4. Hast du einen Mercedes?
5. Maria arbeitet bei Siemens in Österreich.
6. Mein Chef kommt aus Spanien.

9) Ergänzen Sie?
ist, hast.bist, habe

1)_____ du heute eine deutsche Klasse?
2) Mathias, Wo _____ du?
3) Ich _____ ein Meeting.
4) Indien _____ ein grosses Land.

10) Schreiben Sie 10 Sätze über sich selbst ? (Write 10 sentences about yourself?)

Total No. of Pages 01

Roll No. .....

-183-

IST SEMESTER

B.Tech.[All]

MID TERM EXAMINATION

Sept-2019

FEC 45

Engineering Exploration

Time: 1:00 Hour

Max. Marks : 30

Note : Answer all questions. Assume suitable missing data, if any.

Q.1 Explain the steps in engineering design process with the help of a block diagram. (10)

Q.2 Discuss the various reasons of failures in engineering design. (5)

Q.3 Design a +5 volt DC power supply. (5)

Q.4 Mention the features of arduino uno R3 board. (5)

Q.5 Explain the most likely part of the testing and evaluation stage of designing a smart phone. (5)

-184-

Roll. No.....

Total No of Pages 01

1st SEMESTER B.TECH

~~Supplementary~~ Back Exam EXAMINATION Sept. 2019

FEC46 TECHNICAL COMMUNICATION

Time: 1.00 Hour Max. Marks: 25

Note: Answer all the questions
Assume suitable missing data, if any.

1. Write short notes on any two of the following: 10
a) Presentation skills
b) Communication for engineers
c) Importance of listening skills

2. Write a resume for the position of an executive engineer in ABC industries (imagine details). 5

3. The topic for Group discussion is "Spread of fake news in the age of social media"? 10
a) Give your opinion.
b) Suggest solution to the problem.

-END-

-184-

Roll. No.....

B.TECH

Sept. 2019

Total No of Pages 01

1st SEMESTER

~~Supplementary~~ EXAMINATION

FEC46 TECHNICAL COMMUNICATION

Max. Marks: 25

Time: 1.00 Hour

Note: Answer all the questions
Assume suitable missing data, if any.

1. Write short notes on any two of the following: 10
a) Presentation skills
b) Communication for engineers
c) Importance of listening skills

2. Write a resume for the position of an executive engineer in ABC industries (imagine details). 5

3. The topic for Group discussion is "Spread of fake news in the age of social media"? 10
a) Give your opinion.
b) Suggest solution to the problem.

-END-

Total no. of pages_One Roll No.....

BTech

MID SEM Examination **September-2019**

FEC47 **Value Driven Leadership**

Time: 60 Minutes **Max. Marks: 25**

Attempt all questions. Assume suitable missing data, if any.

Question 1. Explain Thomas Donaldson Ethical Algorithm keeping 'Google in China' case as the base. **(8 Marks)**

Question 2. Discuss the circumstances under which Satyam's fraud was exposed. What do you think were the reasons for the fraud? **(8 Marks)**

Question 3. Write short notes on **Any Two: (9 Marks=2* 4.5 Marks)**

i. Practicing Morals in 21st Century
ii. Corporate Social Responsibility
iii. Situations where Truth is dangerous for the organization

-186-

Total No. of Pages 2 Roll No. .....

First and Third Semester B.Tech.

MID SEMESTER EXAMINATION SEP-2019

FEC 48 Introduction to Biological Sciences

Time: 1:00 Hour *Max. Marks : 25*

Note : Answer all questions.

1. Write a note on any four: 2.5X4
   (a) Urey and miller's experiment for origin of Life
   (b) Nitrogen cycle
   (c) Food web
   (d) Ecological pyramids
   (e) Nuclear pollution
   (f) Eutrophication
   (g) Bioremediation

2. Give definition (any eight): 1X8
   (a) DNA
   (b) Ecosystem
   (c) Osmosis
   (d) Omnivorous
   (e) Environmental pollution
   (f) Photosynthesis
   (g) Biome
   (h) Mutualism
   (i) Autotrophs
   (j) Hypotonic solution

3. Differentiate any two: 2X2
   (a) Prokaryotic and eukaryotic cells
   (b) Photosynthesis and cellular respiration
   (c) Arctic Tundra Biome and Temperate Grasslands Biome

4. What is level of organization in Ecology, explain with a diagram/flowchart? What are biotic and a biotic factor? 3

Or

P.T.O.

What is a food chain? Give an example with diagram starting from primary producer, consumers to decomposers.

****

C/7

Total No. of Page 01

Roll No.....

First & Third Semester

Foundation Elective

MID SEMESTER EXAMINATION

September – 2019

FEC 49 SKETCHING & RENDERING

Time: 1 Hour

Max. Marks: 30

Note: Attempt all questions

Section A

Q1. What is the difference between Sketching and Rendering? Briefly explain with visual in 100 wards. 10

Q2. Quick sketch one of your family member in sitting posture in H-6''. 5

Section B

Q3. Draw a geometrical 3D shape of about 4" and render it with only variation of lines. 6

Q4. Draw a Cup of 5"x 2.5" x 2.5" with rendering (tonal) in three position.

i) Eye level ii) Above eye level iii) Below eye level 9

*****

Total No. of Page 01

Roll No.....

First & Third Semester

Foundation Elective

MID SEMESTER EXAMINATION

September – 2019

FEC 50 TINKERING & ELEMENTS OF DESIGN

Time: 1 Hour

Max. Marks: 30

Note: Attempt all questions

Section A

Q1. Explain the following: 15

A: Give brief explanation about the purpose of the product.

B: Explain the working of the product.

C: Identified the main technique involved.

Section B

Q2. Draw a Cylinder of 5"x 2.5" x 2.5" with rendering (tonal) in three position.

i) Eye level ii) Above eye level iii) Below eye level 6

Q3. Draw a shape of 6'' and render the shape with lines. 4

Q4. Close your eyes and imagine the situation of your room and sketch it on size 8''x 10'' 5

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- 189-A -

Total no. of pages: 1 Roll No. .....

FIRST SEMESTER **B. Tech.**

MID SEMESTER EXAMINATION **September- 2019**

HU 101 FEC10 Communication Skills

Time: 1:00 Hours **Max. Marks: 25**

Answer the following questions:

1. Define communication as a bi-polar process. Explain the implication of 'skill' in communication skill. **(12.5)**

   OR

   Bring out the essential features of effective communication. Illustrate your answer.

2. What are the major barriers to effective communication? Suggest the remedial measures to overcome the barriers. **(12.5)**

   OR

   Express your views on "Technology and Human Life".

Total No. of Page-02 Roll No. _____

Mid-semester Examination **Sept.2019**

Third Semester **B.Tech**

HU201- Engineering Economics

Marks-25 Marks **Tim e-1.30 Hrs.**

Attempt all questions.

Q1. Write 'True' or 'false' 10*1/2=5

(a) Goods and service tax is a direct tax.

(b) Cross elasticity of complementary goods are positive.

(c) Complementary goods are those goods which can be used in each other's place.

(d) Labor gets wages for their contribution in production.

(e) Price elasticity is greater than one for necessary goods.

(f) There are few producers in the monopolistic condition market.

(g) In case of adverse balance of payment, value of export is more than the value of import.

(h) Wood in a forest is a free good.

(i) Cost of the next best option is the opportunity cost of best option.

Q2. Discuss the significance of price elasticity of demand. 5

Q3.Difference between Microeconomics and macroeconomics 5

Q4. What is inflation? Discuss the measures to control inflation 5

Q5. How tax is different from subsidy? 5

-192-

Total No of Pages 01 Roll. No.....

FIFTH SEMESTER B.TECH

MID SEMESTER EXAMINATION Sept. 2019

HU301 TECHNICALCOMMUNICATION

Time: 1.50 Hours Max.Marks: 25

Note: Answer all the questions
Assume suitable missing data, if any.

1. Write short notes on any two of the following: **10**

a) Technical communication

b) Formal reports

c) Cover letter

2. Write a resume for the post of executive engineer in an expanding multinational Company based in Mumbai. (Imagine details). **5**

3. The topic for GD is "Reservation for women in parliament". **10**

a) Give your opinion on the topic.

b) Justify by giving solid reasons.

-END-

Total No. of Pages :2 *Roll No. .....*

FIFTH SEMESTER B.Tech.

MID-SEMESTER EXAMINATION SEP-2019

HU303 Professional Ethics &Human Values

Time: 1.5 Hours *Max. Marks :25*

NOTE: There are two sections in this question paper.
Section-A is a compulsory question.
Attempt any four questions from Section-B.

SECTION-A

Q.1.Study the given case carefully and answer the following question: **(5 Marks)**

We are aware about the data breach scandal involving the world's largest social media network, Facebook, its impact on the company, and the challenges facing the social media gaint. Designed with the vision of connecting people with their friends and family to discover what's going on in the world and to share and express what matters to them, facebook became a popular social media company with about 2.19 billion monthly active users as of the first quarter of 2018. However, the company's continuous growth was marred by security concerns. Facebook was caught in a major data breach scandal in which a political consulting firm- Cambridge Analytica- pulled out the personal data of more than 87 milloin Facebook users without their consent. When facebook got to know about the data breach, it allegedly did not do anything and waited for months to send orders to Cambridge Analytica to delete all data. Further, the company did not follow up to check whether the illegally acquired data had been deleted.

Though the company took several initiatives to prevent such data leaks in future, it remained to be seen whether it could fix its reputation.

Facebook founder and CEO Mark Zuckerberg apologized for the 'major breach of trust' but was that enough to reassure users? Analyze the ethical issues arising out of the Facebook data breach scandal.

SECTION-B

(Attempt any four questions) **(4x5=20 Marks)**

Q.2. Define the term 'Professionalism'? A professional has an additional characteristics and responsibility in addition to that of a citizen. explain it.

Q.3. What do you mean by value education? Explain why there is need to focus on value education?

Q.4. Define the term 'values', 'morality' and 'ethics'? What is the practical relevance of ethics in society?

Q.5. What is a code of ethics? Name few professional associations and their ethical codes prescribed by it.

Q.6. There are many problems manifest today at the level of individual, family, society and the nature. Explain some of the ways to maintain happiness, harmony and prosperity in these different spheres of life.

Q.7.Explain and compare the three major ethical theories - Deontology, Utlitarianism and Virtue Ethics.

-END-

Total No. of Pages 02 Roll No.--------

VthSemester B. Tech

MID SEMESTER EXAMINATION September -2019

HU351 Mathematical Economics and Econometrics (University Elective)

Time: 1Hours30 Minutes Max Marks: 25

Note: Answer all questions.
Assume suitable missing data, if any

Q1. Discuss Mathematical Economics and Econometrics with example and also discuss their five applications for engineering students. 4

Q2. Differentiate with giving examples between following 9

i. Nominal data and Ratio data

ii. Cross Sectional data and Time Series data

iii. Use of Differential and Integral Calculus in Economics

Q3. Mr. Suresh went to a market to purchase 3kg of pulses, 4 Kg of Rice, 2 Kg of Flour and 2 Kg of Sugar. In a shop near his residence, these commodities are priced at Rs. 80, Rs. 50, Rs. 35 and Rs. 80 respectively. Whereas in the local market, these commodities are priced at Rs. 70, Rs. 35, Rs. 30 and Rs. 75 respectively. Charges to both way commuting charges to the local market is Rs. 60. Find the net savings of Mr. Suresh using Matrix algebra. 2

Q4. For a certain item the demand curve is $p = D(q) = 20\ q + 1$ and the supply curve is $p = S(q) = q + 2$. Find the equilibrium price and equilibrium quantity. Then compute the consumer and producer surplus. 3

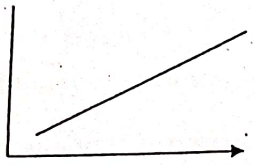
Q5. A firm under monopolistic competition faces a linear demand function and a linear cost function as 3

$P = 16-2q$

$C = 2+8q$

Find the total cost and its monopoly power

Q6. Which two economic relationships can be shown by following diagram. Discuss. 4



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-197-

Total No. of Pages-01

Roll No.....

Vth Semester

B.Tech 2019

MID SEMESTER EXAMINATION September 2019

HU353 INTERNATIONAL TRADE

Time: 1:30 Hours

Max. Marks: 25

Note: All questions are compulsory.
All questions carry equal marks.

1. Discuss research imperatives in International trade.

2. Why do firms internationalize? What are the differences between domestic and International trade?

3. Discuss the role of globalization and innovation in international trade with special reference to developing economies.

4. Trade barriers are like steroids to athletes, a temporary fix and a disaster in Long run. Comment on the statement above.

5. What do you understand by International Business Environment? Explain any one environment in detail.

****

Total No. of Pages-01 Roll No.....

Vth Semester B.Tech 2019

MID SEMESTER EXAMINATION September 2019

HU353 INTERNATIONAL TRADE

Time: 1:30 Hours Max. Marks: 25

Note: All questions are compulsory.
All questions carry equal marks.

1. Discuss research imperatives in International trade.
2. Why do firms internationalize? What are the differences between domestic and International trade?
3. Discuss the role of globalization and innovation in international trade with special reference to developing economies.
4. Trade barriers are like steroids to athletes, a temporary fix and a disaster in Long run. Comment on the statement above.
5. What do you understand by International Business Environment? Explain any one environment in detail.

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-198-

Roll No. .....

Total No. of Pages:01

B.Tech

3rd SEMESTER

SEP-2019

MID SEMESTER EXAMINATION

MG201 Fundamentals of Management

Max. Marks:25

Time: 1:30 Hours

Note: Question 1 is mandatory
Answer any three of the remaining questions

Q1 XYZ Pvt Ltd is in the business of producing formal shoes. Their Top management team h appointed a new general manager 'R' to handle their project of expanding into the sports shoe segment. R holds a press conference to convey the future plans of XYZ. He hires new project team and relays them with necessary requirements of the venture and various responsibilities. R organises the resources needed for the new venture and negotiates wi the top management team for adequate allocation. A separate marketing, finance and HR team is appointed for the new division of shoes. He laid out the goals and targeted result that the division wants to achieve. To develop a successful product line, R decides to stud the psychological change brought in by the fitness trend growing in the country. The project was finally initiated.

Based on the above case, attempt the following questions

a. What are the various features of management referred in the case? Name and briefly explain any three. (3 Mark
b. Mention any three roles of manager being performed in the case. (3 Marks)
c. Which organisational structure would best suit this type of expansion and give any tw advantages of this structure? (4 Marks)

Q2 Explain the primary functions of management? (5 Marks)

Q3 Explain Maslow's Need hierarchy theory with examples and diagram. (5 Marks)

Q4 Compare Functional, Divisional and Matrix organisational structures. (5 Marks)

Q5 Explain the concepts of Accountability, Authority and Responsibility and their relation with each other. (5 Marks)

END

Total No. of Pages02

Roll No. .....

THIRD SEMESTER

B.Tech. (IT)

MID SEMESTER EXAMINATION SEPT-2019

IT-201 DATA STRUCTURES

Time: 1:30 Hours

Max. Marks : 30

Note : Attempt all Questions.
Assume suitable missing data, if any.

1)

a) Classify different types of Data structures. Also discuss how they can help in reducing space complexity for different real world problems. (3)

b) Give the sequence of argument values that result when the following program is invoked for each of integers 3, 4 and 5. (4)

```
int puzzle(int n)
{
    If (n==1)
        return 1;
    If (n%2==0)
        return puzzle(n/2);
    else
        return puzzle(3*n+1);
}
```

2)

a) What is the output of the following code snippet? (3)

```
#include <stdio.h>
int main()
{
    int arr[][3]={{1,2},{3,4,5},{5}};
    printf("%d%d%d", sizeof(arr), arr[0][2], arr[1][2]);
    return 0;
}
```

b) Give an algorithm to convert a Prefix expression to an Infix expression using Stacks. (5)

3)

a) Write a program to insert a node with info 5 after each node having the info as 4 in a linked list. (4)

b) Implement a stack using arrays in C. (4)

4)

a) Write a program to delete redundant elements from a queue. (4)

b) Give the linked implementation of a queue and discuss th implementation of priority queues. (3)

-End-

Total No. of Pages 1

Roll No. .....

III SEMESTER

B.Tech.[IT]

MID SEM EXAM

(SEPT-2019)

IT 203 OBJECT ORIENTED PROGRAMMING

Time:1.5 hrs.

Max. Marks: 30

Note: Assume suitable missing data, if any. Give examples wherever required.

Q1. Answer the following [3x3

a) What is static in data members and member functions? Explain

b) Differentiate between Call by value vs call by reference using 'object as argument' concept.

c) How to invoke a private constructor?

Q2.

a) Differentiate between Class and structure with examples from each. [

b) What is the role of :: in inheritance? [3

c) Can destructors be overloaded? Why or why not. [

Q3.

a) What is operator overloading and which feature of OOP does it repres Explain with example of overloading delete operator and << operator. [

b) Write a program to show the use of virtual base class.

Q4.

a) What is the role of a nested class? How to use it?

b) What is initialiser list and discuss its role in constructor calls in mul inheritance in C++ with examples.

Total No. of Pages: 02 *Roll No.....*

IIIrd SEMESTER **B.Tech. (Information Technology)**

MID SEMESTER EXAMINATION **September-2019**

IT205 Discrete Structures

Time:1:30 Hours *Max. Marks: 25*

Note : Answer all question.
Assume suitable missing data, if any.

Q.1 [A] Write the converse, inverse, contrapositive, and negation of the following statement.
"If Sandra finishes her work, she will go to the basketball game."
(2.5 Marks)

[B] Determine whether the conclusion follows logically from the premises.

Premises: $(\neg p \vee q) \rightarrow r$
$r \rightarrow (s \vee t)$
$\neg s \wedge \neg u$
$\neg u \rightarrow \neg t$
Conclusion: p
(2.5 Marks)

Q.2 [A] Check the following argument logically correct?
Premises: There are men who are soldiers.
All soldiers are strong.
All soldiers are brave.
Conclusion: Therefore, some strong men are brave.
(2.5 Marks)

[B] Let A, B be sets. Prove
$A - (A - B) = A \cap B$.
(2.5 Marks)

Q.3 [A] Prove "A positive integer n is odd if and only if n^2 is odd.", using Direct and Contraposition proof technique.
(2.5 Marks)

[B] Find the of recurrence relation for the "number of binary sequences of length n that have no consecutive 0's". Solve it using characteristic root method.
(2.5 Marks)

Q.4 [A] Let's consider a propositional langiage where

A ="Angelo comes to the party",
B ="Bruno comes to the party",
C ="Carlo comes to the party",
D ="Davide comes to the party".

Formalize the following sentences:

a) "If Angelo and Bruno come to the party, then Carlo comes provided that Davide doesn't come".

b) "Either Carlo comes to the party, or Bruno and Davide don't come".

(2.5 Marks)

[B] If R(x,y)="x relies upon y," express the following in unambiguous English:

a) $\forall x(\exists y R(x,y))$

b) $\exists y(\forall x R(x,y))$

(2.5 Marks)

Q.5 [A] Let $A = \begin{bmatrix} 1 & 1 \\ 0 & 1 \end{bmatrix}$. Then prove that $A^n = \begin{bmatrix} 1 & n \\ 0 & 1 \end{bmatrix}$, for all $n \geq 1$; Using mathematical Induction. (2.5 Marks)

[B] What is the worst case time complexity of following implementation of subset sum problem.

```
bool isSubsetSum(int set[], int n, int sum)
{
// Base Cases
if (sum == 0)
return true;
if (n == 0 && sum != 0)
return false;

// If last element is greater than sum, then ignore it
if (set[n-1] > sum)
return isSubsetSum(set, n-1, sum);

/* else, check if sum can be obtained by any of the following
(a) including the last element
(b) excluding the last element   */
return isSubsetSum(set, n-1, sum) ||
isSubsetSum(set, n-1, sum-set[n-1]);
}
```

(2.5 Marks)

Total No. of Pages: 03
THIRD SEMESTER
MID SEMESTER EXAMINATION

Roll No.....
B.Tech. (IT)
September-2019

IT-207- ENGINEERING ANALYSIS AND DESIGN (MODELLING & SIMULATION)

Time: 1.5 Hours *Max. Marks: 25*

Note: Attempt *ALL* questions.
Assume suitable missing data, if any.

Question No. 1 [1x5=5]

[a] Compare and contrast between model and system.
[b] What is the need for simulation?
[c] When is the simulation not feasible?
[d] Differentiate between stochastic and deterministic models.
[e] Highlight the difference between verification and validation.

Question No. 2 [2+3=5]

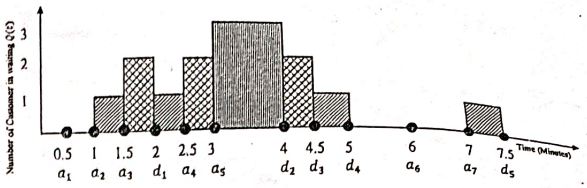
[a] What is system environment? And discuss how it affects the system performance.
[b] What are the components of the system? Consider 'Library of the university' as a system, identify its components. Also, develop workflow mechanism of hostel using various program subroutines.

Question No. 3 [2+3=5]

[a] What is discrete event simulation model? Describe the time advance mechanism of discrete event simulation model.
[b] For the single server queuing system, consider $Q_s(t)$ is the total number of customer in the system at time t and $Q(t)$ is the number of customer waiting in queue at time t . determine the followings:-
I) What is the relation between $Q_s(t)$ and $Q(t)$.
II) A realization of single server queuing system is given in below Fig. and make the plot of $Q_s(t)$ vs. t.

