JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B. Tech II Year I Semester Examinations, March - 2021
ELECTRONIC DEVICES AND CIRCUITS
(Common to ECE, EIE, MCT)

Time: 3 hours

Max. Marks: 75

Answer any five questions
All questions carry equal marks

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1.a) Explain the formation of depletion region in a PN junction.
 b) Design a clipping circuit that clips at two independent levels.　　　　　[7+8]

2.a) Draw and explain the circuit diagram of full wave rectifier with L-section filter.
 b) In half-wave rectifier an ac voltage of peak value 24V is connected in series with silicon diode and load resistance of 480Ω. If the forward resistance of the diode is 20Ω, find average load current and rms value of load current.　　　　　[8+7]

3.a) Explain input and output characteristics of a transistor in CB and CE configurations with neat sketches.
 b) A transistor has a typical β of 100. If the collector current is 40 mA, what is the value of emitter current?　　　　　[10+5]

4.a) Explain transistor biasing and stabilization in detail. Explain any two bias compensation techniques with neat sketches.
 b) An npn transistor if $\beta=50$ is used in CE circuit with $V_{CC} = 10V$, $R_C = 2K\Omega$. The bias is obtained by connecting $100k\Omega$ resistor from collector to base. Find the quiescent point and stability factor.　　　　　[8+7]

5.a) Explain the construction, principle of operation and Volt-Ampere characteristics of JFET.
 b) A certain JFET operates in the linear region with a constant drain voltage of 1V. When the gate voltage is 2V, a drain current of 10mA flows, but when gate voltage is changed to 1V, the drain current becomes 22.8mA. Find (i) the pinch-off voltage (ii) the channel resistance for zero gate voltage.　　　　　[8+7]

6.a) Explain about Zener break down and Avalanche breakdown and describe how Zener diode can be used as voltage regulator with neat circuit diagram.
 b) Describe the working of Silicon Controlled Rectifier with neat diagram and draw its characteristic curve.　　　　　[7+8]

7.a) Draw the h-parameters equivalent circuit for a common emitter amplifier and derive the expression for A_i, R_i and A_v.
 b) Compare the performance of BJT as an amplifier in CE, CB, CC configuration.　　[10+5]

8.a) Explain the drain and transfer characteristics of Enhancement type MOSFET.
 b) For common source amplifier $V_{GSQ} = -2V$, $I_{DSS} = 8mA$, $V_p = -8V$, $Y_{os} = 20\mu s$, $R_G = 1M\Omega$, $R_D = 5.1K\Omega$, calculate g_m, r_d, Z_i, Z_o and A_v.　　　　　[8+7]

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