Code No.: EC301PC | R20 | H.T.No. | | | 8 | R | | | | | |

CMR ENGINEERING COLLEGE: : HYDERABAD
UGC AUTONOMOUS
II–B.TECH–I–Semester End Examinations (Supply) - August- 2023
ELECTRONIC DEVICES AND CIRCUITS
(ECE)

[Time: 3 Hours] **[Max. Marks: 70]**

Note: This question paper contains two parts A and B.
Part A is compulsory which carries 20 marks. Answer all questions in Part A.
Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

PART-A **(20 Marks)**

1. a) Write the expression for transition capacitance (C_T) of a PN junction diode. [2M]
   b) Define transconductance (g_m) and drain resistance (r_d) of a FET. [2M]
   c) Explain the following terms with reference to a BJT [2M]
      i. Emitter transportation factor (β).
      ii. Base transportation factor (α).
   d) Explain how transistor bias compensation using diode is useful, list its advantages. [2M]
   e) List the applications of FET. [2M]
   f) Draw the characteristics of SCR. [2M]
   g) Briefly explain the effect of coupling and bypass capacitor on CE amplifier. [2M]
   h) Compare CB, CE, CC configurations in terms of input and output resistances. [2M]
   i) Justify the statement "A depletion mode MOSFET can also be operated in enhancement mode but an enhancement mode MOSFET cannot be operated in depletion mode". [2M]
   j) Draw the circuit diagram of fixed bias arrangement of a JFET. [2M]

PART-B **(50 Marks)**

2. With neat sketches discuss the operation of a Full Wave Rectifier with L- section filter & derive the expression for its ripple factor. [10M]

OR

3. a) Explain PN junction diode characteristics in forward bias and reverse bias regions. [5M]
   b) Compare the different parameters of half ware, full wave and bridge rectifier with diagrams. [5M]

4. With a neat diagram explain the various current components in an NPN bipolar junction transistor & hence derive general equation for collector cu rrent I_C. [10M]

OR

5. Draw the circuit diagram of NPN transistor in Common Base (CB) configuration and explain with its characterstics. [10M]

6. With neat energy band diagrams, explain the V-I characteristics of Tunnel diode. Also discuss the negative resistance property of tunnel diode. [10M]

OR

7. Draw the basic structure and equivalent circuit of UJT, and also explain how the UJT can be used as a negative-resistance device with the aid of static characteristics. [10M]

8. Find the values of A_V , A_I , R_i and R_O for a bipolar junction transistor with h_{ie}= 1100Ω, h_{re} = 50, h_{re} = 2.4x10^{-4}, h_{oe} = 25 μA/V, is to drive a load of 1KΩ in CB amplifier arrangement. [10M]

OR

9. Compare CB, CE and CC amplifiers in terms of A_V , A_I , R_i and R_O. [10M]

10. Explain the construction & operation of a N-channel MOSFET in enhancement and depletion modes with the help of static drain characteristics and transfer characteristics. [10M]

OR

11.a) Compare CS, CD and CG configurations of FET amplifiers. [5M]

b) Explain the varactor diode with neat diagram. [5M]

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