Question No. 4 [2+2+1=5]

Consider a single server queuing model for which the possible time path of realization is as given in below figure, where $a_1, a_2, a_3, a_4, a_5, a_6, a_7$ and d_1, d_2, d_3, d_4, d_5 are the arrival and departure instances of the customers. Determine the followings:-



[a] Expected average delay in queue of the customers.
[b] Expected time average number of customer in queue.
[c] Expected non utilization of server and plot of utilization of server usir concept of busy function.

Question No. 5

Consider an inventory system which is concerned with the purchase and s of computer magazines. The magazine dealer buys the magazine for ₹ 33 ea and sells them for ₹ 50 each. Magazines not sold at the end of the day are s as scrap for ₹ 5 each. Magazines can be purchased in bundles of 10. Thus, magazine dealer can buy 50, 60, and so on. There are three type of magaz days: "good"; "fair"; and "poor"; they have the probabilities 0.35, 0.45, a 0.20, respectively. The distribution of magazines demanded on each of th days is given in Table 1.

Table 1: Distributions of magazines per day

Demand	Demand Probability Distributions		
	Good	Fair	Poor
40	0.03	0.10	0.44
50	0.05	0.18	0.22
60	0.15	0.40	0.16
70	0.20	0.20	0.12
80	0.35	0.08	0.06
90	0.15	0.04	0.00
100	0.07	0.00	0.00

The difficult is to compute the optimal number of magazines the magazine dealer should purchase and it will be accomplished by simulating demands for 10 days and recording profits from sales each day. The type of newsmagazine day and demand are stochastic in nature. Hence, random numbers for 10 days sale and purchase are as given in Table 2.

Table 2: Random Digit Assignments for Types of day and Types of magazine

Day	Random Digits for type of day	Type of magazine day	Random digit for demand
1	58	Fair	93
2	17	Good	63
3	21	Good	31
4	45	Fair	19
5	43	Fair	91
6	36	Fair	75
7	27	Good	84
8	73	Fair	37
9	86	Poor	23
10	19	Good	02

Develop the simulation table for 10 days which includes 'revenue generated', 'Lost profit from excess demand', 'Salvage from the sale of scrap', and 'Daily profit'. It is assumed that only 70 number of magazines are maintained in the inventory system every day.

Total No. of Pages _02__ Roll No. .....

_Fifth__ SEMESTER B.Tech [IT]

MID SEMESTER EXAMINATION Sept-2019

IT-301 THEORY OF COMPUTATION

Time: 1:30 Hours Max. Marks : 25

Note : Answer all questions
Assume suitable missing data, if any.

Q.1 a) Construct a DFA for L={w: w contains at least one '00' but does not contain any '11'}, given the alphabets {0,1}. Show all steps in detail. Use closure properties if required. (7)

b) Construct the grammar for the language in Q. 1 (a). (4)

Q.2 Use the pumping lemma for regular languages to check whether the following language is regular or not regular: $L=\{a^n, n\neq 3\}$ (4)

Q.3 a) Minimize the following machine (if possible) using pi-partitioning method or any other equivalent process: (4)

P.S	N.S	
	a	b
→(q0)	q3	q1
q1	q0	q2
q2	q1	q3
q3	q0	q2

b) Derive the language accepted by the reduced machine (after minimization) using Arden's theorem. (3)

Q.4 If $L_1=\{ab, ba\}$ and $L_2=\{aa, bb\}$

a) Write down any five members of the language L_1^*

b) What is the UNION set of L_1^*, L_2^*?

c) What is the INTERSECTION set of L_1^*, L_2^*? (3)

Total No. of Pages 1

Roll No.....

FIFTH SEMESTER

B.Tech.[IT]

MID SEMESTER EXAMINATION

Sep-2019

PAPER CODE:IT303

TITLE OF PAPER:Computer Networks

Time: 1:30 Hours

Max. Marks : 25

Note : Answer all questions
Assume suitable missing data, if any.

Q.1. Explain with TCP/IP protocol stack the layered architecture of a computer network. (5)

Q.2. Differentiate between

1. Guided and unguided media
2. Datagram and virtual circuit switching (2X2=4)

Q.3. Compute the CRC for the data word 110101011, where the generator polynomial is x^4+x+1. If the said frame is received as 1101000111101 , verify the correctness of the received frame. (5)

Q.4. What is the purpose of "Framing"? What are the different framing techniques available? (5)

Q.5. Design a bit oriented data link layer protocol to address the various data link layer design issues. The maximum packets outstanding at any time should be 4. (6)

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Total No. of Pages: 01

— 209 —

Roll No_____

FIFTH SEMESTER

B.Tech. [ALL]

September-2019

MID SEMESTER EXAMINATION

IT-307 PATTERN RECOGNTION

Time: 1 Hour and 30 Minutes

Max. Marks: 20

Note: Answer *ALL* questions.
Assume suitable missing data, if any.

Question No. 1 [4]

Explain the role of Feature Extraction and Feature Selection in the optimal design of Pattern recognition systems. Does the feature selection further influences the type of classifier preferred for Pattern recognition? Give proper justification to your answer with a few examples.

Question No. 2 [4]

Let "X" be the continuous random variable with following PDF:-.

$f(x) = \begin{cases} Kx & for\ < 0\ x < 1 \\ 0 & otherwise \end{cases}$, Where K is constant.

[a] Determine the value of K and Sketch $f_x(x)$.
[b] Find and Sketch the corresponding CDF $F_x(x)$.
[c] Find P (0.25 < x < 2)

Question No. 3 [4]

Describe the mathematical analysis of Bayes Decision Theory and state the classification rule for Two Class Classifier. Plot the two regions of Bayesian classifier for the case of two equi-probable classes and give your comments.

Question No. 4 [4]

Consider two weak students in programming, who writes a program and their chance of writing a correct program are 1/8 and 1/12. If the probability of making a common error is 1/10001 and they obtain the same answer, find the chance that their program is correct.

Question No. 5 [4]

Let "X" be a uniformly distributed random variable over the interval 'a' to 'b'. Evaluate the following:-

[a] Mean of random variable "X".
[b] Mean Square value of random variable "X".
[c] The variance of random variable "X".

-210-

Total No. of Pages 1 *Roll No. .....*

FIFTH SEMESTER **B.Tech. (I.T.)**

MID SEMESTER EXAMINATION **(September-2019)**

IT-321 MALWARE ANALYSIS

Time: 1 Hour 30 Mins **Max. Marks: 25**

Note: Attempt ALL questions. Assume suitable missing data, if any.

1. State the difference between
   a) Virus, worm and trojan attack with example.
   b) Static and dynamic analysis.

2.
   a) Give an overview of PE file format with diagram.
   b) How many sections are possible in a PE file. Explain very common sections in detail.

3.
   a) Are Sandbox and virtual machine equivalent. Explain briefly.
   b) What is the purpose of virtual machine? Write the steps to analyze the malware using virtual machine.

4.
   a) Explain "VirusTotal" tool including properties and unique features to analyze a malware.
   b) "Text.dll" Can this file run directly in windows. Why. How run a malware in windows.

5. Explain the following:
   a) Packed and obfuscated malware.
   b) String command in unix.

Total No. of Pages: 02 Roll No_____

FIFTH SEMESTER B.Tech. (ALL)

MID SEMESTER EXAMINATION September-2019

IT-351 ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

Time: 1 Hour and 30 Minutes Max. Marks: 25

Note: Answer *ALL* questions.
Assume suitable missing data, if any.

Question No. 1 [1x5=5]

Translate in two ways each of these statements into logical expressions using predicates, quantifiers, and logical connectives. First, let the domain consist of the students in your class and second, let it consists of all people.

[a] Someone in your class can speak Hindi.

[b] Everyone in your class is friendly.

[c] There is a person in your class who was not born in California.

[d] A student in your class has been in a movie.

[e] No student in your class has taken a course in logic programming.

Question No. 2 [3+2=5]

[a] What are the challenges in AI? Explain how utility-based agents help to improve the performance of AI systems.

[b] Consider, there are two water Jars, and one measures 5 Gallons (5G) while the other measures 7 Gallons (7G). There is no measuring label mentioned on either of these two Jars i.e. the exact amount of water only be known when Jar is completely filled. Assume that there is a countless amount of water supply, explain how one can measure 1G and 3G using these unmarked Jars by representing it as a state-space problem. (You can empty the Jars, and transfer water from one Jar to other).

Question No. 3 [5]

Consider a Tree graph as given in Figure No. 1, apply an alpha-beta pruning approach to obtain optimal solution.

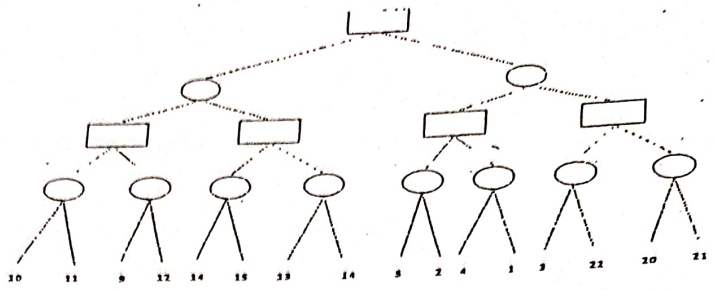
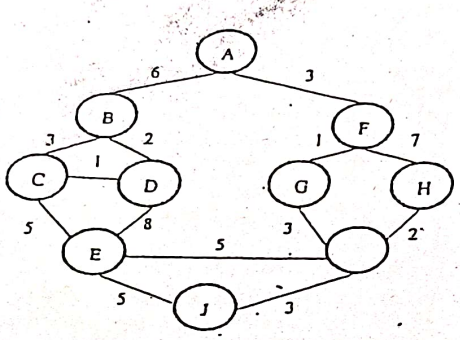


Figure No. 1

Question No. 4 [5]

Describe the Heuristic and Greedy terms in artificial intelligence. Find the shortest path from vertex A to vertex J using A* algorithm.



Node	Heuristic Value
A	10
B	8
C	5
D	7
E	3
F	6
G	5
H	3
I	1
J	0

Question No. 5 [3+2=5]

[a] Explain how hill climbing is a greedy local search-based optimization algorithm. Discuss the challenges in hill climbing.

[b] Identify the differences between artificial intelligence, machine learning, and deep learning.

— 213 —

Total No. of Pages:02 *Roll No.....*

5TH SEMESTER B. Tech. (IT)

MID SEMESTER EXAMINATION SEPTEMBER-*2019*

IT 359 JAVA PROGRAMMING

Time: 1:30 Hours *Max. Marks: 25*

Note: Answer *any Five* questions. Assume suitable missing data, if any.

Q.1 [A] Draw and explain the architecture of JVM. [2.5]
[B] What are the features that make java standout than other Object oriented programming languages? [2.5]

Q.2 [A] Expalin the concepts of object oriented programming. [2.5]
[B] Write a java program that contains various primitive datatypes and performs arithmetic operations on them. [2.5]

Q.3 [A] Discuss various types of operators available in java with suitable examples. [2.5]
[B] What are the rules for assigning identifiers in java? [2.5]

Q.4 [A] Expalin the concept of constructor overloading. [2.5]
[B] Write a java program based on the following criteria.

a) Create a class named 'BankAccount'.
b) Inside the class create three variables named 'balance', 'customerName' and 'accountNumber' with datatypes double, String and int respectively.
c) Create a constructor method that takes three parameters of double, String and int datatype respectively. Assign the parameter values to the variables declared above in the class. Finally, print a Message that says "Account is Created Successfully".
d) Create another class named 'createAccount' outside the BankAccount class. 'createAccount' class should contain the main method.
e) Create an instance of the 'BankAccount' class

in main method of an 'createAccount' class
with random arguments passed to the constructor. [2

Q.5 [A] Explain method overloading with suaitable program. [2
[B] Point out the differences between a class and an object. [2

Q.6 [A] Explain the concept of recursion in java. [2.
[B] Write a java program that prints the factorial of a given number. [2.

Q.7 [A] Explain with an example of Java Source File Structure. [2.
[B] Briefly describe garbage collection mechanism in Java. [2.

END;

Total No. of Pages : 2 Roll No.....

7th SEMESTER [B.TECH. – IV year]

MIDTERM EXAM(SEPTEMBER- 2019)

IT-405 Data Warehouse and Data Mining

Time: 1.30 Hours Max. Marks: 20

Note:	Attempt any 4 Questions. Each Question Carry Equal Marks. Assume suitable missing data, if any.

Section A

Q1. Give a diagrammatical representation of the steps involved in the knowledge discovery from data. Explain in brief. [4]

Q2 a). Identify attribute types for the following: [2]

a. Eye colour
b. Grades
c. Dates in Calendar
d. Age.

b) .Explain architecture of DataWarehouse. [2]

Section B

Attempt any two:

Q.3 (a) Describe the OLAP operations in the Multidimensional data model . [6]

Q.4 Explain the major challenges and applications of Data Mining . [6]

Q.5 Consider the following transaction dataset

Transaction id	Item bought
1	A,D,E
2	A,B,C,E
3	A,B,D,E

4	B,D,E
5	E,B,C
6	C,D
7	D,A
8	A,B,E
9	B,D,C
10	A,E

(a) Compute the support of itemsets {E}, {B,D}, {B,D,E}, {A,B,D,E}(4)

(b) Compute the support and confidence of rules {B,D}->{E} AND (2) {E}->{B,D}

Total No. of Pages 1

Roll No.....

SEVENTH SEMESTER

B.Tech.(IT)

MID SEMESTER EXAMINATION

Sep-2019

PAPER CODE:IT407

TITLE OF PAPER: Information and Network Security

Time: 1:30 Hours

Max. Marks : 25

Note : Answer all questions
Assume suitable missing data, if any.

Q.1. What all can go possibly wrong if two parties are interacting for the first time on an open channel? List the various approaches/techniques to provide security? In an online business it is said "if you are not customer than you are the product". Explain the above statement in context with user privacy using Social Media like Facebook, Amazon etc. (5)

Q.2. Differentiate between substitution and transposition ciphers with example. Encrypt the message "COMPUTERNETWORK" using rail fence cipher (5)

Q.3. How does DES use the Feistel structure to achieve confusion and diffusion of bits from the plaintext to the ciphertext (5)

Q.4. Explain firewall Design Principals and its types. (5)

Q.5. What is the significance of SSL encryption in transport layer security and working. (5)

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Roll No.....

Total No. of Page : 1
VII SEMESTER
MID-SEM EXAMINATION

B.TECH. [IT]
(Sept- 2019)

IT 411 DIGITAL IMAGE PROCESSING

Time: 1:30 Hours **Max. Marks : 20**

Note: Attempt All Questions.

Q.1) Perform histogram equalization on the following 3x3, eight level image. Plot the original and equalized histogram. [4]

1	3	5
4	4	3
5	2	2

Q.2) Why transformed images are more useful than original images? Explain different types of piecewise-linear transformation functions along with their advantages and disadvantages. [5]

Q.3) Describe the algorithm of filtering an image in frequency domain with suitable diagrams. How frequency domain filtering is different from spatial domain filtering? [5]

Q.4) Write short notes on the following: [6]

(a) Mach band pattern
(b) Checkerboard effect
(c) False contouring
(d) Weber ratio

Total No. of Pages _02__ Roll No. .....

_Seventh__ SEMESTER B.Tech [IT]

MID SEMESTER EXAMINATION Sept-2019

IT-425 NATURAL LANGUAGE PROCESSING

Time: 1:30 Hours Max. Marks : 25

Note : Answer all questions in a precise manner.
Assume suitable missing data, if any.

Q.1 Fill in the blanks with the most appropriate answer:

1. Perplexity is used to determine.....
2. Smoothing is used to avoid.....
3. The regular expression the(at)?re/.$ matches the text patterns.....
4. ..... and .... are morphological variants of the word **compute** and both can be mapped to the same root word by the process of ..... (5)

Q.2 Consider the following training corpus:

long long ago, there lived a man.

he was a farmer.

as long as the man was alive, he was happy.

the man lived as long, as long, as he would have wished.

1. Construct a Normalized TF feature vector, using unigrams, for the first sentence and also for the last sentence, where the vocabulary comprises of the words highlighted **in bold only** in the given text.

2. Compute the cosine similarity metric between the two feature vectors
3. In the auto-generated sentence: "**As long .....**" test the candidature of the two words "**as**" and "**ago**" using bigram probabilistic model and decide which word of the two candidate words fits the space well, as per the training corpus.
4. Solve the above part (3) using trigram probabilistic model.
5. Justify by argument which of these two models is a better choice for predicting the next word in the given example "**As long .....**".

(2*5)

Q.3 Define semantic ambiguity in NLP and analyse how it is resolved by WSD using relevant mathematics? (5)

Q.4 Given the following grammar (*order of productions to be strictly followed*) and lexicon (*in the second text box*):

1. S→NP VP	5. NP→Det Adj N
2. S→Adj VP	6. VP→V
3. NP→Name	7. VP→V NP
4. NP→Det N	

N→ fox|man
Adj→fast|slow|red
Name→Harry
Det→the
V→ran|fell

Construct a top-down parsing table for checking whether the test sentence "**fast ran the red fox**" is syntactically correct or not. (5)

Total No. of Pages 1 — 221 — Roll no.....

SEVENTH SEMESTER B.Tech.[All]

MID SEMESTER EXAMINATION Sep-2019

IT427 INTRUSION DETECTION AND INFORMATION WARFARE

Time: 1:30 Hours *Max. Marks : 25*

Note : Answer all questions
Assume suitable missing data, if any.

Q.1. What are intrusion detection systems? What are the various components of an IDS? (5)

Q.2. Explain anamoly, misuse, signature and pattern rule based detection methods. (5)

Q.3. Compare and discuss some common sandboxing techniques with respect to features, design and application. (5)

Q.4. With a help of suitable diagrams show the logical components of SNORT. Explain the working of the detection engine. (5)

Q.5. "Email is based on store and forward mechanism. Both sender and receiver are not connected at all times, also a variety of media may be attached with mails". With reference to the given context discuss email security. (5)

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Total No. of Pages: 1 — 222 — Roll No.....

1st Semester

Mid Semester Examination

B. Tech.

(September-2019)

MA101: Mathematics-I

Time: 1:30 Hours *Max. Marks: 25*

Note: Answer all questions. Each question carries 5 marks. Non-programmable calculator is allowed. Assume suitable missing data, if any.

1. Discuss the convergence of the following series.

$$x-\frac{x^2}{\sqrt{2}}+\frac{x^3}{\sqrt{3}}-\frac{x^4}{\sqrt{4}}+\ldots \text{ where } x\in(-\infty,\infty)$$

2. Discuss the convergence of the following series.

$$x+\left(\frac{1}{2}\cdot\frac{x^3}{3}\right)+\left(\frac{1}{2}\cdot\frac{3}{4}\cdot\frac{x^5}{5}\right)+\left(\frac{1}{2}\cdot\frac{3}{4}\cdot\frac{5}{6}\cdot\frac{x^7}{7}\right)+\ldots \qquad (x>0).$$

3. Assuming the possibility of expansion, find Maclaurin's series of $\sin\left(\frac{\pi}{4}+x\right)$ up to 5 terms. Hence, find the approximate value of $\sin(15^\circ)$.

4. Find the radius of curvatures of the curves $r=a\theta$ and $r\theta=a$, $(0\le\theta\le 2\pi)$ at their points of intersection.

5. Find the volume of the solid generated by revolving the curve $y^2(2a-x)=x^3$ about its asymptote.

III Semester
Mid Semester Examination
Paper Code: MC-201
Max Marks: 25

Roll No.: .....
B.Tech., September-2019
Discrete Mathematics
Time: 1:30 Hours

- NOTE: Answer ALL questions. Assume suitable missing data, if any.

Q 1. Answer all the following questions: (5x1=5)

(a) For each claim, determine whether it is always true or else false is some cases. Give justification for your answer.

i. $|\{\emptyset\}| = 1$ but $|\emptyset| = 0$

ii. Suppose that A is any set and $B = \{A, \{A\}\}$. Then $A \subseteq B$.

(b) Suppose f(x) is the generating function of the sequence 0, 1, 2, 3,.....Find f(x).

(c) Give degree and order of following Recurrence Relation:

$$a_n = cosa_{n-1} + cosa_{n-2} + cosa_{n-3} + ... + e^n$$

(d) What is an abelian group. Give example of an abelian group as well as non abelian group.

(e) solve the system

$$x \equiv 2(mod4)$$
$$x \equiv 6(mod7)$$

Q 2. Answer all the following questions: (2x5=10)

(a) State and prove Lagrange's Theorem for a Group G.

(b) Solve the recurrence relation

$$a_n = -3a_{n-1} + n, n \geq 1, a_0 = 1$$

Q 3. Answer all the following questions: (2x5=10)

(a) For (x, y) and (u, v) in $\Re^2$, define $(x, y)R(u, v)$ if $x^2 + y^2 = u^2 + v^2$. Prove that R is an equivalence relation on $\Re^2$ and interpret the equivalence class geometrically.

(b) Check whether the following statement is a tautology or not

$$([P \rightarrow Q] \leftrightarrow [\sim (P \wedge (\sim Q))]) \rightarrow [(\sim P) \vee Q]$$

Total No. of Pages: 1 — 224 — Roll No.....

IIIrd SEMESTER B. Tech.

