Code No: 153AT **R18**

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B. Tech II Year I Semester Examinations, August/September - 2022
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) Derive the expression for diffusion capacitance of a diode.
b) Discuss how a diode could be used as switch and define all switching times. [8+7]

2.a) Derive ripple factor for a bridge rectifier.
b) Derive expressions for ripple factor of a Full Wave Rectifier with and without a capacitive filter. [8+7]

3.a) Determine I_C, I_E and α for a transistor circuit having I_B=15μA and β=150.
b) Draw and explain the working principle of CE characteristics of a transistor. [8+7]

4.a) Find the Q-point of self-bias transistor circuit with the following specifications: V_{CC} = 22.5V, R_L = 5.6kΩ, R_C = 1kΩ, R_1 = 90kΩ, R_2 = 10kΩ, V_{BE} = 0.7V and β = 55. Assume $I_B >> I_{CO}$.
b) The reverse leakage current of the transistor when in CB configuration is 0.3 μA while it is 16 μA when the same transistor is connected in CE configuration. Determine α, β and γ. [8+7]

5.a) Differentiate between a BJT and FET.
b) Explain the operation of FET with its characteristics and explain the different regions in transfer characteristics. [7+8]

6.a) Draw the symbol and equivalent circuit of a UJT. Explain the operation of UJT with the help of its V – I characteristics.
b) With neat sketches explain about the regulation characteristics of Zener diode. [8+7]

7.a) For a CE amplifier given I_E= 2.5mA, h_{fe}= 140, h_{oe}= 20μs and h_{ob}= 0.5μs. Draw hybrid equivalent circuit.
b) Compare the three transistor amplifier configurations with related to A_I, A_V, R_i and R_O. [8+7]

8.a) With neat sketches, necessary equations explain the drain and transfer characteristics of MOSFET in depletion mode.
b) Draw the small-signal model of common drain JFET amplifier. Derive expressions for voltage gain and output resistance. [8+7]

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