

II B. Tech I Semester Supplementary Examinations, September - 2021
ELECTRONIC DIVICES AND CIRCUITS
 (Electronics and Communication Engineering)

Time: 3 hours

Max. Marks: 75

Answer any **FIVE** Questions each Question from each unit
 All Questions carry **Equal** Marks
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1 a) Draw and explain the graph indicating the variation of minority carrier density with distance in a p-n junction diode under forward biased condition. [8M]

b) Write the equation for Volt-Ampere characteristics of a photo diode. [7M]

**Or**

2 a) Draw and explain the circuit of a half-wave rectifier with capacitor filter. [7M]

b) With the support of neat waveforms & diagrams, explain the design of Full wave bridge rectifier. [8M]

3 a) A half wave rectifier has a load of 4.5 K $\Omega$ . If the diode resistance and the secondary coil resistance together have a resistance of 400 $\Omega$  and the input voltage has a signal voltage of 240 V, calculate i) Peak, average and rms value of current flowing. ii) dc power output. iii) ac power input iv) Efficiency of the rectifier. [8M]

b) What is pinch-off voltage? Give its expression. Also, compare inductor and capacitor filters. [7M]

**Or**

4 a) Explain how does the reverse saturation current of a p-n diode vary with temperature. Explain the base spreading resistance. [8M]

b) Explain the input and output characteristics of a transistor in CB configuration. [7M]

5 a) Draw the circuit diagram of an NPN junction transistor in CE configuration and describe its characteristics. [8M]

b) Discuss the stabilization against variations in  $V_{BE}$  and  $\beta$ . [7M]

**Or**

6 a) Draw a transistor amplifier using self-bias (CE configuration) and explain the operation. [8M]

b) Explain the hybrid small signal model for common collector configuration. [7M]

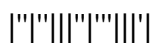
7 a) Illustrate and explain active region, saturation region and cut-off region in transistor characteristics. [8M]

b) The reverse saturation current  $I_o$  in a germanium diode is 6 $\mu$ A. Calculate the current flowing through the diode when the applied forward bias voltages are 0.2, 0.3 and 0.4 V at room temperature. [7M]

**Or**

8 a) Draw the small signal model of Tunnel Diode operating in the negative resistance region. [8M]

b) (i) What is thermal runaway? (ii) List and briefly explain three sources of instability of collector current. (iii) What are the different types of FETs? [7M]



- 9 a) A transistor amplifier  $V_{cc}=12V$ ,  $R_1=8K\ \Omega$ ,  $R_2=4K\Omega$ ,  $R_e=1K\Omega$  and  $R_L=1.5K\Omega$ . Assume  $V_{be}=0.7V$  Determine the operating point and draw the DC and AC load line. [8M]
- b) Explain the collector to base bias method along with circuit diagram and derive the stability factor for it [7M]
- Or**
- 10 a) Which of the BJT configurations are suitable for impedance matching applications. Why? Also, draw small signal model of JFET. [8M]
- b) Draw and explain small-signal model of a MOSFET. [7M]