MID SEMESTER EXAM (SEPTEMBER-2019)

MC 203: Mathematics-III

Time: 1:30 Hours Max. Marks: 30

Note: All questions are compulsory. All questions carry equal marks. Assume suitable missing data, if any.

Q1. Discuss the convergence of $\int_0^1 (\log(1/x))^{n-1} dx$.

Q2. Prove that $\int_0^1 \frac{x^{m-1}}{1+x} dx$ converges for $m > 0$.

Q3. Show that the function $f(z) = u + iv$, where

$$f(z) = \frac{x^3(1+i) - y^3(1-i)}{x^2 + y^2}, z \neq 0$$

$$and \quad f(0) = 0$$

is continuous and that Cauchy-Riemann equations are satisfied at the origin, yet $f'(0)$ does not exist.

Q4. If $u + v = \frac{2\sin 2x}{e^{2y} + e^{-2y} - 2\cos 2x}$, then use Milne-Thompson's method to find the corresponding analytic function $f(z) = u + iv$.

Q5. Find the bilinear transformation which maps $z = 1, i, -1$ respectively onto $w = i, 0, -i$. For this transformation, find the image of $|z| \leq 1$.

- END -

-225-

Roll No.

Total no. of pages: 1

B.Tech (MCE

SEP 201

3rd_SEMESTER

MID SEMESTER EXAMINATION

MC – 205 Probability and statistics

Max. Marks: 30

Time: 90 mins

Note: Attempt ALL questions. All are of equal marks.
Assume missing data, if any.

1. For two random variables X and Y with joint probability distribution $f(x,y) = \frac{x^2+2y}{k}$ $x = 1,2$ & $y = 1,2,$. Find k and $cov(X,Y)$.

2. A worker operated machine produces a defective item with probability 0.01, if worker follows the machine's operating instructions exactly, and with probability .03, if he does not. If the worker follows the instructions 90% of the time, what proportion of all items produced by the machine will be defective?

3. A Rs. 5000 item can be insured for its total value by paying an yearly premium of Rs. N. If the probability of theft in a year is estimated to be .01, what premium should the insurance company change if it wants the expected gain to equal Rs. 1000?

4. Define moment generating function (mgf), and hence find it for Binomial Distribution. Using the m.g.f. find the mean and S.D. of Binomial Distribution.

5. In a certain factory turning out optical lenses, there is a small chance 1/500 for any lens to be defective. The lenses are supplied in a packet of 10. Use Poisson distribution to calculate the approximate number of packets containing no defective, one defective, two defective and three defective lenses in a consignment of 20,000 packets.

6 A drug is known to bring relief in 80% of the cases where it is used. Find the probability that the fifth patient to experience relief is the seventh patient to receive the drug during a given week.

Total No. of Pages 01 — 226 — Roll No. .....

THIRD SEMESTER B.Tech.[MC]

MID SEM EXAMINATION SEPTEMBER-2019

MC-207 Engineering Analysis and Design (Differential Equations and Applications)

Time: 1:30 Hours *Max. Marks : 30*

Note: Answer ALL questions. All questions carry equal marks. Assume suitable missing data, if any.

Q.1 Solve the initial value problem of differential equation by matrix method

$$x_1'(t) = 3x_1 - x_2 + x_3;\ x_2'(t) = x_1 + x_2 - x_3;\ x_3'(t) = x_1 - x_2 + x_3$$

with $x_1(0) = 1,\ x_2(0) = 5,\ x_3(0) = 1$.

Q.2 What do you mean by Sturm-Liouville problems? Find the eigen values and the corresponding eigen functions of

$$4y''(x) - 4y'(x) + (1+\lambda)y(x) = 0$$

with the boundary conditions $y(0) = 0,\quad y(a) = 0.$

Q.3 Form a partial differential equation of

$$xyz = f(x+y+z)$$

Q.4 Solve the following partial differential equations:

(i) $(x^2 - y^2 - yz)p + (x^2 - y^2 - zx)q = z(x-y),$

(ii) $z(z^2 + xy)(xp - yq) = x^4.$

Q.5 Find the complete solution of the equations:

(i) $y(1+x^2)p^2 = x^2 q,$

(ii) $xyp + pq + yq = yz$

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Total no. of ...

-227-

Roll no._____

Total no. of Pages 01

Sep-2019

MID TERM EXAMINATION

B.Tech.[BT]

III SEMESTER

MC 251 (BIOSTATISTICS)

Max marks: 25

Time: 1:30 hrs

NOTE: All the questions are compulsory. All questions carry equal marks.

Q1. Calculate: (i) Quartile deviation, and (ii) Mean deviation from mean, for the data given as:

Marks	0-10	10-20	20-30	30-40	40-50	50-60	60-70
No. of students	6	5	8	15	7	6	3

Q2. A card is drawn from a pack of 52 cards. Find the probability of getting a king or a heart or a red card?

Q3. A bin contains 5 defective (that immediately fail when put in use), 10 partially defective (that fails after a couple of hour of use), and 25 acceptable transistors. A transistor is chosen at random from the bin and put in use. If it does not immediately fail, what is the probability it is acceptable?

Q4. A continuous random variable X has a p.d.f(probability density function) $f(x) = 3x^2, 0 \leq x \leq 1$. Find a and b such that (i) $P(X < a) = P(X > a)$, and (ii) $(P(X > b) = .05$

Q5. A coffee Connoisseur claims that he can distinguish between a cup of instant coffee and a cup of percolator coffee 75% of the time. It is agreed that his claim will be accepted if he correctly identifies at least 5 of 6 cups. Find his chances of having the claim

(i) Accepted

(ii) rejected, when he does have the ability he claims.

No. of pages: 1 Roll No.....

Third Semester B.Tech (Electrcal)

Mid-Semester Examination Sept. 2019

MC-261: Numerical and Engineering Optimization Methods.

Time: 1:30 Hrs Max Marks: 20

Notes: 1. Attempt all questions.
2. Assume missing data if any.

Q1. Find the approximate solution of the following initial value problem by RK2 and RK4 methods, making all calculations up to six places of decimal.

$$dy/dt = y - t^2 + 1 \quad \text{Given } y(0) = 0.5$$

taking step size $h = 0.5$ for $0 \le t \le 1.0$

Discuss the results assuming that the exact value of

$y(1) = 2.640859$. [8]

Q2. Using simplex method

Minimize $Z = 2x_1 - 3x_2 + 2x_3$

Subjected to

$$3x_1 - 2x_2 + 3x_3 \le 7$$

$$-2x_1 + 4x_3 \le 12$$

$$-4x_1 + 3x_2 + 8x_3 \le 10$$

$$x_1, x_2, x_3 \ge 0$$ [8]

Q3. Write short notes on

i) Bi-section method
ii) Newton Raphson method [2x2=4]

-End-

Roll No: .....

Total pages: 1

FIFTH SEMESTER **B.Tech. Mathematics & Computing**

Mid Semester Exam, Sept. 2019

Code & Title: MC 303 Stochastic Processes

Time: One and half hrs. *Max. Marks : 30*

Note : Answer all questions. All questions carry equal marks. Assume suitable missing data, if any. You can ask for statistical tables.

1. Explain Bernoulli process. Give one example each of homogeneous and non homogeneous Bernoulli processes. In case of a Bernoulli process find the distribution of the number of succeeding trials before the next success. Is it memory less or with memory?

2. Explain birth and death process. Derive the distribution of the number of departures at time t in case of a pure death process with departure rate $\mu > 0$ and initial inventories N.

3. What is a renewal process? Give examples. How does it differ from a Poission process? In case of a renewal process if inter renewal process is exponentially distributed with parameter $\mu > 0$, then find the renewal function and renewal distribution.

4. A barber shop serves one customer at a time and provides three seats for waiting customers. If the place is full, customers go elsewhere. Arrivals occur according to a Poisson distribution with mean of 4 per hour. The time to get a haircut is exponential with mean 15 minutes. Determine, (i) steady-state probabilities, (ii) expected number of customers in the shop, (iii) probability that customers will go elsewhere because the shop is full.

5. Define Markov chain. Give an example each of a Markov and a non-Markov chain. What are Chapman-Kolmogorov equations ? Design a suitable problem of your choice to illustrate its application.

— 230 —

Total no. of pages 2 Roll no. .....

FIFTH SEMESTER B.Tech. (MC)

MID SEMESTER EXAMINATION (September-2019)

MC 305 OPERATIONS RESEARCH

Time: 2 Hours Max. Marks: 30

Note: Answer all questions. Assume suitable data, if any.

1. ChemLabs uses raw materials I and II to produce two domestic cleaning solutions, A and B. The daily availability of raw materials I and II are 150 and 145 units, respectively. One unit of solution A consumes .5 unit of raw material I and .6 unit of raw material II, and one unit of solution B uses .5 unit of raw material I and .4 unit of raw material II. The profits per unit of solutions A and B are \$8 and \$10, respectively. The daily demand for solution A lies between 30 and 150 units, and that for solution B between 40 and 200 units. Find the optimal amounts of A and B that ChemLabs should produce.

(6 *marks*)

2. Show how the M-method will indicate that the following problem has no feasible solution.

$$\text{Maximize } Z = 2x_1 + 5x_2$$

Subject to

$$3x_1 + 2x_2 \geq 6$$
$$2x_1 + x_2 \leq 2$$
$$x_1, x_2 \geq 0$$

(8 *marks*)

3. Solve

$$\text{Minimize } z = 3x_1 + 2x_2$$

Subject to

$$3x_1 + x_2 \geq 3$$
$$4x_1 + 3x_2 \geq 6$$
$$x_1 + x_2 \leq 3$$
$$x_1, x_2 \geq 0$$

(8 *marks*)

4. Maximize $z = 5x_1 + 12x_2 + 4x_3$
Subject to

$$x_1 + 2x_2 + x_3 \leq 10$$
$$2x_1 - x_2 + 3x_3 = 8$$
$$x_1, x_2, x_3 \geq 0$$

Show the primal and hence write the solution of the dual. Also, write the dual of the primal. *(8 marks)*

Total No. of Pages: 03

Roll No.....

Vth SEMESTER

B.TECH. [MCE]

MID-TERM EXAMINATION

(September - 2019)

MC307 OBJECT ORIENTED PROGRAMMING

Time: 1.5 Hours

Max. Marks: 25

Note: **Attempt all the questions.**
Assume suitable missing data, if any.

Q.1 With respect to C++, briefly explain the following: [2×4=8 marks]

(a) Virtual Destructors

(b) Static Data Members

(c) V Table in Polymorphism

(d) Friend Functions

Q.2 Write a C++ program to develop a class named Complex that creates complex number objects. Each object should have two private data members, one integer representing the real part and another integer representing the imaginary part. Provide an appropriate constructor function that initializes the object with its corresponding real and imaginary parts. Overload the assignment (=) operator that assigns one complex object to another complex object. Overload the multiplication (*) operator that multiplies two complex number objects. Overload the equal to (= =) operator that compares whether the two complex numbers are equal or not. Further, overload the stream insertion (<<) operator that prints the real and imaginary parts of a complex number, i.e., suppose "obj" is an object of the class, then "*cout<<obj*" should print the real and imaginary parts of the object. [7 marks]

Q.3 Create an abstract class in C++ named Shape with a pure virtual function named "area" that calculates the area of an object. With public

inheritance, derive the classes named Square, and Circle from the base class shape. Create the objects of each of the derived classes in the main, and find their area by calling their corresponding member function "area" with the help of base class pointer. Use appropriate data members for each of the derived classes which are required to calculate the area. [4 marks]

Q.4 Write the output of the following program: [6 marks]

```
class Date
{     public:
      Date (int x, int y, int z)
      {     day = x;
            month =y;
            year = z;
            cout<< "Date object created: "<<day "/" <<month "/" <<year;
      }
      ~Date ()
      {     cout<<"Date object destroyed: " <<day "/" << month "/"
      <<year;
      }
      private:
      int day;
      int month;
      int year;
};

class Person
{     public:
      Person ( string z, const Date &x , const Date &y) : name (z), hire(x),
                                                          birth (y)
      {     cout<<"Person object created";
      }
      ~Person ( )
      { cout<< "Person object destroyed";
      }
      private:
      string name;
      Date birth;
      Date hire;

};

class Student : public Person
{     public:
      Student (string p, const Date &w, const Date &y, string s) : Person
      (p, w, y)
      {
            course = s;
            cout<< "Student object created";
      }
      ~Student ( )
      {     cout <<"Student object destroyed";
      }
      private:
      string course;
};
int main
{
      Date obj1 (1, 1, 2019);
      Date obj2 (4, 4, 2019);
      Date obj3 (3, 3, 2019);
      Date obj4 (10, 3, 2019);
      Person obj5 ("Jon", obj1, obj2 );
      Student obj6 ("Mike", obj3, obj4, "Graphs");
}
```

-233-

Total No. of Pages: 1 -234- Roll No.....

5th SEMESTER B. Tech.

MID SEMESTER EXAMINATION (SEPTEMBER-2019)

MC 315: Modern Algebra

Time: 1:30 Hours **Max. Marks: 25**

Note: All questions are compulsory. Assume suitable missing data, if any.

Q1. (a) Give an example of a two elements $x, y \in S_3$ such that $(x.y)^2 = x^2.y^2$. (2.5)

(b) Give an example of a finite abelian group, which is not cyclic. (2.5)

Q2.(a) Give an example of an infinite non-abelian group. (2)

(b) Show by an example that a left coset may not be equal to right coset of a subgroup H of a group G, i.e., $Ha \neq aH$ for some $a \in G$. (3)

Q3. Give an example of three groups $E \subset F \subset G$, where E is normal in F, F is normal in G, but E is not normal in G. (5)

Q4. Show that every homomorphic image of a cyclic group is cyclic, but the converse may not be true. (5)

Q5. Verify Caley's Theorem for the cyclic group G of order 3. What is the corresponding permutation group isomorphic to G? (5)

- END –

Roll No.....

Total No. of Pages: 03

B.Tech.(MC)

SEVENTH SEMESTER

SEP-2019

MID SEMESTER EXAMINATION

MC 405 GRAPH THEORY

Max. Marks : 30

Time: 1:30 Hours

Note : Answer all questions.
Assume suitable missing data, if any.

Q.1 Choose the correct answer. Justify. (6)

I. Given an adjacency matrix A = [[0, 1, 1], [1, 0, 1], [1, 1, 0]], how many ways are there in which a vertex can walk to itself using 2 edges.

a) 2
b) 4
c) 6
d) 8

II. If A[x+3][y+5] represents an adjacency matrix, which of these could be the value of x and y.

a) x=5, y=3
b) x=3, y=5
c) x=3, y=3
d) x=5, y=5

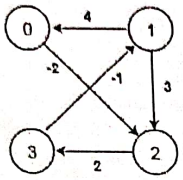
III. Two graphs are isomorphic if they have:

a) Equal number of vertices and edges.
b) There exists a bijection between their vertex sets and between their edge sets.
c) The number of vertices of a given degree are equal in both the graphs.
d) None of the above.

1 2 3 5 1

Q.2[a] Is the degree sequence (6,5,5,5,4,4,2,1) graphical. (3+2)
[b] Show that it is not possible to have a group of 7 persons such that each knows exactly 3 persons in the group.

Q.3 Find the shortest path between all the pair of vertices for the graph given below. (5)

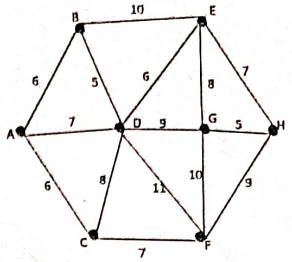


-236-

Q.4 Draw a graph which is: (4)
i. Hamilton and Eulerian
ii. Hamilton and non-Eulerian
iii. Non-Hamilton and Eulerian
iv. Non-Hamilton and non-Eulerian

Q.5 Let G be a connected graph with n vertices, n > 2 and no loops or multiple edges. G has Hamiltonian circuit if $deg(u) + deg(v) \geq n$, where u, v are non-adjacent to each other. (5)

Q.6 A Country council is responsible for maintaining the network of roads in the figure given below. The number on each edge is the length of road in miles. The council office is based at A. A council officer has to inspect all roads starting and finishing at A. Find the length of optimal Chinese Postman route. (5)



Total No. of Pages: 02 Roll No.....

VIIth SEMESTER B.TECH. [MCE]

MID-TERM EXAMINATION (September - 2019)

MC407 CRYPTOGRAPHY AND NETWORK SECURITY

Time: 1.5 Hours Max. Marks: 25

Note:	Attempt all the questions. Assume suitable missing data, if any.

Q.1 Answer the following questions: [2×5=10 marks]

(a) Differentiate between passive and active attacks with examples.

(b) Consider the set S={a,b} with addition and multiplication defined by the following tables. Is the set S a ring ?

+	a	b
a	a	b
b	b	a

×	a	b
a	a	a
b	a	b

(c) Find the value of $11^{13} mod 13$.

(d) Apply the Playfair Cipher to encrypt the word "university" using the key "guidance".

(e) Using Fermat's Theorem, find $3^{201} mod 11$.

Q.2 Given the following plaintext ciphertext pairs, identify the key that must have been used on the plaintext to get the corresponding ciphertext if Vigenere cipher is used for encryption. [5 marks]

(a) Plaintext: NEVERTRUSTINSECURITYBYOBSCURITY

Ciphertext: ARIREGEHFGVAFRPHEVGLOLBOFPHEVGL

(b) Plaintext: GOOD

Ciphertext: OVUA

Q.3 Consider a block encryption algorithm that encrypts blocks of length 'n' , and let $N = 2^n$. Assume we have "t" plaintext–ciphertext pairs P_i, C_i = E(K, P_i), where we assume that the key K selects one of the N! possible mappings. Imagine that we wish to find K by exhaustive search. We could generate key K' and test whether C_i=E(K', P_i) for $1 \leq i \leq t$. If K' encrypts each P_i to its proper C_i, then we have evidence that K=K'. However, it may be the case that the mappings E(K, •) and E(K', •) exactly agree on the "t" plaintext–cipher text pairs P_i, C_i, and agree on no other pairs. What is the probability that E(K, •) and E(K', •) are in fact distinct mappings? [5 marks]

Q.4 Discuss the following with respect to DES algorithm: [5 marks]

(a) One Round of DES
(b) Strength of DES

Total No. of Pages: 01

Roll No:.....

SEVENTH SEMESTER

B.Tech. [MC]

MID TERM EXAMINATION

Sept. 2019

MC409, Mathematical Modeling and Simulation

Time: 1.5 Hours

Max. Marks: 30

Note: *Attempt All questions. All questions carry equal marks. Assume suitable missing data, if any.*

1. Give a short note on Mathematical modeling and its purpose and uses.
2. For the data set below, determine if it is reasonable to assume that y is inversely proportional to x. If it is, approximate the constant of proportionality. If it is not, describe why this assumption is not reasonable.

x :	1	1.2	1.4	1.6	1.8	2
y :	6.80	6.18	4.20	4.22	3.72	3.08

3. For the given set of data, fit a quadratic function:

x :	-2	-1	0	1	2
y :	15	1	1	3	19

4. Discuss linear decay model.
5. Solve the mathematical model and discuss its stability.

$$\frac{dx}{dt} = ax + by \;\; ; \;\; \frac{dy}{dt} = cx + dy$$

6. Discuss single population model.

Total No. of Pages -2 Roll No. .....

Ist SEMESTER B.Tech.

Mid TERM EXAMINATIONSeptember 2019

ME 101 BASIC MECHANICAL ENGG.

Time: 1.5 Hours Max. Marks: 25

Note:Part-A and Part-B are to be answered in the same answer sheet separetaly .
Do not mix the answer of part A and Part B.
Answer all questions from each part. Assume suitable missing data, if any.

-240-

Part A

1. Explain the following: (i) path function (ii) point function. (1)
2. State first law of thermodynamics for a process and cycle. Derive expression for work done,heat transfer for a system undergoinga polytropic processPV^n=Constant. (2)
3. Write expressions for steady flow Mass and Energy Balance equations and apply the same for nozzle and diffuser considering assumptions made. (2)
4. 100 litres of an ideal gas at 300 K and 1 bar is compressed adiabatically to 10 bar. It is then cooled at constant volume and further expanded isothermally so as to reach the condition where it started. Draw the p-V diagram and calculate:

(i) Pressure at the end of constant volume cooling
(ii) Change in internal energy during constant volume process
(iii) Net work done and heat transferred during the cycle. (4.5)

5. Air flows steadily at the rate of 0.4 kg / s through an air compressor entering at 6 m/s with a pressure of 1 bar and specific volume of 0.87 m^3 / kg and leaving at 5 m/s with a pressure of 7 bar and a specific volume of 0.16 m^3 / kg. The internal energy of the air leaving is 90 kJ / kg greater than that of the air entering. Heat absorbed by cooling water in a jacket surrounding the cylinder from the air is at the rate of 60 kJ / s. calculate the power required to drive the compressor. (3)

Part B

1. State the differences between the following materials on the basis of their composition, properties and applications.

(a) Grey cast iron and ductile cast iron

(b) High carbon steel and high speed steel (2.5×2)

2. "Patterns are not truly identical to the final cast products". Justify the statement suitably. 2.5

3. Writ short notes on the following

(a) Composites

(b) Brasses and bronzes (2.5×2)

Total No. of Pages 1
THIRD SEMESTER
MID-SEM EXAMINATION

Roll No. ....
B.Tech.(ME)
Sept,2019

ME-201 MECHANICS OF SOLIDS

Time: 1 hr 30 min

Max Marks : 30

Note: Answer all questions.
Assume suitable missing data, if any.
All questions carry equal marks.

