Total No. of Pages 03

Roll No........

Third Semester

B. Tech(EL/EE)

EndSemester (Supplementary) Examination

Feb-2019

Time: 3 Hours

Maximum Marks: 40

EE/EL-203 ELECTRONIC DEVICES AND CIRCUITS

Note: Question 1 is compulsory.
Attempt Eight more Questions.
Assume suitable value for missing data (if any).

1   Fill up the blanks with suitable answers

(i)   The input impedance of an ideal voltage amplifier should be
....

(ii)   Bandwidth of an ideal transresistance amplifier should be
....

(iii)   A voltage gain of 120 dB when expressed as a dimensionless
quantity is equal to ....

(iv)   For a silicon pn-junction having reverse saturation current of
30 nA at 300 K with a V_T of 26 mV the forward bias required
to produce a current of 0.1.mA and 10 mA respectively, will
be.......... and ....

(v)   In the forward active mode of operation of a BJT the
collector-base junction is ..... biased.

(vi)   The dynamic resistance r_d of a forward biased diode depends
on....................

(vii)   The terminal voltage in a npn transistor were measured and
found as $V_E = -2.7V$, $V_B = -2.0V$ and $V_C = 0V$. The transistor
is operating in ....mode.

2[a]   What is the current through the diode
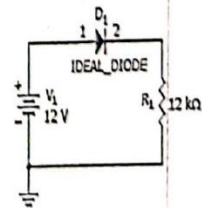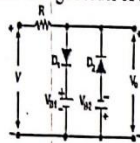
2[b] Assuming $V_{IN} = Vp \sin\omega t$ plot the output waveform of the circuit shown below for an initial capacitor voltage of 0.3V across the capacitor.
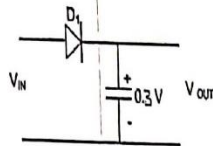

3 Plot the input/output characteristics of the circuit shown below assuming the constant voltage model of the diode.

4 A centre tap full wave rectifier has the load resistance $R_L=1K\Omega$. The forward resistance R_F of each diode is 10Ω. The voltage across half of secondary winding is given by the equation v= 200 sin314t. Determine:
   a) The peak and average value of current
   b) The rms value of current
   c) The ripple factor
   d) The rectification efficiency

5 Compute the input impedance of the circuit given below. Take V_A to be infinite.
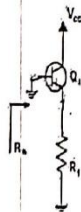
6 Draw the small signal model of the circuit below and determine its voltage gain and output impedance.
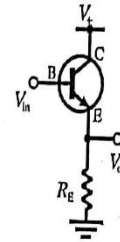
7 Draw the circuit diagram of a common source amplifier along with the biasing diagram (fixed-bias) and derive expression for its voltage gain, input and output resistance

8 Draw the circuit diagram of a BJT differential amplifier loaded with passive resistors and biased with a constant current source. Using small signal model and the concept of half circuits determine the common mode gain, and differential mode input resistance.

9 For the following feedback configurations draw the schematic diagram and compute the input and output impedance:
   (i)   Voltage-current
   (ii)   Current-Current

10 Derive the expression to study the effect of C_S, C_C and C_E on the low frequency response of a common base npn transistor in a fixed biased configuration

11 Write short notes on any TWO of the following:

   (i) Enhancement and Depletion type MOSFET

   (ii) Avalanche and Zener breakdown

   (iii) Properties of negative feedback

                    END