EC/EEE 123 (R-22)

Total No. of Questions : 10] [Total No.of Pages : 02

I/IV B. Tech. DEGREE EXAMINATIONS, AUGUST - 2023

Second Semester

EC / EEE

ELECTRONICS DEVICES AND CIRCUITS

Time : **Three Hours** Maximum : **70** Marks

Answer All Questions

Answer ONE question from each Unit. 5x14=70 M

UNIT - I

1. a) Explain PN diode characteristics in forward bias and reverse bias regions.

   b) A full wave rectifier circuit with C-type capacitor filter is to supply a D.C. Current of 20 mA at 16V. If frequency is 50 Hz ripple allowed is 5%. Calculate :

   (i) Required secondary voltage of the transformer.

   (ii) Ratio of I peak / Imax through diodes and the value of C required.

(OR)

2. a) Explain the Voltage regulation using Zener Diode.

   b) With a neat circuit diagram and necessary wave forms explain the operation of half wave rectifier.

UNIT - II

3. a) Explain the working of PNP transistor and how it can act as an amplifier.

   b) Explain the input and output characteristics of a transistor in CB configuration.

(OR)

4. a) What is the need of biasing ? Explain about Transistor current components.

   b) Illustrate and explain active region, saturation region and cut-off region in transistor characteristics, mention the application of a transistor in each region.

UNIT - III

5. a) Draw and explain the Fixed Bias Circuit. Explain why the circuit is unsatisfactory if the transistor is replaced by another of same type.

   b) Define and derive the stability factor 'S' for collector to base bias of BJT.

P.T.O.

(OR)

6. a) Determine the quiescent currents and the collector to emitter voltage for a Ge transistor with $\beta = 50$ in the self-biasing arrangements. The circuit component values are V_{CC}=20V, RC = 2kΩ, Re = 0.1 kΩ, R1 = 100 kΩ and R2 = 5 kΩ. Find the stability factor S.

   b) Explain diode compensation technique for the parameters of VBE and ICO.

UNIT - IV

7. a) Explain the different methods of biasing JFET along with their characteristics in detail.

   b) Draw and explain small-signal model of a MOSFET.

(OR)

8. a) Describe the operation of JFET fixed bias circuit along with stability factor.

   b) Explain the operation of Depletion mode MOSFET in detail.

UNIT - V

9. a) Discuss, how the h-parameters are determined from transistor characteristics.

   b) Using low frequency h-parameter model, derive the expressions for voltage gain, current input impedance and output admittance for a BJT amplifier in CE configuration.

(OR)

10. a) With neat diagram, derive the CE amplifier parameters using approximate analysis.

    b) Determine the parameters Ai, Ri, Av and R0 of Emitter Follower using simplified hybrid model analysis.