1. The cross-sectional area of bar ABCD is 100 mm^2. Determine the maximum normal stress in the bar (Fig. 1).

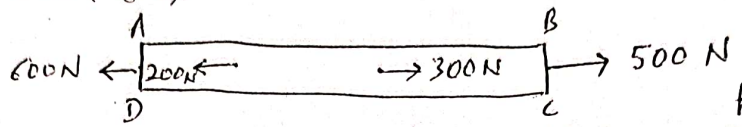


Fig 1

2. Determine the total increase of length of a bar of constant cross-section hanging vertically and subject to its own weight as the only load.

3. A cube of 1 m side is subject to uniaxial tension. Find its change in volume. E=200 GPa and ν=0.3.

4. The collar B is welded to the midpoint of the cylinderical steel bar AC of length 2L. The left half of the bar is then inserted in a brass tube and the assembly is placed between rigid walls. Determine the forces in the steel bar and the brass tube when the force P is applied to the collar. Neglect the deformation of the collar and assume $(EA)_{steel} = 3(EA)_{brass}$. (Fig. 2)

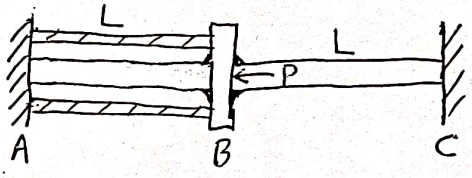


Fig 2

5. The bar AB carries a 500 N vertical force at A. The bar is supported by a pin at B and the 15 mm diameter cable CD. Find the stresses in the cable. Neglect the weight of the bar. (Fig. 3)

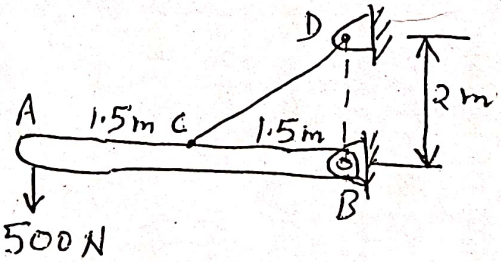


Fig 3

6. For the truss shown in Fig. 4, find the stresses in the bars. The cross-sectional area of the bars is 1 cm^2.

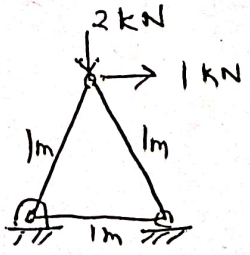


Fig 4

-242- Roll No.

Total no. Of pages : 1

B.TECH.(ME)

THIRD SEMESTER

SEP 2019

MID SEMESTER EXAMINATION

ME 203 THERMAL ENGINEERING – I

Max Marks : 30

TIME : 1hr 30 min

Answer all questions. Assume suitable missing data if any. Use of steam tables and Mollier & psychrometric charts is permitted

1 What do you mean by pure substance? Draw the p-V, p-T, T-s diagram of a pure substance. Define terms: critical temperature, critical pressure and triple point. What is dryness fraction of steam? How the quality of steam is measured? (3.5)

2 Define the terms: steam rate, heat rate and work ratio. When is reheating of steam recommended in a steam power plant? Discuss the effect of reheat on specific work output, cycle efficiency, steam rate and heat rate. (3.5)

3 What is bleeding? How does it affect cycle efficiency? Describe with neat sketch the working of regenerative steam power cycle with two feed water heaters. (3.5)

4 What is steam boiler? Describe the working principle of super critical boiler with neat sketch. Name boiler mountings and accessories in a steam power plant. (3.5)

5 Steam at 40 bar and 300° C expands isentropically in a device to 0.1 bar. Determine the final quality of steam, work developed and change in internal energy of steam.

If the steam expands adiabatically in the device to 0.1 bar with the same inlet conditions and developing work of 500 kJ / kg, determine the final quality of steam, change in entropy and change in internal energy of steam. Comment on the results. (8)

6. Steam at 150 bar and 550° C is supplied to a turbine plant and steam expands in HPT then the steam is reheated to its initial temperature and expands to 0.1 bar in LPT. If Moisture content at condenser inlet is limited to 5 %, determine thermal efficiency of the cycle, Reheat pressure, heat ratio and specific steam consumption. (8)

-242-

Total no. Of pages : 1 *Roll No.*

THIRD SEMESTER B.TECH.(ME)

MID SEMESTER EXAMINATION SEP 2019

ME 203 THERMAL ENGINEERING – I

TIME : 1hr 30 min *Max Marks : 30*

Answer all questions. Assume suitable missing data if any. Use of steam tables and Mollier & psychrometric charts is permitted

1 What do you mean by pure substance? Draw the p-V, p-T, T-s diagram of a pure substance. Define terms: critical temperature, critical pressure and triple point. What is dryness fraction of steam? How the quality of steam is measured? (3.5)

2 Define the terms: steam rate, heat rate and work ratio. When is reheating of steam recommended in a steam power plant? Discuss the effect of reheat on specific work output, cycle efficiency, steam rate and heat rate. (3.5)

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6. Steam at 150 bar and 550° C is supplied to a turbine plant and steam expands in HPT then the steam is reheated to its initial temperature and expands to 0.1 bar in LPT. If Moisture content at condenser inlet is limited to 5 %, determine thermal efficiency of the cycle, Reheat pressure, heat ratio and specific steam consumption. (8)

Total No of Pages... Two... *Roll No.....*

Third Semester **B.Tech (Mechanical Engineering)**

Mid Semester Examination ***(September-2019)***

ME 207 **Engineering Analysis and Design**

Time: $1\frac{1}{2}$ Hrs. **Max Marks. 20**

Note: Attempt all the Questions.
Assume missing data, if any.

Q No 1 Differentiate between. **(4x01)**

(i) – Histogram and Ogive.
(ii) – Central Tendency and Dispersion.
(iii) – Feasibility and Optimality.
(iv) – Skewness and Kurtosis.

Q No 2 What are the steps followed in an Engineering Design processes? **(04)** Discuss various considerations made in the process, with an example.

Q No 3 From the four factories A, B, C and D, whose production capacities **(04)** are 5, 8,7 and 14 items respectively, the produced items have to be transported to three warehouses X, Y and Z, whose storing capacities are 7, 9 and 18 items respectively. The cost of transportation per item (in hundreds of rupees), from each factory to each warehouse is given in the following table. Solve the Transportation problem, by Vogel's Approximation Method. Also perform the Optimality Check.

		Warehouses			Plant Capacity
		X	Y	Z	
Factories	A	2	7	4	5
	B	3	3	1	8
	C	5	4	7	7
	D	1	6	2	14
Factory Capacity		7	9	18	

P.T.O.

Q No 4 The End Semester Examination Marks of EAD of 49 students are given in the following table. Calculate the third Quartile and Sixth Decile of the distribution. (04)

Class of Marks	No. of Students	Class of Marks	No. of Students
5-10	5	25-30	5
10-15	6	30-35	4
15-20	15	35-40	2
20-25	10	40-45	2

Q No 5 Solve the following Linear Programming problems by Graphical method. (04)

Maximize $Z = 6X + 5Y$

Subject to the Constraints $2X - 3Y \leq 5$

$X + 3Y \leq 11$

$4X + Y \leq 15$

$X \text{ and } Y \geq 0$

OR

In a Statistical Distribution, Establish relationship between the Moments (upto Fourth Moment) about Mean in terms of the Moments about any other value.

— 245 —

Total No. of Pages 1
THIRD SEMESTER
MID SEM EXAMINATION

Roll No. ....
B.Tech.(EP)
Sept,2019

ME-251 Engineering Mechanics

Time: 1 hr 30 min

Max Marks : 30

Note: Answer all questions.
Show coordinate system(xyz) in every problem.
Assume suitable missing data, if any.
All questions carry equal marks.

1. Find the resultant force for the system of forces given by

$$F_1 = 100i + 200j \ \text{(N)}$$
$$F_2 = 200i + 300j \ \text{(N)}$$

Force F_1 passes through point $(1, 2)$ and force F_2 passes through point $(3, 5)$. What is moment of the system of forces about the origin?
Find a point through which the resultant force should pass so that its moment about the origin is same as that of original force system.

2. Find centroid of a semi-circular disk. Find I_{xx}.

3. A man is climbing up a ladder against a smooth wall. He is able to climb up half the way when the ladder starts slipping. Draw free body diagram of the ladder. Find reaction forces from the wall and ground at the time of impending slip. Weight of man is W. Neglect weight of the ladder. Analyse it as a three force system and graphically show the concurrence of the forces.

4. Calculate the axial force in each bar of the simple truss shown in Fig.1. Also state whether the members are in tension or compression.

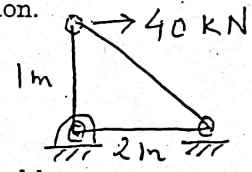


Fig 1

5. The homogeneous 6000 N bar ABC is supported by a pin at C and a cable that runs from A to B around the frictionless pulley at D. Find the tension in the cable. What are support reactions? (Fig. 2)

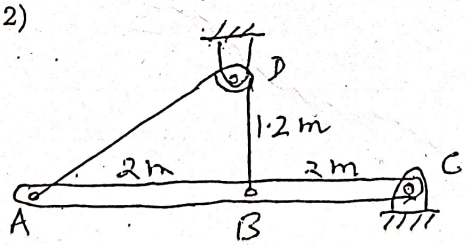


Fig 2

6. A uniform cylinder weighing 1000 N is supported by the cable BC in the position shown (Fig.3). Neglect friction and weight of the bar AB. Draw free body diagram of each member and find all the forces involved.

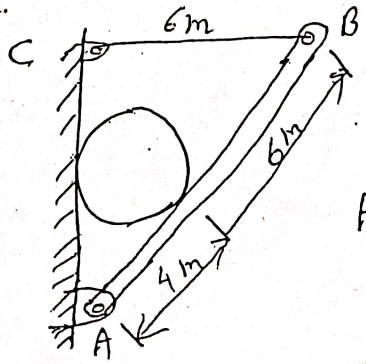


Fig 3

Total no. of pages :1 —246— Roll No._____

THIRD SEMESTER (Production and Industrial Engg.) B.Tech

Mid SEMESTER EXAMINATION September 2019

ME-261 Kinematics and Dynamics of Machines

Time: 1.5 Hours Max. Marks: 20

Note: Attempt all questions. All questions carry equal marks.
Assume missing data, if any.

1 [a] With the help of neat sketch, describe the Kinematic pair by the relative motion between the links. 2

[b] Discuss the inversions of double slider crank chain. 2

[c] State Kennedy's rule for instantaneous centres. 2

[d] With the help of screw-jack, describe the degree of freedom of kinematic pair. 2

[e] Define prime circle and pressure angle of the cam. 2

2. A four bar chain mechanism has different links as shown in Fig.1 has AB=15 mm, BC=25 mm, CD=20 mm, AD=30 mm, BE=CE=16 mm, CG=10 mm and DG=14 mm. Draw the velocity and acceleration diagram when the crank makes 45⁰ and rotates at 300 rpm in a clockwise direction. Determine the absolute velocity of E and C. Also calculate the velocity of G and E with respect to C for the given instant. 10

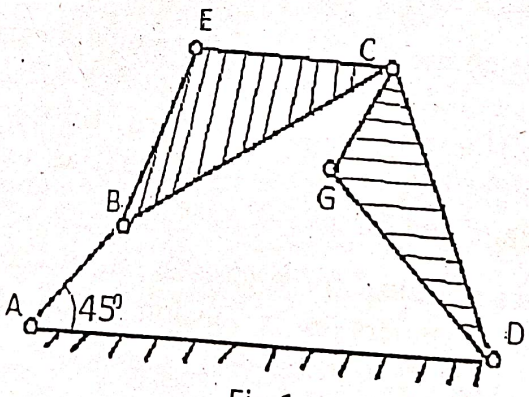


Fig.1

END

-247-

Total No. of Pages :02

Roll No. .....

FIFTH SEMESTER

B.Tech.[ME]

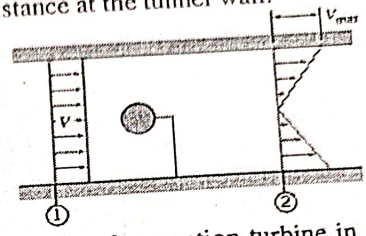
MID SEMESTER EXAMINATION SEP.-2019

ME 301 Fluid Systems

Time: 1.30 Hours Max. Marks: 30

Note : Answer all question.
All questions carry equal marks.
Assume suitable missing data, if any.

Q.1 [a] A small round object is tested in a 0.75-m diameter wind tunnel. The pressure is uniform across sections 1 and 2. The upstream pressure is 30 mm H2O (gage), the downstream pressure is 15 mm H2O (gage), and the mean air speed is 12.5 m/s. The velocity profile at section 2 is linear; it varies from zero at the tunnel centreline to a maximum at the tunnel wall. Calculate the drag of the object and its supporting vane. Neglect viscous resistance at the tunnel wall.



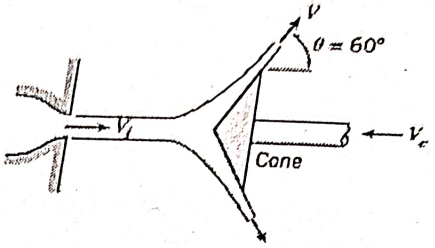
[b] Write Euler equation for reaction turbine in the form of absolute, relative and peripheral velocity heads and explain the significance of each terms.

Q.2[a] The following data pertains to a Pelton turbine:

Bucket angle at bucket outlet = 165^0	Coefficient of velocity of the nozzle = 0.98
Net head = 340 m	Jet diameter = 12 cm
Pitch diameter of runner = 2.25 m	Speed ratio = 0.46

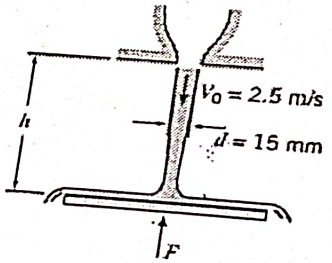
Due to bucket friction, the relative velocity at bucket exit is found to be 5% less than the relative velocity at inlet to the bucket. Calculate (i) water power, (ii) speed of the turbine, and (iii) power lost in discharge

[b]Water, in a 100 mm diameter jet with speed of 30 m/s to the right, is deflected by a cone that moves to the left at 14 m/s. Determine (a) the thickness of the jet sheet at a radius of 230mm and (b) the external horizontal force needed to move the cone.



Q.3[a] Draw and explain velocity triangles at inlet and outlet for the fan used in our classrooms, Francis and Kaplan turbines.

[b] A uniform jet of water leaves a 15-mm-diameter nozzle and flows directly downward. The jet speed at the nozzle exit plane is 2.5 m/s. The jet impinges on a horizontal disk and flows radially outward in a flat sheet. Obtain a general expression for the velocity the liquid stream would reach at the level of the disk. Develop an expression for the force required to hold the disk stationary, neglecting the mass of the disk and water sheet. Evaluate for h = 3 m.



Total no. of pages :1

Roll No._____

____V____SEMESTER

B.Tech (Mech. Engg.)

MID SEMESTER EXAMINATION

September 2019

ME-303 DYNAMICS OF MACHINES

Time : 90 mins

Max. Marks: 20

Note: Attempt all questions. Assume missing data , if any

1. In a Hartnell governor, the lengths of ball and sleeve arms of a bell crank lever are 120 mm and 100 mm respectively. The distance of the fulcrum of the bell crank lever from the governor axis is 140 mm. Each governor ball has a mass of 4 kg. The governor runs at a means speed of 300 rpm with the ball arms vertical and sleeve arms horizontal. For an increase of speed of 4%, the sleeve moves 10 mm upwards. Neglecting friction at sleeve determine the minimum equilibrium speed if the total sleeve movement is limited to 20 mm and spring stiffness. **10**

2. Draw the turning moment diagram for 4-stroke single cylinder internal combustion (IC) engine and single cylinder single acting steam engine. Also justify that the mass moment of inertia used in four stroke IC engine is more in comparison to single cylinder single acting steam engine for the same output. **5**

3. Attempt the following:
   i. Define Coefficient of fluctuation of energy and coefficient fluctuation of speed. Also deduce the expression relating each other.
   ii. Describe the hunting of mechanical governor and its effect stopping the prime mover.

-END-

Total No. of Pages :02 — 250 —

Roll No. .....

FIFTH SEMESTER

B.Tech (ME)

MID SEMESTER EXAMINATION Sept -2019

ME305 Design of Machine Elements

Time: 1:30 Hours Max. Marks : 30

Note : Answer all questions.
All questions carry equal marks. Assume suitable missing data, if any. Design Data H/Book is allowed

Q.1[a] Differentiate stress life approach and strain life approach model for design. [2]

[b] What is theoretical and actual stress concentration factor? How does stress concentration vary with orientation of elliptical hole w.r.t. the applied axial load in a plate of thickness t? [2]

[c] The state of stress at a point in a shaft is given by σ_x , σ_y and τ_{xy} 81MPa, 21MPa and 84MPa, respectively. If the yield strength of the material is 280MPa determine the FOS by distortion energy theory of failure. [2]

[e] Differentiate hole basis system and shaft basis system? Explain the type of fit with applications : (i) 50H11d8 and (ii) 40H7u6 [2]

[f] Discuss the effects of mean stress on fatigue of a component using Haigh-Soderberg diagram. [2]

Q.2 A shaft made of AISI4340 with UTS of 650MPa is subjected to complete reversed bending stresses for the following percentage of time: ±400MPa for 75% of time, ±480MPa for 13% of time, ±600MPa for 7% of time and ±300MPa for 5% of time. Draw SN diagram and determine life of the shaft in number of cycles. [10]

Q. 3 Select a suitable material for a crank lever subjected to the various loads as shown in Figure 1.0 with proper reasoning. Also determine a suitable diameter of the critical section on the lever assuming a FOS of 2.5 on tensile strength and a ratio of outside to inside diameter of 2. All dimensions are in mm. [10]

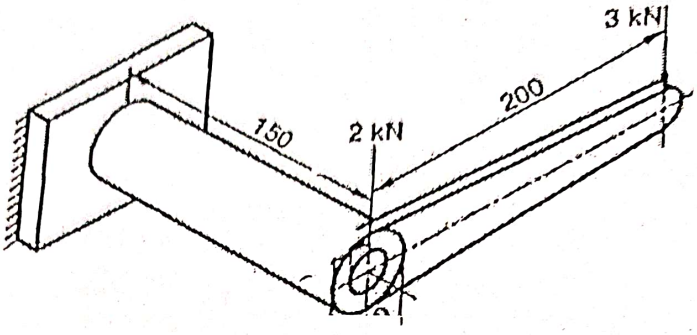


Figure 1.0

Total No. of Pages _01

5TH SEMESTER B.Tech. Mechanical Engg.

END TERM EXAMINATION Sept-2019

ME-307 MANUFACTURING TECHNOLOGY-II Time: 1:30 Hours
Max. Marks : 30

Note : Answer all questions.
Assume suitable missing data, if any.

1. Define machine tool. Differentiate between orthagonal cutting and oblique cutting. -05-

2. Explain the mechanism of chip formation in metal machining. -04-

3. Derive the equation for shear angle in terms of cutting ratio and rake angle. -05-

4. Write a note on temperature distribution in metal cutting under some cutting conditions. -04-

5. Define tool wear. Explain the different "mechanisms" of tool wear. -04-

6. The end of a pipe was orthagonally cut with a tool of 20° rake angle. The chip length was measured as 85 mm whereas uncut chip length was 202 mm. Determine the shear angle and chip thickness, if the depth of cut was 0.5 mm. -04-

7. Explain the basis of standard value of common ratio. -04-

-253-

Total No. of Pages 02 Roll No. .....

5th SEMESTER **B.Tech.**

MID SEMESTER EXAMINATION SEP.2019

ME359 : REFRIGERATION AND AIR CONDITIONING

Time: 1:30 Hours *Max. Marks: 25*

Note : Answer any five questions. Use of refrigeration tables and charts is allowed. All questions carry equal marks. Assume suitable missing data, If any.

1. Explain the reason for variation in condenser pressure. Discuss its effect on the performance of the vapour compression refrigeration system with the help of P-h diagram. 4

2. In a 5 TR vapour compression system used as an ice plant working between evaporator and condenser temperatures of -10° C and 35° C respectively. The dryness fraction of the refrigerant at discharge from compressor is 0.97. The refrigerant leaves the condenser in the saturated liquid state. Calculate specific refrigeration effect, specific compressor work, mass flow rate of refrigerant (kg/s) and COP of the system. The following properties of the refrigerant may be used. 6

Tsat (C)	h_f (kJ/kg)	h_g (kJ/kg)	S_f (kJ/kgK)	S_g (kJ/kgK)
-10	154.056	1450.22	0.8297	5.755
35	366.072	1488.57	1.566	5.2086

3. What is the difference between dry and wet compression? 3

4 Write six desirable properties of refrigerants. Name the conventional and alternative refrigerant for a refrigerator. 3

5. When is it recommended to go for multistage compression? Explain with reason. 3

6. Draw a neat sketch of a two stage compression refrigeration system with flash gas removal. Also draw P-h diagram and specify relevant equations for calculation of COP. 4

Total No. of Pages -02 Roll No. .....

7TH SEMESTER B.Tech.

MID SEMESTER EXAMINATION SEPT-2019

ME407; REFRIGERATION AND AIR-CONDITIONING

Time: 1:30 Hours Max. Marks: 30

Note : Attempt all question. Assume suitable missing data, if any.

