Roll No. ..... Total Pages : 3

BT-3/DX **8310**

SEMICONDUCTOR DEVICES AND CIRCUITS

Paper : ECE-201(E)

Time : Three Hours] [Maximum Marks : 100

Note : Attempt *five* questions in all, selecting at least *one* question from each unit.

UNIT–I

1. (a) Explain the following :
   (i) Reverse saturation current.
   (ii) Cut-in voltage.
   (iii) Forward biasing.
   (iv) Reverse biasing. 2½×4=10
   (b) What are various Filter circuits ? Explain, what are their applications. 10

2. (a) Explain the following :
   (i) Ripple factor.
   (ii) Average voltage.
   (iii) Form factor.
   (iv) Voltage regulation. 2½×4=10
   (b) Draw and explain the circuit of a Series voltage regulator and compare it with the features of Shunt voltage regulator. 10

UNIT–II

3. (a) Draw the hybrid model of a transistor. Obtain *h*-parameters for a CE stage amplifier. 10
   (b) What is the need of biasing the transistor ? Explain self-bias circuit. 10

4. (a) Explain transistor RC coupled amplifier with special reference to frequency response, advantages, disadvantages and applications. 10
   (b) What is the dB gain of an amplifier for an increase of power level from 12 W to 24 W ? 10

UNIT–III

5. (a) The overall gain of a multistage amplifier is 140. When negative voltage feedback is applied, the gain is reduced to 17.5. Find the fraction of the output that is fedback to the input. 10
   (b) What is Barkhausen's criterion ? Where is it applied ? 10

6. (a) What are the advantages and disadvantages of feedback in amplifiers ? Explain. 10
   (b) What are Oscillators ? How do they produce oscillations ? Explain the circuit of Wein Bridge oscillator. What is its frequency ? 10

UNIT–IV

7. (a) Explain a depletion mode MOSFET with its construction and characteristics. 10

   (b) When V_{GS} of a JFET changes from –3.1 V to –3 V, the drain current changes from 1 mA to 1.3 mA. Calculate the value of transconductance. 10

8. Write short notes on the following :

   (a) Small signal model of JFET. 10

   (b) Biasing of MOSFETs. 10