Q.1 With the help of suitable T-s diagram, describe the processes and practical limitations of reversed Carnot cycle if refrigerant is: **a)** Gas, **b)** Vapor **(3+3)**

Q.2 A simple saturation cycle (refrigerant is R12) operates at temperature of 35^0C and -15^0C for the condenser and evaporator. Determine the COP and HP/TR of the system.
If a liquid-vapor heat exchanger is installed in the system, with the temperature of vapor leaving the heat exchanger at 15^0C. What will be change in COP and HP/TR

The property of R12 are given as:

T(^{0}C)	h_f	h_g	s_g	For 20K Superheat		For 40K Superheat	
				h	s	h	s
35	69.5	201.5	0.6839	216.4	0.731	231.0	0.7741
-15	22.3	181	0.7052	193.2	0.751	205.7	0.7942

Unit of enthalpy and entropy are kJ/kg and kJ/kg-K respectively **(2+4)**

Q.3 a) Write the chemical formula of the following refrigerants: **R11, R13B1, R134, R744** **(3)**

Q.3 b) Briefly describe the meaning of **ODP** and **GWP** of CFC refrigerants **(3)**

Q.4 With the help of suitable schematic and T-s diagram, describe the **Simple** and **Bootstrap** system of aircraft refrigeration. **(6)**

P.T.O.

Q.5a) What do you mean by multistage compression? Describe the necessity of multistaging in VCR cycle. **(1+2)**

Q.5b) With the help of suitable schematic and P-h diagram, describe the flash intercooling. **(3)**

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Total No of Pages.....One *Roll No.....*

SEVENTH SEMESTER B Tech (Mech. Engg.)

Mid Semester Examination *(September-2019)*

ME409 MECHATRONICS & CONTROL

Time: $1\frac{1}{2}$ Hrs. Max Marks. 20

Note : Attempt All Questions.
Assume missing data, if any.
All questions carry equal marks.

Q No 1 Differentiate between. **(1x4=04)**
(a) – Open Loop and Closed Loop systems.
(b) – Response time and Time constant.
(c) – Static and Dynamic characteristics of Instruments.
(d) – SR Flip flop and JK Flip flop.

Q No 2 What is a Mechatronic system? Giving some example explain various components of it in brief. **(04)**

Q No 3 Mention about any four types of Sensors, along with its principle, operation and Applications. **(04)**

Q No 4 What is Mechanical Actuation system? Also discuss various types of Mechanical Actuation system. **(04)**

Q No 5 What is the importance of the following materials in Mechatronic systems? **(04)**
(a) – MR Fluid.
(b) – Shape Memory alloys (SMA).

Total No. of Pages 1

Roll No. .....

VIIth SEMESTER

B.Tech (AUTOMOBILE ENGINEERING)

MID SEMESTER EXAMINATION SEPT-201

ME-411 INTERNAL COMBUSTION ENGINE

Time: 1:5 Hours

Max. Marks: 20

Note: Attempt any five questions.
Assume suitable missing data, if any.

1. Explain in detail the combustion process of C.I. engine with the help of P-Θ diagram? 4
2. Write down the type of IC engine terminology and enumerate t effect of compression ratio in knocking in SI engine. 4
3. What is the basic difference between otto cycle and diesel cycle with derivation 4
4. Explain why the constant volume combustion gives a higher indicated fuel conversion efficiency than constant pressure combustion for same compression ratio. 4
5. Explain the valve timing diagram of four stroke engine. 4
6. Explain with a neat diagram of the various methods of scavenging process. 4

the following on it – A. Fuel Quality. B. Degree of atomization C. Compression ratio

-End-

-260-

Total no. of pages: 1 Roll No.....

Seventh SEMESTER **B. Tech.**

MID SEMESTER EXAMINATION **September- 2019**

ME419 Robotics & Automation

Time: 1:30 Hours **Max. Marks: 30**

Note: Attempt all questions. All questions carries equal marks.

1) Explain the various generations of robots?
2) With the help of sketch describe pitch, yaw and roll motion of a robot wrist?
3) Enumerate the functions of robots in manufacturing and non-manufacturing applications?
4) Explain 3-fingered and 2-fingered gripper mechanism used in robots manipulator?
5) With neat sketch explain the classification of robot based on
   I) Work volume
   II) Configurations
   III) Degree of Freedom

OR

6) I) Write the design considerations of Grippers?
   II) Explain force control of the manipulator?

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Total No. of Page - 01 Roll No... .....

SEVENTH SEMESTER B. Tech. (ME)

MID SEMESTER EXAMINATION Sept.-2019

ME-413 Metrology

Time: 1:30 Hours Maximum Marks: 25

Note: Answer all the questions.

1 What is the difference between line standard and end standard? How are end standard derived from line standard? 6

2 What is the effect of temperature variation on measurement? What is the standard temperature for measurement? 3

3 Explain the term "interchangeability" and "selective assembly" with an example. 3

4 What are the advantages and disadvantages of optical comparator? 4

5 Describe sigma comparator and clearly explain the magnification method adopted in it. 6

6 The slip gauge set M-38 consist of the following: 3

Range	Steps	Pieces
1.005	--	1
1.01 – 1.09	0.01	9
1.1 – 1.9	0.1	9
1.0 – 9.0	1.0	9
10.0 – 100.0	10.0	10

Choose the suitable slip to give the following dimensions:

(i) 57.055 mm

(ii) 23.95 mm

(iii) 101.025 mm

Total No. of Pages -1 *Roll No. .....*

VII SEMESTER (Mechanical) **B.Tech.**

MID SEMESTER EXAMINATION **Sep-2019**

ME421 Computational Fluid Dynamics

Time: 1.5 Hours ***Max. Marks: 30***

Note: Attempt all questions. Assume suitable missing data, if any.

1 Discuss historical background of CFD and its impact on engineering. 6

2 Differentiate between conservative and non conservative form of governing equations and its impact on CFD. 6

3 Write down the most generic form of a partial differential equation used in CFD and explain the significance of each term. 6

4 Discuss briefly about multi block and non conformal grids with neat sketches with applications. 6

5 Write short notes on any two of the following 3,3
i Adaptive grids and unstructured meshes
ii Computational Time and accuracy
iii Grid generation, techniques and application.

Total no. of pages: 1 Roll No.....

SEVENTH SEMESTER B. Tech. [AE/ME/PE]

MID SEMESTER EXAMINATION September- 2019

ME 423 Advanced Manufacturing Processes

Time: 1hrs:30min. **Max. Marks: 30**

Note: All questions carry equal marks.
Assume suitable missing data, if any.

Q1 Give explanation for the need of advance machining processes in today's industries. Explain the factors that should be considered during the selection of an appropriate advance machining process for a given job? (6 Marks)

Q2 Draw the simple sketch of abrasive flow finishing process and explain the working principle. Enumerate the differences between abrasive jet machining and abrasive flow finishing. (6 Marks)

Q3 Drive the material removal rate of brittle material for abrasive jet machining and calculate the material removal rate of a brittle material with flow strength of 5 GPa. The abrasive flow rate is 4 gm/min, velocity is 200 m/s and density of the abrasive is 4 gm/cc. (6 Marks)

Q4 Explain the working principle of Abrasive water jet machining with a neat sketch. Derive the abrasive water jet velocity in AWJM and calculate the abrasive water jet velocity when the mass flow rate of abrasive is 2 Kg/min. Given; water pressure is 4000 bar, orifice diameter is 0.4 mm. Assume no mixing losses and all related coefficients to be 1. (6 Marks)

Q5 Write short notes on ANY TWO of the following with neat sketches: (6 Marks)

(a) Magnetic Abrasive Flow Machining
(b) Ice Jet Machining
(c) Water Jet Machining

END

Total No. of Pages 02 *Roll no.....*

VII SEMESTER B.Tech.

MID SEMESTER EXAMINATION SEP-2019

OPERATIONS RESEARCH (ME427)

MAX. MARKS: 25 Time : 1:30 hr

NOTE:

1. *Answer all questions.*
2. *Assume suitable missing data if any.*

Q1 (a) how you will identify that there is redundant constrai nt in an LP problem solved by Graphical Method, and by Simplex Method. [2]

(b) Solve the following LP problem using Two Phase method.

MAXIMIZE $Z = 8\,X1 + 4\,X2 + X3$

Subject to

$$4\,X1 + 6\,X2 + 3\,X3 \leq 8$$
$$3\,X1 - 6\,X2 - 4\,X3 \leq 1$$
$$2\,X1 + 3X2 - 5\,X3 \geq 4$$
$$X1, X2, X3 \geq 0$$

[8]

Q 2(a) Write the LP model of the problem given in part (b). [2]

(b) Cost coefficients for a transportation problem are given below. Find the optimum solution to the following transportation problem. Is there any alternate solution of the problem? [8]

	P	Q	R	S	Supply
A	2	7	4	3	6
B	3	3	1	2	10
C	5	4	8	3	10
D	1	6	2	4	17
Demand	7	9	18	9	

P.T.O.

Q 3. Solve the following Assignment Problem. [5]

	1	2	3	4	5
A	20	18	23	16	20
B	50	17	20	15	11
C	60	40	30	7	6
D	18	28	19	60	70
E	8	20	9	40	55

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Total No. of Pages - 01 *Roll No.....*

VII SEMESTER **B.Tech.**

MID SEMESTER EXAMINATION **SEPTEMBER -2019**

ME 431 NON CONVENTIONAL ENERGY RESOURCES

Time: 1:30 Hours ***Max. Marks : 25***

Note : Attempt **Five** Questions in all.
Question No. 1 and 6 are compulsory
Answer **any three** questions from the remaining.

1. Write short notes on the following (Any Two) :

   a. World energy production and reserves.
   b. Solar Photo voltaic technology.
   c. Solar Thermal energy technology. (2.5 x 2 = 05 Marks)

2. Discuss the evolution of Society in the light of the growth and development of energy sources? (05 Marks)

3. Evaluate the potential of solar energy in India by clearly demonstrating the availability of solar energy for the entire Nation ? (05 Marks)

4. What do you understand by Thermal Energy Storage systems ? Compare the properties of any two PCM materials ? (05 Marks)

5. Briefly examine the effects of site location and its orientation on the feasibility of a solar PV power plant ? (05 Marks)

6. Propose a feasible Design for a 1 MW stand alone power plant system for a small housing society located in the coastal areas of Gujarat state ? Justify your proposal with all the technical viability details of your design ? (05 Marks)

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Total no. of pages : 1 *Roll No.*_____

THIRD SEMESTER **B.Tech (PIE)**

MID SEMESTER EXAMINATION

SEPTEMBER 2018

PE-201 ENGINEERING MATERIALS & METALLURGY

Time : 1 hr & 30 Minutes Max. Marks: 20

Answer all the questions .

1a. With suitable examples explain Bravais space lattice. 2.5

1b. Discuss about different types of point defects in a crystal. 2.5

2a. Explain Miller indices for planes and directions of a cubic crystal and HCP crystal 2.5

2b. Explain about slip and twinning mechanism with suitable diagrams. 2.5

3a. Calculate the number of vacancies per cubic meter in iron at 850°C.The energy for vacancy formation is 1.08 eV/atom. Furthermore, the density and atomic weight for Fe are 7.65g/cm3 (at 850°C) and 55.85 g/mol, respectively. Assuming that Boltzman's constant to be 8.6×10^{-5}eV/K. 2.5

3b. Discuss about different types of surface_defects. 2.5

4a. Find the atomic packing factors for FCC, BCC and HCP crystals. 2.5

4b. Discuss about critically resolved shear stress in a single crystal under plastic deformation. 2.5

Total no. Of pages :1 -267- Roll No.

THIRD SEMESTER B.TECH.(PE)

MID SEMESTER EXAMINATION SEP 2019

PE 203 THERMAL ENGINEERING – I

TIME : 1hr 30 min Max Marks : 30

Answer all questions. Assume suitable missing data if any. Use of steam tables and Mollier& psychrometric charts is permitted

1 What do you mean by pure substance? Draw the p-V, p-T, T-s diagram of a pure substance and explain the process of steam generation. Define terms: critical temperature, critical pressure and triple point. (4)

2 What is dryness fraction of steam?How the quality of steam isis measured? Explain any one method of measuring quality of steam with a neat sketch. (4)

3 Explain the working principle of simple Rankine steam power cycle with a neat sketch and draw T-s and h-s diagram. Develop the expression for Rankine cycle efficiency. Define the terms: steam rate, heat rate and work ratio. (4)

4 When is reheating of steam recommended in a steam power plant?Explain the working principle of Rankine reheat steam power cycle with a neat sketch and draw T-s diagram. Discuss the effect of reheat on specific work output, cycle efficiency, steam rate and heat rate. Draw the neat sketch o reheat T-s diagram. (4)

5 Steam at 25 bar is available. Determine the enthalpy, entropy, specif volume and internal energy of steam for the following cases:

(i) Wet steam with a dryness fraction of 0.85

(ii) Dry saturated steam

(iii)Steam with a degree of superheat of 50^0 C. (6)

6 Steam at 40 bar and 300^0 C expands isentropically in a device to bar. Determine the final quality of steam, work developed and chang internal energy of steam.If the steam expands adiabatically in the device t bar with the same inlet conditions and developing work of 500 kJ determine the final quality of steam, change in entropy and change in in energy of steam. Comment on the results. (8)

Total No. of Pages 1 *Roll No.* .....

THIRD SEMESTER **B.Tech (PE)**

MID SEM. EXAMINATION [SEPT. 2019]

PE205: MANUFACTURING MACHINES

Time: 1 Hr 30 Minutes *Max. Marks: 30*

Note: Answer *ALL* questions. Assume suitable missing data, if any.

[1] Draw and explain the internal mechanism of an all geared head stock of a centre lathe. 5

[2] Sketch various views and explain the essential elements and angles of a single point RH turning tool. 5

[3] With a neat sketch explain the working of the crank and slotted link mechanism of a shaper. How is the length of stroke adjusted? 5

[4] Define the terms cutting feed and depth of cut in drilling operation. In a C40 steel plate of 25 mm thickness, 5 holes of 15 mm diameter each are to be drilled by standard twist drill. The cutting speed can be taken as 28 m/min and feed rate as 0.15 mm/rev. Calculate the machining time and the metal removal rate for the operation. 5

[5] With the help of a neat sketch discuss the working of a Turret lathe. Also compare it with Capstan lathe. 5

[6] Write short notes on the following. (*ANY TWO*)
(a) Cutting tool materials
(b) Types of lathe machines
(c) Automatic screw cutting machine 5

END

Total No. of Pages 02 — 269 — Roll No.....

THIRD SEMESTER B.Tech. [PE]

MID TERM EXAMINATION September-2019

PE-207 Engineering Analysis and Design
(Modeling and Simulation)

Time: 1:30 Hours Max. Marks: 30

Note : Answer any six questions.
All questions carry equal marks.
Assume suitable missing data, if any.

Q.1.(a) A prismatic bar 40mm in diameter is subjected to an axial load of 4kN. The elongation of the bar over a gauge length of 200mm is 0.3mm. Determine the poission's ratio if the decrease in diameter is 0.018mm. (2.5)

(b) A stepped circular bar 150mm long and having three portions AB, BC and CD is subjected axial forces as shown in Fig. 1. Determine the change in its length. Give $E=200GN/m^2$. (2.5)

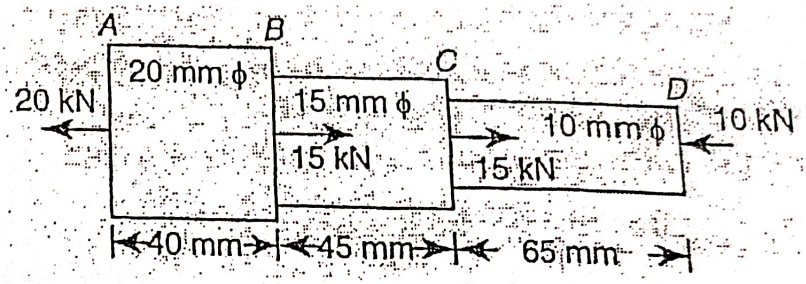

Fig. 1

Q.2. A load of 5kN is supported on a rigid bar by two vertical rods, one of steel and the other of copper. Each rod is 4m long and 20mm diameter. The vertical rods are placed at 50cm apart. Give $Es = 2x10^5$ N/mm^2 and $Ec = 1x10^5$ N/mm^2, determine the tension in each rod and the position of the load on the bar so that it remains horizontal after loading. (5)

Q.3. A simply supported beam of 10m span supports point load of 10kN each at a distance of 3m and 7m from left support and also a uniformly distributed load of 1 kN/m between the point loads. Draw the shear force and bending moment diagrams. (5)

Q.4. Derive an expression for "Bending Equation"? Also write assumptions in theory of Bending? (5)

Q.5. A simply supported beam, 4m long, has a rectangular cross section 10 cm wide and 20 cm long, if it is loaded with uniformly distributed load 400 kgf/m throughout the span and a concentrated load of 200kgf placed at the distance of 1.5 m from the left end, determine the maximum bending stress of the beam. (5)

Q.6. A cantilever beam, 2m long, made of steel tube of section 150 mm external diameter and 10mm thick is loaded with point loads 2W and 1W at a distance of 1.5m and 2m from left end. Calculate the value of W so that the maximum bending stress is 150 MN/m^2 and slope and deflection at a distance of 0.5 m from right end. Take Es = $2x10^5$ N/mm^2 (5)

Q.7. Determine the ratio of buckling load of a solid steel column to that of hollow one of the same cross-sectional areas. The internal diameter of the hollow column is ¾ of the external diameter. The column are pinned at the ends and have the same length. (5)

-End-

Total no. of pages: 2 Roll No.....

THRID SEMESTER B. Tech. [ME]

MID-TERM EXAMINATION September - 2019

30

PE 251 Engineering Materials and Metallurgy

Time: 1hr 30 minutes **Max. Marks: 30**

Note: All questions carry equal marks. Drawn neat diagram wherever necessary. Assume suitable missing data, if any.

Q1a). What are 'Miller indices'? Sketch the (111) plane planes and (101) line in body centered cubic structure and for the hexagonal crystal system, the (1010) plane. (3 Marks)

Q1b). Show that the atomic packing factor for the FCC crystal structure is 0.74 (3 Marks)

Q2a). Define CRSS? Consider a single crystal of BCC iron oriented in such a way that tensile stress is applied along a [010] direction. If slip occurs on a (110) plane and in a [$\bar{1}11$] direction, and the critical resolved shear stress is 30 MPa, calculate the magnitude of the applied tensile stress necessary to initiate yielding. (3 Marks)

Q2b). What is powder metallurgy? Describe the various steps involved in the production of a component by powder metallurgy and What are the limitations of this technique? (3 Marks)

Q3a). Define Creep and its stages with a neat curve. Explain the mechanism of Creep. Discuss the factors that effect creep. (3 Marks)

Q3b). Explain fatigue in materials. Discuss the factors effecting fatigue life and methods to improve fatigue life. (3 Marks)

Q4a). Explain Hume-Rothery rules and Calculate the equilibrium number of vacancies per cubic meter for copper at 1000 °C. the energy for vacancy formation is 0.9 eV/atom; the atomic weight and density at 1000 °C for copper are 63.5 g/mol and 8.4 g/cm^3 (3 Marks)

P.T.O

Q4b). Explain the different types of imperfection in solid. imperfection affect material properties?

Q5 Write short notes on ANY THREE the following with neat sk
(a) Transgranular and Intergranular facture
(b) Slip and Twining plastic deformation
(c) Liquid phase and Solid phase sintering
(d) Crystalline and Noncrystalline Materials
(e) Ductile fracture

END

Total No. of Pages 01
III SEMESTER
MID SEMESTER EXAMINATION

Roll no.....
B.Tech
SEP-2019

QUANTITATIVE TECHNIQUES (PE2 61)

MAX. MARKS: 25 **Time : 1:30 hr**

NOTE:

1. *Answer all questions.*
2. *Assume suitable missing data if any.*

Q1. Solve the following Linear Programming problem by using Two-phase method.

Maximize $Z = 4x_1 + 5x_2 - 3x_3$
subject to

$$x_1 + x_2 + x_3 = 10,$$
$$x1 - x2 \geq 1,$$
$$2x1 + 3x2 + x3 \leq 40,$$
$$x1 \geq 0, x2 \geq 0, x3 \geq 0$$

[9]

Q2. Solve the following Integer Programming problem.

Maximize $Z = x_1 + x_2$
subject to

$$4x_1 - x_2 \leq 10,$$
$$2x1 + 5x2 \leq 10,$$
$$4x1 - 3x2 \leq 6$$
$$x1 \geq 0, x2 \geq 0, \text{and integer}$$

[10]

Q3. (a) Write the short notes on *any three* of the following. [6]

(i) Decision Tree
(ii) Artificial Variable
(iii) Primal-Dual
(iv) Saddle Point

-274-

Total No. of pages 1 Roll No.

FIFTH SMESTER B.TECH (PE)

MID SEMESTER EXAMINATION SEP 2019

PE-301 CASTING TECHNOLOGY

Time 1.5 Hours Max Marks: 30

Note: Answer ALL Questions
ALL Questions carry equal marks
Assume missing data if any

1. Discuss the different types of sands used for molding in foundry and Explain the bonding mechanism of a molding sand with Clay.
2. With the help of diagrams, discuss the shell molding method. Write the advantages, disadvantages and product applications of the shell molding method casting.
3. With neat sketches explain, core, core print, chaplet, chills and gate.
4. Calculate the pouring time and gating dimensions for a Aluminum casting with the plate like dimensions: 100mm x 100mm x 50mm. Assume a sprue height of 200mm. Use the gating ratio of 1:3:3. Assume density of Aluminum 2.7×10^{-3} kg/cm^2 and flow efficiency factor 0.8.
5. Using Caine's method and modulus method calculate the size of cylindrical riser (Height=Diameter) necessary to feed steel slab casting 20 x 20 x 10 cm with side riser, casting is poured horizontally into the mold. Data for steel casting a = 0.1, b = 0.02, and c = 1.0.

-275-

Total No. of Pages 2 Roll no.....

5th Sem B.Tech

MID SEMESTER EXAMINATION Sept-2019

PE303 Production Planning and Control

Time: 1:30 Hours ***Max. Marks : 30***

Note: 1. Answer ALL the questions; assume missing data if any
2. Use of Normal Distribution (z) Table allowed.

1a Explain production system as an input-output system. In the context of competitiveness, what are the metrics and significance of outcome?

1b Briefly outline the characteristics of mass, batch and job shop production systems. 6

2a What do you understand by JIT manufacturing system? Can it be applied to service systems? Compare the Spoke system and Rim system of supplies from vendor. Which one is better in JIT context?

2b What is work study? What are the major considerations in selecting a project of work study? 6

3a Explain with example any three principles of motion economy.

3b For a given element of work the time study engineer has obtained the following elemental times: 6

0.20 0.22 0.17 0.20 0.23 0.21 0.18

If he wants his sample average to be within 10 per cent of the population average with a probability of 0.96, has he taken a sufficient number of observations? If not how many more observations must he take?

4 The work sampling study of a laboratory technician over a one-week period (40 hours) yielded the following data : 6

Total samples analyzed	=	900
Idle Time	=	25%
Performance rating	=	90%

(a) Determine the required number of samples in order to obtain 90% confidence and ± 5% precision level.

(b) If allowance for this particular type of work total to 15%, determine the standard time per sand sample.

5 A metal component is required to be produced in a large number (approximately 5000 per day). Two successive milling operations are required which are done on milling machines with automatic feed. The operator need not attend to the machine during the machining portion of the cycle. The operating characteristics of the two operations are as given below: 6

	Operation 1	Operation 2
Unload	0.12 minute	0.11 minute
Load	0.19 minute	0.15 minute
Mill	0.38 minute	0.45 minute

On the average these machines are working approximately 75 per cent of the 8 hour working day.

What arrangement of men and machines would you recommend? Support your answer with suitable multiple activity chart. You may assume any convenient arrangement of machines. Any assumption made in arriving at the solution may also be given.

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-277-

Total no. of page: 1 Roll no.:.....

5th SEMESTER, B.TECH. (Production Engineering / branches slot B electives)
MID-SEMESTER EXAMINATION, September-2019

Paper code-PE-315 Subject: Mechatronics

Max Time: 1.30 hrs Max Marks: 30

Note: Attempt all questions. All questions carry equal marks. Assume suitable missing data, if any.

1. (a) Explain what is meant by sequential control and illustrate your answer with a neat sketch of washing machine system in relation with showing different sequences of operation. (4)
   (b) Identify the various elements that might be present in a close-loop control system involving a room heater. (2)
2. (a) Identify the sensor, signal conditioner and display element in the measurement system of a digital thermometer. (3)
   (b) Distinguish between contact and non-contact sensors with example. (3)
3. (a) Explain the following terminology (i) Sensitivity (ii) Resolution (iii) Hysteresis error. (3)
   (b) Make a neat sketch showing the process of digital to analog convertor (DAC). (3)
4. (a) A strain gauge is bonded to a beam of 150 mm long and having a cross-section area of 5 cm^2. Young modulus for steel is 200 GPa. The strain gauge has an unstrained resistance of 220Ω and gauge factor of 2. When the load is applied, the resistance of gauge changes by 0.0152Ω. Find the change in length of the steel beam and amount of the force applied to the beam. (3)
   (b) What is the velocity of the piston and force generated by it if the fluid pressure is 50 bar inside the cylinder? The piston diameter is 100 mm and flow rate is 8 cm^3/min. (3)
5. (a) Draw labeled symbols used for 3/2 valve, 4/2 valve and directional valve. (3)
   (b) Draw a labeled diagram of the control of a single acting cylinder. (3)

-278-

Roll no.....

Total No. of Pages 01

B.Tech

V SEMESTER

SEP-2019

MID SEMESTER EXAMINATION

SUPPLY CHAIN MANAGEMENT (PE353)

Time : 1:30 hr

MAX. MARKS: 25

NOTE:

1. *Answer all questions.*
2. *Assume suitable missing data if any.*

Q1. Discuss the key issues involved in supply chain management. What are the strategic, planning, and operational issues that must be addressed by an e-retailer like Amazon? [5]

Q2. Discuss the term "Risk Pooling". Do you expect aggregation of inventory at one location to be more effective when a company such as Dell sells computers or when a company such as Amazon sells products? Explain by considering transportation and inventory costs. [5]

Q3. The annual demand for an automobile component nut is 36,000 units. The carrying cost is Rs. 50 per 100 units per year. The ordering cost is Rs. 25 per order and shortage cost is Rs. 1.25 per unit per month. Find the economic order quantity, number of orders per year, and total optimum inventory cost. [5]

Q4. What are the possible uncertainties in a supply chain? Discuss the number of factors contributing to these uncertainties. How you will manage them as a supply chain manager? [5]

Q5. Write the short notes on *any five* of the following. [5]

(a) ABC Analysis
(b) Aggregate Planning
(c) Push Vs. Pull strategy
(d) Postponement Strategy
(e) Agile Manufacturing System
(f) Bullwhip Effect

Total No. of Pages _02 -279- Roll No.....

5th SEMESTER Course: B.Tech.

MID SEMESTER EXAMINATION SEP-2019

PE-361 Total Quality Management

Time: 1:30 Hours Max. Marks : 25

Note : Question 3 is compulsory.
Answer any one from remaining two questions.
Assume suitable missing data, if any.

1. (a) Differentiate between quality control and quality assurance? Explain various dimensions of quality.

(b) Discuss quality philosophies of Crosby and Taguchi.

(c) The values of sample means and the range of ten samples of size 5 each are given in Table 1. Draw X-bar and R charts and comment on state of control of the process. [3+3+7]

Sample no.	1	2	3	4	5	6	7	8	9	10
$\bar{X}$	43	49	37	44	45	37	51	46	43	47
R	5	6	5	7	7	4	8	6	4	6

Given that:

For n=5, A= 1.342, A_2=0.577, A_3=1.427, D_1=0, D_2= 4.918, D_3=0 and D_4=2.115

n=10, A=0.949, A_2=0.308, A_3=0.975, D_1=0.687, D_2=5.469, D_3= 0.223, D_4=1.777

2. (a) Discuss the evolution of the concepts of quality management systems.

(b) Define process capability. Discuss various measures of process capability.

(c) Draw a 'p' chart for the following data. Revise the trial control limits if require and interpret the chart for assignable cause. [3+3+7]

Sample size:	100	150	120	110	180	200	110	140	160	180
No. of defectives:	4	6	5	3	10	6	17	9	8	4

The quality assurance manager is assessing the capability of a process that produces a machining component. The design specification for a component are 90±0.5, whereas the process report shows that process average is 89.9

mm and standard deviation is 0.15. Calculate the appropriate process capability measure(s). [4×3=12]

3. Write short notes on

(a) Quality planning

(b) Malcolm Baldrige National Quality Award

(c) Causes and sources of variation

(d) Cost of quality

-END-

Total No. of Page 01 | Roll No. .....

FIFTH SEMESTER | B.Tech. (PE)

MID SEMESTER EXAMINATION *September-2019*

PE405 Metal Forming & Press Working

Time: 1:30 Hours | *Max. Marks: 30*

Note:Answer all questions.
Assume suitable missing data, if any.

1a Explain with the help of an example the advantages of metal forming processes compared to other manufacturing processes. 5

b Under what conditions does the two yield criteria's give similar results? A metal body is in plastic state under the action of following stresses. 5

$$T = \begin{pmatrix} 20 & 5 & 10 \\ 5 & -8 & 6 \\ 10 & 6 & 22 \end{pmatrix}$$

Determine the yield strength of material in tension and shear according to Von Mises yield condition. The stresses are in Kgf/mm^2.

2a What is Bauschinger effect? How can this effect be reduced? 5

b List the assumptions used in slab method. 3

3a What is the use of providing land on wire drawing? A 3 mm diameter copper wire is reduced to 2.5 mm diameter by drawing through a conical die of 10^0 semi-cone angle. Determine the drawing stress and the total pull if the coefficient of friction is 0.05, the average yield strength of the material is $220N/mm^2$ and length of land portion of die is 2 mm. 7

b Prove that the maximum area reduction in wire drawing is limited to 63%. 5

-218 Roll ... B.Tech

Roll No._____

Total no. of pages:01 -282-

B.Tech (PE)

SEVENTH SEMESTER

September- 2019

MID SEMESTER EXAMINATION

PE-407QUANTITATIVE TECHNIQUES

Time: 1&1/2 Hours

Max. Marks: 25

Note: Attempt all questions.
Each question carries equal marks.
Assume missing data , if any

1 Define ordinary moments and central moments of a frequency distribution. Obtain the relationship between the two types of moments.

2 Calculate the first four moments for the following frequency distribution about the mean and comment upon the nature of the frequency distribution.

x	-4	-3	-2	-1	0	1	2	3	4
f	3	4	5	7	12	7	5	4	3

3. Solve the following linear programming problem:

Minimize $Z = 2x_1+9x_2+x_3$

Subjected to: $x_1+4x_2+2x_3 \geq 5$

$3x_1+x_2+2x_3 \geq 4$

x_1, x_2 and $x_3 \geq 0$

4. Determine the optimum strategies and value of the following game:

		Player B			
		I	II	III	IV
Player A	I	-3	4	2	9
	II	7	8	6	10
	III	6	2	4	-1

5. Explain two person zero sum game by giving suitable example. Also discuss the difference between a pure strategy and a mixed strategy.

Roll No.....

Total No. of Page-01

B.Tech. (PE)

SEVENTH SEMESTER

Sept.-2019

MID SEMESTER EXAMINATION

PE-419 **Project Management**

Time: 1:30 Hours **Maximum Marks: 25**

Note: Answer all the questions.

1	Define project management.	3
2	What are the points involves in Project Management and their Failures?	5
3	Describe three types of project risk.	4
4	Explain project life cycle and its uncertainty.	4
5	Explain different types of resources required in project management.	5
6	Describe the strategic planning in project management.	4

Total No. of Pages: 01
B. Tech. (PT)
Mid Semester Examination

Roll No. .....
Third Semester
(Sep.--2019)

PT-201 Principles of Polymerization

Time: 1h 30 min | Max. Marks: 30

NOTE: Answer any five questions.
Assume suitable missing data if any.

1. (a) Explain with suitable example the IUPAC structure-based nomenclature system of Polymers. 3

(b) Define Degree of Polymerization and Functionality. 2

(c) Classify the polymers based on thermal characteristics. 1

2. (a) Draw the structures of the polymers obtained in each of the following polymerization: 2

(i) H_2N-R-COOH

(ii) OH-R-COOH

(b) 'The condensation of an acid chloride is not preferred compared to acid anhydride with glycol', Justify. 2

(c) Discuss the ring versus chain formation in step polymerization. 1

3. (a) What is the draw back of 'Trade name nomenclature system' of polymers.

(b) Explain why polycondensation reaction should be arrested before 10-15% of extent of reaction.

(c) Discuss briefly the methods of generating free radicals in radical chain polymerization

4. (a) Explain how polymerization rate can be followed by experimental method in vinyl polymerization.

(b) Explain chain transfer reaction in radical chain polymerization.

5. Derive the number – distribution function and weight – distribution function for a linea step-wise polymerization.

6. (a) Which factors affect the rate of condensation reaction in polymer systems as comp to small molecules.

(b) Explain the rate constants involved in different steps of monomer to polymer conv in case of vinyl radical polymerization.

Roll No._____

Total No. of Pages=1

B.Tech. PSCT

3rd SEMESTER

(Sept-2019)

MID SEMESTER EXAMINATION

PT 203 Elements of Chemical Engineering

Time: 1:30 Hours

Max. Marks: 30

Note: Answer all questions. Assume the suitable data, if any. **Figures should be drawn with pencil only.**

2×5=[10]

1 Answer the following questions:

[a].The dilute acid containing 25% H_2SO_4 is concentrated by commercial grade sulphuric acid containing 98% H_2SO_4 to obtain desired acid containing 65% H_2SO_4. Find the quantities of the acids required to make 1000 kg of desired acid.

[b]. List the different methods to reduce the drag.

[c]. Differentiate between a co-current flow and a counter current flow, with the help of a neat diagram.

[d]. How the reaction in a Semi-batch reactor can be controlled in better manner?

[e]. Who is called the father of Chemical Engineering? What was his profession?

2 [a] Differentiate between

i. Limiting Reactant and Excess Reactant

ii. Batch Reactor and Continuous Reactor

[b]. 10,000 kg/h of solution containing 20% methanol is continuously fed to a distillation column. Distillate (product) is found to contain 98% methanol and waste solution from the column carries 1% methanol. All the percentages are by weight. Calculate: (i) the mass flow rates of distillate and bottom products and (ii) the percentage loss of methyl alcohol.

2.5+2.5+5=[10]

3 [a]. Explain how, a chemical process is a combination of different Unit Operations and Unit Processes. Take an example of any manufacturing process (involving a chemical reaction), write its steps and draw a neat flow sheet or block diagram of the same.

[b]. What are the factors on which the rate of reaction depends?

5+5=[10]

-End-

Roll No. ... .

Total No. of Pages:02 B.Tech[PSCT]

Fifth Semester *(SEP.-2019)*

MID SEMESTER EXAMINATION

(PT 205) Chemical Engineering Thermodynamics

Time: 1:30Hours *Max. Marks: 30*

Note: All Questions are compulsory.
Assume suitable missing data, if any.

Q.1 Explain first law of thermodynamics. Write the mathematical expression of first law of thermodynamics for open system. (3)

Q.2 Derive the correlation between Cp and Cv for ideal gases. (3)

Q.3 (a) Derive the mathematical expression for change in internal energy (ΔU), change in enthalpy (ΔH), work (W) and heat (Q) for a closed system containing ideal gas and undergoes an Isochoric reversible process. (3)

(b) The pressure of a closed system containing one mole of ideal gas varies from three bar to five bar, while the temperature of the system remain constant at 360 K. Calculate the values of change in volume (ΔV), change in internal energy (ΔU), change in enthalpy (ΔH), work (W) and heat (Q). (3)

Q.4 Describe the working of a Carnot's engine with PV diagram. Derive the expression for calculating the efficiency of a Carnot's engine. If a Carnot's engine is working between two heat reservoir, in which hot reservoir is at constant temperature of 800 K and cold reservoir is at constant temperature of 200 K. Calculate the efficiency of the Carnot's engine. (6)

P.T.O.

(3×2)

Q.5 Attempt any three

(a) What are you understand by reversible systems.

(b) Write the condition when work done in a process will be zero for a closed system containing ideal gas.

(c) What are you understand by triple point in phase diagram.

(d) Write the difference between vapor phase and gas phase.

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Total No. of Pages 1 —288— Roll No.....

THIRD SEMESTER B.Tech.(PT)

MID SEMESTER EXAMINATION SEP-2019

PT 207 Engineering Analysis and Design

Time: 1:30 Hours Max. Marks : 30

Note : All questions carry equal marks.
Assume suitable missing data, if any.

Q.1 [a] The =C—H stretching absorption of 2-methyl-1-pentene is observed at 3090 cm^{-1}. If the hydrogen were replaced by deuterium, at what wavenumber would the =C—D stretching absorption be observed? Explain. (Assume that the force constants for the C—H and C—D bonds are identical).

[b] Explain the principle of Fourier transform Infrared Spectroscopy.

Q.2 [a] Differentiate polyvinyl alcohol and poly ethylene using FTIR spectroscopy.

[b] Differentiate stokes and anti-stokes in Raman spectroscopy.

Q.3 [a] Differentiate NMR spectrum of propane and 2-chloropropane and explain the position of each band.

[b] A polymer solution contains 1 g of 1000 molecular weight MW; 5 g of 2000 MW and 3 g of 10,000 MW. Calculate number average molecular weight, weight average molecular weight and PDI of the sample. Explain the significance of PDI.

Q.4 [a]A sample (3.0g) of carboxyl terminated polybutadiene (CTPB) required titration with 20 ml 0.1 N KOH to reach phenolphthalein end point. Calculate number average molecular weight of the polymer.

[b]Write a note on threshold molecular weight.

Q.5 Explain in detail membrane osmometric method for determining the molecular weight of a polymer sample.

-END-

-289-

Roll No.

Total No. of Pages=1

B.Tech. PSCT

5th SEMESTER

(Sept-2019)

MID SEMESTER EXAMINATION

PT 301 Heat Transfer

Time: 1:30 Hours

Max. Marks: 30

Note: Answer all questions. Assume the suitable data, if any.
Figures should be drawn with pencil only.

1 Answer the following questions: [2×5]

[a]. Conduction as a limiting case of convection. Elaborate.

[b]. What are the basic assumptions for the Fourier's Law?

[c]. Explain the analogy between heat transfer by conduction and flow of electricity through ohmic resistance.

[d]. What is Fourth Power Law? What is the value of Stefan-Boltzmann Constant in in S. I.?

[e]. Difference between Steady State and Unsteady State Conduction.

2 [a]. What is the effect of temperature on the thermal conductivity of the materials? Derive an expression for the average thermal conductivity.

[b]. The walls of a house in a cold regime consists of three layers an outer brick wall of 15 cm thickness and an inner wooden panel of 1.2 cm thickness. The intermediate layer is made of an insulating material 7 cm thick. The thermal conductivities of brick and the wood used are 0.70 W/m^0C and 0.18W/m^0 respectively. The inside and outside temperatures of the composite walls are 21^0 and 115^{0}C respectively. If the layer of the insulation offers twice the thermal resistance of brick wall, calculate: a) The rate of heat loss per unit area of the wall

5+5 = [10

3 [a]. Derive an expression for unsteady State Conduction.

[b]. What are the necessary conditions for Convective heat transfer? What is Newton's Law of Cooling? What are the factors on which the heat transfer coefficient depends.

6+4 = [10

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Total No. of Pages 2

Roll No.....

FIFTH SEMESTER

B.Tech.

Mid Semester Examination

September-2019

PT303 Polymer Processing Techniques

Time: 1:30 Hours

Max.Marks:30

Note: Attempt FOUR questions.
Assume suitable missing data, if any.

1. **Write brief answers/reasons to the following:** [1x6]
   a) Which 3 elements play important role in the production of articles by injection moulding process?
   b) How do 2 barrels in the plunger type moulding machine work?
   c) Write the range of compression and L/D ratios of the reciprocating screw?
   d) What is the role of check ring when the screw is advanced during resin injection?
   e) What is the role of cushion that is left in the barrel between the nozzle and the screw tip?
   f) What is the role of drive unit in injection moulding machine?

2. a) Write the difference between electric vs hydraulic injection moulding machine? [4]

   b) Draw a neat diagram of tank, hydraulic pump, electric motor, relief valve 1, pressure gauge, relief valve 2 and throttle valve. Relief valve 1 is set as 150 bar and relief bar 2 is set at 80 bar.

   i) What is the pressure gauge reading when the throttle valve is fully closed?

   ii) What happens when pressure setting of relief valve 1 is reduced to 50 bar? [

OR

3. a) Write the description of several types of heater bands used for heating a barrel. [4]
   b) Compare the 2 types of injection moulding machines that is plunger type and reciprocating screw type. [4]

4. a) Write the typical; process variables which need to be monitored and are controlled during each moulding cycle. [4]
   b) Describe the 3 main geometric categories of moulded parts for gas assist technology. [4]

5. a) Describe in gas assist moulding 5 steps of a short shot moulding diagram. [4]
   b) What are the advantages of gas assist moulding. [4]

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-292-

Total No. of Pages:02 *Roll No. ... .*

Fifth Semester **B.Tech[PSCT]**

MID SEMESTER EXAMINATION ***(SEP.-2019)***

(PT 309) Petroleum Refining

Time: 1:30Hours ***Max. Marks: 25***

Note: All Questions are compulsory.
Assume suitable missing data, if any.

Q.1 Write Answer in One Word or in One Sentence (1×8 = 8)

(a) What is the difference between petroleum oil and coal based on their chemical composition?

(b) Determine the performance number of the aviation fuel having octane number 137.

(c) What is the pore point?

(d) Suppose average boiling point of a crude sample is 890 °R and specific gravity is 0.843. What will be the value of Characterization Factor (Kuop) of the crude.

(e) What are you understand by smoke point.

(f)What are you understand by Aniline point.

(g) A gas oil has the same ignition delay characteristics as mixture of 73.2% n-cetane and 27.4% heptamethyl nonane. What is the cetane number of the gas oil.

(h) What is the main compounds present in LPG.

Q.2 (a) Explain the oil production from shale formation and tar sands in brief. (3)

(b) What are you understand by API Index. Calculate the API for a petroleum sample with Specific gravity 0.81 at 15.56 °C. (3)

(c) Write a short note on sulfur compounds present in petroleum. (3)

Q.3(a)Write about different grades of LPG and naphtha, and their applications. (4)

(b) Explain the working of Atmospheric Distillation Unit with flow diagram. (4)

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B. Tech. (V Sem) Mid Semester Examination 2019

(Elective Paper PT-315- Packagin g Technology)

Time: 1.5 H

Max. Marks = 25

NOTE: Attempt All Questions. All questions carry equal marks.

1. (a). "Primary packaging is for containment only", justify.
   (b). Describe the protective functions of packaging
   (c). Name the Top Five global and Indian packaging industries.

2. Define basis weight and grammage for paper packaging. The mass of 17 sheets of 36 cms x 18 cms is 119 gram. What is the basis weight and grammage of the paper?

3. Which metals are used in packaging? Enumerate the processes of making of two piece metal can. Describe the single drawn and multiple drawn methods of making two piece can.

4. Name the 5 plastics used in packaging. What are advantages and disadvantages of usif plastics as packag material? Name the plastics exhibiting good bar properties of water vapor transmission?

5. Describe the followings.
   (i). Wet paper strength
   (ii). Metals used in packaging
   (iii). Solid bleached board
   (iv). Compounds needed to get blue and red colour gl
   (v). Characteristics of HDPE and PP for packaging

Total no of pages: 01 Roll no.....

MID SEMESTER EXAMINATION September-2019

B. Tech 5th Semester.

PT-319 (Biomaterials)

Time: 1:30 Hours Max. Marks: 25

Note: Answer three questions, and Question No.1 is compulsory. Attempt any two questions from the rest of four questions.

1. What do you understand by the term "Biological Materials", "Artificial Materials" and "Biomaterials". Using materials in-vivo, Biocompatibility is a very important parameter. What are your views on this, like general requirements? 9 Marks.

2. What are the guidelines for the assessment of Biocompatibility? 8 Marks

3. What are the material properties that are important for the design of biomaterials as implants etc? 8 Marks

4. Metallic implants are in use, what are the metals used in making implants. Write on stainless steel or on cobalt based alloys, or on Nickel-titanium alloy (write only on one out of these three). 8 Marks.

5. Corrosion of implants is a serious problem, what are your views on this. What is Passivation and Immunity with respect to metal implants? 8 Marks.

-End-

Total No. of Pages _2__ Roll No.....

FIFTH SEMESTER B.Tech

MID SEMESTER EXAMINATION SEP-2019

HIGH PERFORMANCE POLYMERS (PT361)

Time: 1:30 Hours Max. Marks: 25

Note : Answer all questions
All questions carry equal marks.
Assume suitable missing data, if any.

Q. 1 i) Write the name and chemical structure of monomer units of the following polymers

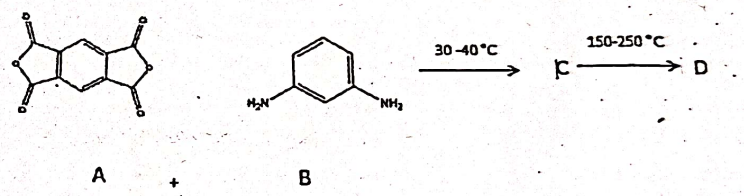
1) PEEK
2) PPS
3) PPO
4) PBI

Arrange the above mentioned polymers in order of their increasing thermal resistance.

ii) Enumerate and explain in brief various structural features responsible for building heat resistance in polymers. How one can assess heat resistance of a given polymer?

(2 + 3 = 5 marks)

Q. 2 Give the structure of polymers C & D.



Enlist the important properties and applications of polymer C & D.

(5 mar

Q. 3 Discuss PET and PBT w.r.t. preparation, structure, properties, and applications. (5 marks)

Q. 4 i) Nomex is chemically known as _____

ii) Write short note on

a) Burning mechanism of polymers

b) Polyquinoxalines as Heat Resistant Polymer

(1+ 2 +2 = 5 marks)

Q.5

i) With an example define conducting polymers

ii) Explain in detail "Band Theory" in case of conducting polymers using MOT and Quantum approach.

(1+ 4 = 5 marks)

END

-298-

Total No. of Pages: 01 *Roll No. .....*

FIFTH SEMESTER **B.Tech.**

MID SEMESTER EXAMINATION **Sept-2019**

PT-367 POLYMER WASTE MANAGEMENT

Time: 1.5 Hours ***Max. Marks: 25***

Note : Answer all questions. All questions carry equal marks. Assume suitable missing data, if any.

1 What do you understand by Plastic waste? Explain the role and methods of segregation in plastic waste management?

2 Write the name and address of three organizations working in the field of plastic waste management. Explain a case study related to the organization.

3 Explain SPI resin identification coding system in detail. Write its importance.

4 Differentiate between thermosetting and thermoplastics. Which can easily recycled and why?

5 Explain the use of plastics in road construction. Write the merits demerits of polymer blended bitumen roads. List four other impor uses post-consumer waste plastics.

Total no. of Pages-01

7th SEMESTER

MID SEMESTER EXAMINATION

Roll No.

[B.Tech.

(Septembe

PT-405 Fiber Technology

Time: 1hour 30 min

Max Marks

Note: Answer all questions
Assume suitable missing data, if any

Q.1 Justify the following statements with suitable examples.

a Fiber forming polymer should be linear and semi crystalline in nature. 3

b Heat setting is an essential post spinning operation for thermoplastic fibers. 3

Q.2 a How the molecular chain orientation takes place in melt spinning and drawing process? 4

b Discuss the cross-section structure formed during melt spinning, wet spinning and dry spinning. 4

Q.3 a Differentiate between the structure and properties of Jute and Flex Fibers. 3

b Differentiate Between silk and wool Fibers. 3

Q.4 a What is fabric creasing? Why is it happened in cotton fabrics? 3

b Write a short note on spin finish. 3

Q.5 a Give classification of Fibers with suitable example. 2

b A Polypropylene filament has length of 80 cm and weight of 2.4 mg was tested on Instron tensile testing machine. The filament has the breaking load of 60cN. Calculate the fineness and tenacity of the filament in ISO system. 2

Total No. Pages 01 — 300 —

B. Tech. (PT) Roll No. ... .

Mid Semester Examination Seventh Semester

PT407 Chemical Process Technology (Sep.-2019)

Time: 1hr 30min Max. Marks: 30

NOTE: Answer any five questions.
Assume suitable missing data if any.

1. (a) What is Process Instrumentation Diagram? 2
(b) Write the uses of Centrifugation and Grinding Unit Operations. 2
(c) Compare the advantages of Continuous versus Batch process for soap manufacturing. 2

2. (a) What is Flow sheet? Write the important features of Process Flow sheet? 3
(b) What are the major oil seeds produced in India? Comment on the Edible oil industries' potential in India. 3

3. (a) Explain the potential of soap industries in India from global scenario. 3
(b) Comment on the engineering problems arising due to thermodynamics of hydrogenation of oil reaction. 3

4. (a) How the pressure-temperature parameters are controlled t produce the different varieties of hydrogenated oils.
(b) What is the end uses of Glycerin? Write the chemical reactio involved in glycerol manufacture.

5. Draw the schematic representations of the following Unit Operatio i] Wet Scrubber ii] Bag filter iii] Screw Conveyer

6. Explain the extraction of vegetable oil by solvent extraction meth with the help of neat Process flow diagram.

Total No. Pages 01 — 300 —

Roll No. ... .

B. Tech. (PT)

Seventh Semester

Mid Semester Examination (Sep.-2019)

PT407 Chemical Process Technology

Time: 1hr 30min Max. Marks: 30

NOTE: Answer any five questions.
Assume suitable missing data if any.

1. (a) What is Process Instrumentation Diagram? 2
(b) Write the uses of Centrifugation and Grinding Unit Operations. 2
(c) Compare the advantages of Continuous versus Batch process for soap manufacturing. 2

2. (a) What is Flow sheet? Write the important features of Process Flow sheet? 3
(b) What are the major oil seeds produced in India? Comment on the Edible oil industries' potential in India. 3

3. (a) Explain the potential of soap industries in India from global scenario. 3
(b) Comment on the engineering problems arising due to thermodynamics of hydrogenation of oil reaction. 3

4. (a) How the pressure-temperature parameters are controlled to produce the different varieties of hydrogenated oils. 3
(b) What is the end uses of Glycerin? Write the chemical reaction involved in glycerol manufacture. 3

5. Draw the schematic representations of the following Unit Operations: i] Wet Scrubber ii] Bag filter iii] Screw Conveyer 6

6. Explain the extraction of vegetable oil by solvent extraction method with the help of neat Process flow diagram. 6

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— 301 —

Total no. of pages: 2 Roll No.....

SEVENTH SEMESTER SEP-2019

MID SEMESTER EXAMINATION SEP-2019

PT427 SAFETY AND HAZARDS IN CHEMICAL INDUSTRIES

Time: 1:30 Hours Max. Marks: 25

Note: Answer FOUR questions.
Assume suitable missing data, if any.

1. [A] What are commonly used managed systems directed towards eliminating the existence of hazards? [1]

[B] What is bonding? [1]

[C] What is the distinction between fires and explosion? [1]

[D] Give examples of some non-conductive liquids that will accumulate charge and are flammable? [1]

[E] What should you do with respect to static electricity before you transfer a flammable liquid material from a 50 gallon drum to an open container? [1]

[F] What is inherent safety? [1]

[G] What are chemical process hazards? [1]

2. [A] A university had about 1200 full time employees. In a particular year this university had total of 38 reportable lost time injuries with a resulting 274 lost work days. Compute the following i) OSHA incidence rate based on injuries and ii) Lost work days [4]

[B] An employee works in a plant with FAR of 4. If this employee works a 4hr shift 200 days per year, what is the expected death s per person per year? [2]

P.T.O.

3. [A] What are some of the important aspects of storage layout? Elaborate. [4]

[B] What are some of the safety benefits of a good plant layout? [2]

4. [A] Describe the 4 process safety strategies along with examples. [4]

[B] Explain how is the methods of static electricity control achieved? [2]

OR

5. [A] Explain process safety strategies to the batch chemical reactor example. [4]

[B] What is the difference between detonation and deflagration? [2]

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Total No. of Pages:2
IIIrd SEMESTER
MID TERM EXAMINATION
Paper Code: **SE-201**

Roll No.....
B.Tech (SE)
(Sept – 2019)
Title: Data Structures

Time: 1:30 Hours
Max. Marks: 30

Note: 1. All questions are compulsory.
2. Assume any suitable value(s) for missing data.
3. If asked to write algorithms, write as C/C++ functions or in pseudo code.

Q 1. **(2*5=10 marks)**

(a) What is meant by stack overflow condition? Is it applicable to the linked list method of implementation of the stack? Give reasons.

(b) Consider a two-dimensional array A [20][10]. Assume 4 words per memory cell, the base address of array A is 100, elements are stored in row-major order and first element is A[0][0]. What is the address of A[11][5] ?

(c) What is the output of following function for start pointing to first node of following linked list? 1->2->3->4->5->6

```
void fun(struct node*start)
{
 if(start == NULL)
  return;
 printf("%d  ", start->data);
  if(start->next != NULL )
  fun(start->next->next);
 printf("%d  ", start>data);
}
```

(d) What is the time complexity of the function?

```
int fun(int n)
{
 int count = 0;
 for (int i = n; i > 0; i /= 2)
   for (int j = 0; j < i; j++)
     count += 1;
 return count;
}
```

(e) The result of evaluating the postfix expression 10, 5, +, 60, 6, /, *, 8, – is

Q 2.

a) Consider the following queue of characters where QUEUE is a circular array whic allocated six memory cells: (3 ma
Front=2 Rear=4 QUEUE: _, A, C, D, _, _ ("_" denotes empty memory cells).
Describe the queue after each step as the following operations takes place:
i) F is added to the queue, ii) Two letters are deleted, iii) K, L, and M are added to qu
iv)Two letters are deleted, v) R is added to queue, vi) Two letters are deleted, vii)
added to queue, viii) Two letters are deleted.

b) Translate the following infix expression into postfix expression: (2 ma
A + (B * C – (D / E / F) * G) * H

c) Let A and B be two linked list. Write a 'C' function to create a new linked list C contains elements alternately from A and B beginning with the first element of A. If run out of elements in one of the lists, the append the remaining elements of the othe to C. (5 ma

Q 3.

a) Write an algorithm to concatenate two singly linked list? (3 ma

b) Create a data structure *twoStacks* that represents two stacks. A single a A[1...MAXSIZE] is used to implement *twoStacks*. The two stacks S1 and S2 grow opposite ends of the array. Variables top1 and top2 (top1<top2) point to the locatio the topmost element in each of the stacks. Following functions must be supporte *twoStacks*.

Push1(int x)→ pushes x to first stack.
Push2(int x)→ pushes x to second stack.
Pop1()→ pops an element from first stack and return the popped element.
Pop2()→ pops an element from second stack and return the popped element.
Write an algorithm for the implementation of above said *twoStack*.

c) Write an algorithm to insert a new node 'p' in a doubly linked list after a node pointe a node pointer 'q' consider all the cases. (5 mar (2 mar

- 305 -

Total No. of Pages:01 *Roll No.....*

3RD SEMESTER **B.Tech.(CSE)**

MID SEMESTER EXAMINATION **(Sept-2019)**

SE 203: Object Oriented Programming

Time: 1:30 Hours **Max. Marks: 30**

Note: Answer all questions.
Assume suitable missing data, if any.

Q 1. Differentiate between characteristics of procedure-oriented programing and object-oriented programing languages. (4)

Q 2. List the operators that cannot be overloaded through member function and friend function. (3)

Q 3. What is inline function? Explain situations where inline expansion may not work. (3)

Q 4. Write a C++ program that adds two numbers belonging to different classes. Demonstrate the use of friend function in one class that is a member function of the second class. (5)

Q 5. Write a C++ program to keep a track of number of objects created, number of objects destroyed, and number of active objects in a program. (5)

Q 6. Explain virtual base class with suitable example. (5)

Q 7. Write a C++ program to convert class time with data members as hrs and mins into class minutes with data member as totalminutes. (5)

Total No. of Pages 02 -306-

Roll No. .....

THIRD SEMESTER

B. Tech [SE]

MID SEMESTER EXAMINATION

Sept-2019

SE 205: Operating Systems

Time: 1.5 Hours

Max. Marks: 25

Note: 1) Answer all questions.
2) Assume suitable data, if any.

Q.1. a) Write down the major difference between Real Time and Time-shared operating systems with suitable example. [2]

b) What do you understand by race condition? Give few example of arising race condition in concurrent processing. [3]

OR

b) Explain the difference between multiprogramming, multitasking, multiprocessing and multi-threading systems. [3]

Q2. a) What is system call? Explain various types of system calls in detail. [3]

b) What is Multi-level feedback queue scheduling? [2]

Q3. What is a process? Discuss various states of a process with the help of process state transition diagram. [5]

Q4. Consider the following set of processes, assumed to have arrived at time 0, in the order P1, P2,.., P5 with the length of the CPU burst time given in milliseconds: [5]

Processes	Burst Time
P1	4
P2	1
P3	2
P4	1
P5	5

P.T.O.

Calculate the following:

i) Average waiting time and average turn-around Time using Sjf preemptive scheduling mechanism.

ii) Assume time quantum to be 1 unit of time. Calculate average waiting time and average turn-around time using Round-Robin Scheduling.

Q5. What is mutual exclusion? How mutual exclusion is achieved in peterson's solution? Explain by giving proper structure of process Pi and Pj. [5]

OR

What is inter-process communication? Compare and contrast two fundamental models of inter-process communication. [5]

-END-

Total No. Of Pages 1
THIRD SEMESTER
MID SEMESTER EXAMINATION

Roll no.....
B.TECH (SE)
September 2019

SE207 ENGINEERING ANALYSIS AND DESIGN (MODELLING AND SIMULATION)

Time 1:30 hours **Max. Marks: 25**

Note: All Questions are Compulsory. All Questions Carries Equal Marks. Assume suitable missing data ;if any:

Q1. How to simulate a single-server queueing system by showing how its simulation model would be represented inside the computer at time $e_0 = 0$ and the times $e_1, e_2, \ldots\ldots\ldots\ldots e_9$ at which the 8 successive events occur that are needed to observe the desired number, n = 3, of delays in queue. Assume the interarrival and service times of customers are

$A_1 = 0.4, A_2 = 1.2, A_3 = 0.5, A_4 = 1.7, A_5 = 0.2, A_6 = 1.6, A_7 = 0.2, \ldots\ldots$

$S_1 = 2.0, S_2 = 0.7, S_3 = 0.2, S_4 = 1.1, S_5 = 3.7, S_6 = 0.6, \ldots\ldots\ldots$

(5)

Q2. Draw the flow diagram for the execution of arrival and departure events in a queueing model. **(5)**

Q3. Name the entities, attributes, activities, events and state variables for the system shown below:

(a)Library (b)Bank (c)Airport (d)Grocery Store (e) Hospital

(1*5=5)

Q4 Use Linear Congruential method to generate a sequence of 5 random numbers with given seed 27, increment 43, and constant multiplier 17, modulus 100. **(5)**

Q5.) Explain the following:-

i) Mid Square Method. ii) Next Event Time Advance Mechanism.

(2.5*2=5)

Total No. of Pages:02

5TH SEMESTER

MID SEMESTER EXAMINATION

Roll No.....

B.Tech.(SE)

(September – 2019)

SE 301 Object Oriented Software Engineering

Time: 1:30 Hours

Max. Marks: 30

Note: Answer all questions.
Assume suitable missing data, if any.

Q1. Describe Jacobson's methodology. What are the benefits of UML? (4)

Q2. More and more applications are available, provided for example by transport operators such as railway companies, metropolitan of regional transportation authorities, that provide real-time information to users when disruptions occur in their networks. Typically, however, these applications provide generic information, in a "one size fits all" approach, where every user receives the same notifications.

The goal of the project is to develop a system that allows users to receive targeted, personalized information only when their routes of interest are affected by the disruptions, and only at the right time (for example, a disruption that occurs in a metro line when the user is out of town is of no interest to the user). The students are expected to identify one or more transport operators of interest, identify the available sources of information concerning disruptions (which might also be user-generated information spread through social networks, possibly through functions available on the application itself), and to create a system that provides users with information that is as accurate, timely and personalized as possible. Students are encouraged to interact with transport operators and potential users of the system to gather their expectations and needs concerning such a system.

The goals of the project are the following:

- To design a system that allows travelers to indicate services to be monitored, and to define the kind of events and disruptions that should be monitored.
- To develop mechanisms that allow users to receive notifications when events of interest occur for the monitored services, according to the preferences and the context of the user (e.g., only if the event is relevant given the current situation of the user, such as her position).

To achieve the goals of the project, an analysis of available sources of information concerning the status of the transport services of interest should be carried out. Given that information concerning the status of a transportation network is typically proprietary, and not always readily available, if the analysis of data sources reveals a difficulty in accessing the required data, then risk-mitigating actions must be considered (e.g., generating synthetic data).

Given the user-centeredness of the whole idea of the disruption notification system, teams tackling the project should make an effort to identify, possibly with the help of user surveys, the kinds of information and the mechanisms and timings of notifications that travelers find more useful.

Draw the following using standard notations. If necessary, you can make suitable assumptions regarding the details of various features of above system, but you must clearly write down the assumptions you make.

1. Identify use cases and actors.
2. Draw use case diagram for the system. (4)
3. Write use case description of "Send Notifications" use case. (4)
4. Identify classes and their relationship for system. (6)

(12)

-END-

-311-

Total No. of Page: 2

V TH SEMESTER
MID SEMESTER EXAMINATION

Roll No. .....
B.TECH. [SE]
(SEPT - 2019)

SE303 ALGORITHM DESIGN AND ANALYSIS

Time: 1:30 Hours **Max. Marks: 25**

Note:	Answer all questions. Assume suitable missing data, if any.

Q1 Solve the following?

a) Apply master method to find the complexity of the following: [2 X2 = 4]

i) $T(n) = 4T\left(\frac{n}{2}\right) + n^3$

ii) $T(n) = 4T\left(\frac{n}{2}\right) + n^2$

b) For the recurrence equation $T(n) = T\left(\frac{n}{3}\right) + T\left(\frac{2n}{3}\right) + n$ [3 x 2 =6]

i) Apply recurrence tree method to find complexity. Show each and every step involved in calculation.

ii) For the complexity calculated in the previous part, use the same to prove with the help of substitution method. Use $\log_2 3$ and $\log_2(\frac{3}{2})$ as $3/2$ *and* ½ respectively. Also write the minimum value of constant c for which the proof holds.

Q2 Given a sorted array of non-repeated integers A [1…n], check whether there is an index i for which A[i] = i. Modify the divide and conquer algorithm/ pseudo code for binary search to do the needful. Give an example to justify your implementation. Analyze the complexity for the same? [2+2+1]

Q3 Consider following problem of frog willing to reach position n in minimum number of jumps. The frog begins at position 0 in the river. Its goal is to get to position n. There are lilypads at various positions. There is always a lilypad at position 0 and position n. The frog can jump at most r units at a time from one

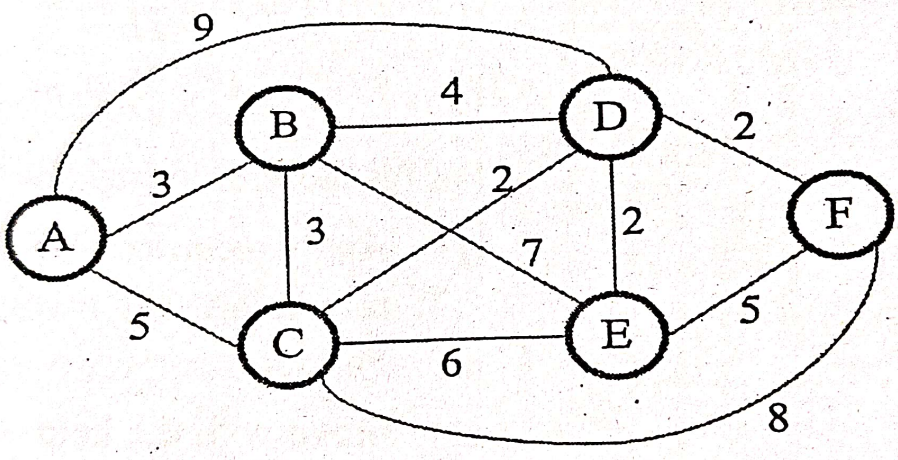
lilypad to another lilypad. Goal is to find the path the frog should take minimize jumps, assuming a solution exists. Write a greedy algorithm pseu codes for your solution.

Solve following instance of problem using your greedy algorithm with r = 3.



[5]

Q4 Write down Dijkstra algorithm. Show step by step implementation of t same algorithm on the given graph with A as the source node. [5



-313-

Total No. of Pages:1 *Roll No.....*

FIFTH SEMESTER **B. Tech.(All Branch)**

MID SEMESTER EXAMINATION **Sep-*2019***

SE321 ARTIFICIAL INTELLIGENCE

Time: 1:30 Hours *Max. Marks: 25*

Note:All questions are compulsory. Assume suitable missing data, if any.

Q.1 What are the various applications of AI? [3]

Q.2 Explain the following: [2*2]

a) Task domain of AI.

b) Intelligent Agent along with its all classifications.

Q.3 Describe Hill- Climbing algorithm. What are its limitations? [3]

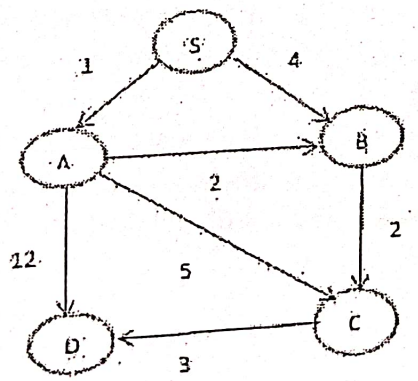
Q.4 Consider the crypt arithmetic problem shown below: [5]

```
  EAT
+ THAT
-------
 APPLE
```

Explain steps in detail to solve this problem using the constraint satisfaction problem.

Q.5 Write an algorithm for AO*. Explain with the help of suitable example. [5]

Q.6 Explain A* algorithm and solve the following problem using A* algorithm. [5]



State	Heuristic Value
S	7
A	6
B	2
C	1
D	0

Total No. of Pages 02

FIFTH SEMESTER

Roll No. .....

B.Tech. (SE)

MID SEMESTER EXAMINATION

SEPT-2019

SE323 THEORY OF COMPUTATION

Time: 1:30 Hours

Max. Marks: 25

Note: Answer ALL questions. All questions carry equal marks.
Assume suitable missing data, if any.

1 [a] Discuss whether the following statement are True/False.
(I) The languages $L=\{0^m0^n \mid n>=m>=0\}$ is not regular.
(II) If L is a language containing at least one non empty word then L^* is an infinite language.
(III) $L= \{wxw \mid w,x \in \Sigma^*\}$ is regular language.
(IV) The set of no. 1, 2, 4,.....2^n,.....written in binary recognized by FA.
(V) For a regular expression (a+b)(a+b)(a+b)...(n – times). The minimum number of states in infinite automata that recognizes its language is n+2.

[b] Design a mealy machine and its transition table which accept two's complement of a binary number.

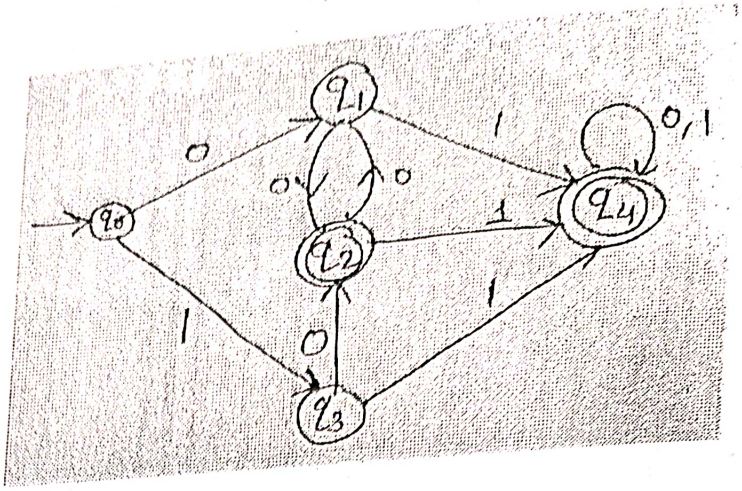
2 [a] Design a DFA for complement of Language L ,which is defined as L= a*b*c*, where a,b,c are the input alphabets for the language.

[b] What is the result of Union , intersection and infinite intersection for a regular and a non- regular language? explain with example.

3 [a] Design a DFA and transition table for a language over a and b contains all string in binary whose decimal equivalent is divisible by 6.

[b] Minimized the following DFA ,where q0 is initial state and q2 and q4 are final states.

P.T.O.



4 [a] For the language L={a ^{P} ,where P is any Prime number} discuss a
whether the language L and kleen's closer of L are regular or not.
[b] What is the Chomsky classification of grammar explain with exampl

5 [a] What do you mean by NFA and discuss process of removing epsilon
with example.
[b] Let L={$a^i b^k c^j$, where j > i+k}, what are the strings of length 7 gene
the language.

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Total No. of Pages :02 — 316 —

7th SEMESTER

MID TERM EXAMINATION B.Tech.[SE] Sept-2019

SE405 SOFTWARE PROJECT MANAGEMENT

Time: 1.5 hrs Max. Marks: 30

Note: Assume suitable missing data, if any.

Q.1 The special purpose vehicle company, Metro Link Express for Gandhinagar and Ahmedabad (MEGA) Company Ltd (now renamed Gujarat Metro Rail Corporation (GMRC)), was established by Government of Gujarat on 4 February 2010 with Rs 200 crore. Later in 2014, it was decided that the Central Government will own 50% of the company. On 19 October 2014, Union Cabinet of India approved ₹10,773 Crores for the Phase–1. In 2015 budget of Gujarat, ₹ 611 crore was further allocated for the metro. The Government of Gujarat gave approval for Phase-2 of project in October 2017 and revised it in October 2018. In February 2019, the Union cabinet approved the Rs 5384.17 crore for second phase of the project.

Phase-1 (under construction)

- Total Length: 40.03 km (24.87 mi)
  - North-South corridor: 18.87 km (11.73 mi)
  - East-West corridor: 21.16 km (13.15 mi)
- Elevation:
  - Elevated: 33.50 km (20.82 mi)
  - Underground: 6.53 km (4.06 mi)

Phase-2 (approved)

- Total length: 28.254 km (all elevated)
  - Motera-Mahatma Mandir corridor: 22.838 km
  - Gujarat National Law University (GNLU)-GIFT City corridor: 5.416 km

The project will connect four corners of Ahmedabad city with 2 corridors and 32 stations. North-South corridor will be completely elevated with 15 stations and will connect Motera Stadium to APMC, Vasna. East-West corridor will have 17 stations in route. In east-West corridor, approximately 6.5 km is underground section with four underground stations and rest is the elevated section with 13 elevated stations. The old high court station will be interchange for both the

corridors. Phase-1 is expected to be completed by 2020. In second phase, It will extend from Motera to Mahatma Mandir in Gandhinagar,(22.838 km) with a separate line from Gujarat National Law University (GNLU) linking Pandit Deendayal Petroleum University (PDPU) and GIFT City (5.416 km). The Phase-2 will have total 28.254 km long elevated corridor with 22 stations.

(a) Identify the scope of project. (01)

(b) List the objectives of project in order of their importance. (02)

(c) Is the project technically and/or economically feasible? Justify your opinion. (02)

(d) What will be the deliverables of this project? (02)

(e) Which lifecycle model will you recommend for this project? Also provide rough outline of all phases involved with respect to the project. (04)

(f) Identify all the stakeholders and define their responsibilities. (04)

Q.2 Briefly explain modes of COCOMO. Suppose a project is estimated for 150 KLOC. Project requires medium innovation and its schedule is also not very tight. Calculate average staff size and productivity of the project. (02+03=05)

Q.3 A software project has 2 internal classes- C1 with 4 DETs and 5 RETs, C2 with 2 DETs and 1RETs. It has 1 external class C3 also with 5 DETs and 10 RETs. Concrete services in the classes are 4 of average complexity. Assuming adjustment factors to be moderate, calculate object point for the system. (05)

Q.4 Consider the project cash flow estimates for 2 projects at ABC company pv ltd. What do negative values and positive values represent? Rank the 2 projects i order of financial desirability on basis of NPV, using 10% discount rate. (05)

Year	Project 1	Project 2
0	-100000	-120000
1	10000	30000
2	10000	30000
3	10000	30000
4	20000	30000
5	100000	75000

-318-

Total No. of Pages 01

Roll No:

VII SEMESTER

B.Tech. (SE)

MID SEMESTER EXAMINATION

Sept-2019

Paper Code: SE407

Title of Paper: Computer Network

Time: 1:30 Hours

Max. Marks: 30

Note : Answer any five questions. All Questions Carry equal marks
Assume suitable missing data, if any.

Q. No.1

Compare and contrast the OSI and TCP/IP Model.

Q. No.2.

Consider the Pure ALOHA, Slotted ALOHA, and Non-persistent CSMA. Which one will you use at high load? Why?

Q. No.3.

Define CRC. A bit stream 1001110101 is transmitted using the standard CRC method described in the text. The generator polynomial is $x^3 + x + 1$. Show the actual bit string transmitted. Suppose the fourth bit from the left is inverted during transmission. Show that this error is detected at the receiver's end.

Q. No.4.

What are different data encoding techniques? Explain and Encode data stream 00110101 by using Manchester, Differential Manchester and NRZ-L encoding methods.

Q. No.5.

Describe Distance Vector Algorithm in detail with suitable example.

Q. No.6

Write Short notes on any three:

(i) Bit-stuffing
(ii) Shortest path Algorithm
(iii) Count- to- infinity Problem
(iv) Guided and Unguided communication channel

Total No. of Pages:1

Roll No.....

SEVENTH SEMESTER B.TECH

Mid SEMESTER EXAMINATION SEPT-2

Subject: SE-411 SOFTWARE QUALITY AND METRICS

Time: 1.30 Hours *Max. Marks:2*

Note: Answer all questions. Assume suitable missing data, if any.

1. [a] What are the various attributes of software quality. Explain with the help of diagram. Identify two important attributes of the software. [4]

[b] Explain various steps involved in SQA plan. [4]

2. [a] Explain CMMI model? Explain all the levels with the help of diagram. [5]

[b] Compare and contrast 3 Sigma and 6 Sigma model. [2]

3. [a] Consider the following dataset consisting of lines of source code for a given project.

100, 150, 156, 187, 206, 209, 235, 270, 275, 280, 305, 309, 351, 359, 375, 400, 406, 410, 450, 475, 500.

(i) Calculate quartile for it.

(ii) Determine normality of data.

(iii) Identify outliers using box plots [5]

[b] In mission critical systems, such as those developed by NASA, it is very important that the test engineers properly recognize the severity of each issue they identify during testing. Proper severity assessment is essential for appropriate resource allocation and planning for fixing activities and additional testing. A model is needed to be developed for the assessment of the severity level of the defects. Data gathered from source code such as inheritance, size, attributes and so on is to be taken as input. Identify the various variables and specify their measurement scale. [5]

-End-

4/12

Total no of Pages: 01 Roll No. .....

FIRST SEMESTER (B.DES.)

MID TERM EXAMINATIONS SEPTEMBER 2019

Course Code: DD101 WORLD OF DESIGN

Time: 90 Mins Max. Marks: 20

Note: Attempt any Four.

Section A

Q1. Do you think Design & Nature relate to each other? Justify your answer. (Max. 300 words)

Q2. What is the role of designer in society? How they can achieve it? (Max. 300 words)

Q3. What properties of a material makes it more efficient, economic to use, easily manufactural and aesthetically appealing? (Max. 300 words)

Q4. Discuss the design intervention from Industrialization to Modernism to Post modernism Era. (Max. 300 words)

Q5. What is Biomimicry? Which problem of society would you like to solve by Biomimicry and How? (Max. 300 words)

{4*5 Marks}

END

Roll. No.....

Total No of Pages 01
FIRST SEMESTER
MID TERM EXAMINATION

B.DESIGN
Sept- 2019

Course Code: DD103 Sketching 2D/ 3D & Rendering

Time: 1 ½ Hours **Max. Marks: 20**

Section A

Human Figure Study
To be drawn from memory.

Q 1 Draw line sketch of full human figure of the postures as mentioned below:
(Any two) **{2x4= 8 Marks}**

a) Standing relaxed
b) Sitting on bench
c) Running fast

Section B

Creativity
To be drawn on the reference.

Q 2

a) Create any two interesting ideas (Drawings) from your imagination, using objects in the images provided to you. (The reference object must fit in your drawing seemingly and should appear to be a part of it).
{2x4=8 Marks}

b) Pen down your thought-process and idea behind your creation. (200 words)
{2x2= 4 Marks}

END

Total no of Pages: 01 Roll No._____

FIRST SEMESTER (B.DES.)

MID TERM EXAMINATIONS SEPTEMBER 2019

Course Code: DD105 ELEMENTS OF DESIGN

Time: 90 Mins Max. Marks: 20

Note: All questions are compulsory.

Section A

Q1. What are Elements of Design. Discuss their importance in Design. (Max. 200 words)

OR

What are the difference between shape and form? Give at-least 4 examples. (Max. 200 words)

{1*10 Marks}

Q2. Which elements of design does the picture below consists? What does the artist has tried to convey with this artwork. After completing the write up give a title to artwork. (Max. 250 words)



END {1*10 Marks}

Total no of pages :01

FIRST [redacted] SEMESTER,

Roll No._____ (B.DES.)

MID TERM EXAMINATIONS: SEPTEMBER 2019

Course Code: DD 107 TINKERING STUDIO

Time: 120 Minutes Max. Marks: 40

Note: All questions are compulsory.

Q1 How are plastics classified for recycling process. What are the symbols used? How many categories are there? What are these categories? Which of these categories safe /unsafe? (5marks)

Briefly write about the plastic and process used in two plastic components you brought to the class (5marks)

Q2. What is injection molding? What are the tell-tale signs in an injection molded part? Draw an injection molded component with these features (10 marks)

Q3. Through illustrations explain the process of making a mold in silicone rubber and using the same for resin casting (10 marks)

Q4 For any product that you have explored in the studio class explain the following (10 marks)

a) Purpose of this product
b) How does this product function?
c) What is the front end of this product?
d) What is the back-end of this product?
e) What are the components that make up the inner core of the product

-END-

Total No of Pages 01 Roll. No.....

FIRST SEMESTER B.DESIGN

MID TERM EXAMINATION Sept- 2019

DD109 Computer Graphics 2D

Time: 1 ½ Hours **Max. Marks: 20**

Note: Attempt the question using Photoshop application.

Q1

a) Create an interesting composition using the references provided. You may add color, texture, text and drawing (lines/ shapes/ forms) to make the composition meaningful. Usage of **any four** references is essential.

{15 Marks}

b) Write a brief note on the 'concept' of your composition. (limit: 100 words)

{05 Marks}

Dimension :A4 size
Color Mode :CYMK
Output :PSD & JPEG files

END

Total no of pages : 01 Roll No._____

THIRD SEMESTER, B.Des.
MIDTERM EXAMINATIONS: SEPTEMBER 2019

Course Code: DD 201 PHYSICAL ERGONOMICS

Time: 90 Minutes Max. Marks: 20

Note: All questions are compulsory.

Q1 Multiple choice questions **{2.5 Marks}**
(write a one-line statement to support your answer)

a) Physical Ergonomics is related to human
1. Comfort 2. Safety 3. Cognitive 4. All of the above

b) The most frequently used components are arranged in
1. Left side 2. Right Side 3. Central location 4. All of the above

c) The height of the top of the workbench should be __ the height of the elbow of the workmen.
1. At 2. Above 3. Below 4. None of the above

d) You are at risk of an MSD if you:
1. Keep repeating a forceful task 2. Use hand tools once a year 3. Rest between repetitive task 4. None of the above

e) The neutral position is:
1. The position that places the least amount of stress on the body
2. The most difficult position for the body to hold
3. A safe position that protects only the back
4. The only position you can work in

Q2 What is ergonomics? Explain the principles (with illustrations). **{5 Marks}**
(Word limit- 300)

Q3 Explain Vertebral Column, Type of Vertebrae, and its functions. **{5 Marks}**

Q4 Analyze the task of a cobbler and propose an ergonomically designed workstation to enhance cobbler's productivity (Support your answer with illustration and sketches) **{7.5 Marks}**

END

Total no of pages:01

Roll No.....

THIRD SEMESTER

(B.DES.)

MID TERM EXAMINATIONS

SEPTEMBER 2019

Course Code:DD203 DESIGN AND PEOPLE

Time: 90 Mins

Max. Marks: 20

Instructions: - The Question Paper may be provided TWO days before the exam for the students to prepare and do the field work.

Q1. {20 Marks}

The Unorganised Sector in India is very prevalent. It employs a vast majority of workforce which is the backbone of the Indian Economy. The Unorganised Sector and Frugal Innovation are deeply interconnected. There are a lot of innovations which people do for their daily needs.

(For Example: "The Cobbler". The cobbler is a part of the Unorganised Sector. A variety of Tools and Products have been innovated by the cobbler for the profession. The Cobbler profession in itself is providing a service which caters to many)

Please DO NOT choose the cobbler profession as the example is already given. You are free to choose any other service or profession.

The task is to Observe and Understand the basic needs upon which these Informal sectors are working on and the innovations which the people involved with these sectors come up with. You are to document such Innovations.

The format for documentation can be in the form of Photographs, Graphics, Videos etc. (any out of the box format is welcome). More weightage will be given to Original work provided there is sufficient proof.

-328-

Total no of pages:01 Roll No.....

THIRD SEMESTER (B.DES.)

MID TERM EXAMINATIONS SEPTEMBER 2019

Course Code: DD205 BASICS OF INTERACTION DESIGN

Time: 90 Mins Max. Marks: 20

Instructions: - The Question Paper may be provided a day before the exam for the students to prepare and do the field work.

Q1. {20 Marks}

The task is to Identify an Issue when you are travelling to University Campus. You can take up any issue that you face during the journey. The journey can be from your (Home /PG /Hostel /Airport /Train-Station /Bus-Stop etc.) to the DTU Campus.

Once the identification is done use the following tools and processes that you are familiar with to solve the issue.

(Root Cause Analysis and Fish Bone Diagram (Ishikawa diagram), Persona, Scenario and Solutions Based on Persona and Scenario)

— 329 —

Total No. of pages: 01
[illegible] SEMESTER
[illegible] TERM EXAMINATIONS

Roll No. _____
B.Des.
SEPTEMBER 2019

Course Code: DD 207 BASICS OF PHOTOGRAPHY AND VIDEOGRAPHY

Time: 120 Minutes Max. Marks: 40

Note: All questions are compulsory.

Q1 We have watched a high-speed photography of red and green capsicum fall on water in a glass tank. {15 Marks}

Similarly you want to shoot an event at high speed in order to understand

a. How a transformation happens eg popping of a corn
b. Collision of two objects eg. A ball tearing into the surface of water
c. Fusion of objects eg. Condensation water vapor
d. Any other

Suggest three examples for a, b, & c

Choose any one. Develop your plan for recording the event.

What equipment you will require? Describe your setup. How will you conduct the event and synchronize the event, camera and light to get the necessary results?

Q2 How will you create panorama of an insect using a digital microscope and Photoshop / Lightroom? {5 Marks}

Q3 Briefly describe any five of the following lighting styles in portrait photography {10 Marks}

Backlight with a Reflector Fill.
Split Lighting with a Reflector Fill.
Split Lighting.
Rim Lighting.
One Light Rembrandt.
Loop Lighting.
Clamshell Lighting
Butterfly Lighting.

Q4 Explain the relationship between ISO rating, f-stop, and shutter speed {5 Marks}

Explain
When high and low ISO number is used
When large or small f-stop is used
When high or low shutter speed is used.

Based on your life time experience explain, point wise, what constitutes a great photographer. {5 Marks}

-END-

— 330 —

Total no of pages:01

THIRD SEMESTER

Roll No.....

MID TERM EXAMINATIONS

(B.DES.)

Course Code: DD209 VISUAL DESIGN SEPTEMBER 2019

Time: 90 Mins

Max. Marks: 20

Note: This is an Open test. Use of Computers and Internet is allowed.

Q1: For a Visual Designer, **playfulness**, **experimentation** and **ingenuity** are highly desirable traits. With this noble thought, use certain elements and play with the idea of **composition** and **abstraction**. You are required to submit an A4 size printout (Black and White) and the softcopy in pdf format. The Printout may be taken in the last half hour in civilized batches from the department printer.

{20 Marks}

-END-