

**PART-A**

(Answer all the Questions 10 x 2 = 20 Marks)

- 1 a Define efficiency of a rectifier. CO4 L1 2M
- b List the applications of clippers. CO2 L1 2M
- c List the types of BJT and operating regions. CO2 L1 2M
- d Discuss the need of biasing. CO2 L2 2M
- e What is the trans conductance  $g_m$  in a BJT? CO3 L1 2M
- f Name the applications of CC amplifier CO2 L2 2M
- g State the application of JFET CO2 L1 2M
- h Draw the CMOS structure. CO5 L1 2M
- i Define Transconductance. CO5 L1 2M
- j List the applications of the Small-Signal Equivalent Circuits CO2 L1 2M

**PART-B**

(Answer all Five Units 5 x 10 = 50 Marks)

**UNIT-I**

- 2 a Illustrate the working of a PN Junction diode under forward bias and reverse bias with neat diagrams and draw VI characteristics. CO1 L2 5M
- b With basic structure, symbol and equivalent circuit explain working of UJT and draw characteristics. CO2 L2 5M

OR

- 3 a A Half Wave Rectifier is supplied from a 230V, 50 Hz supply with a step-down ratio of 3:1 to a resistive load of 10k $\Omega$ . The diode forward resistance is 75 $\Omega$  while transformer secondary is 10 $\Omega$ . Calculate maximum, average, RMS values of current, DC output voltage, efficiency of rectification. CO4 L4 5M
- b Draw the circuit symbol of Tunnel diode. Explain the Volt-Ampere (V-I) characteristics. CO2 L2 5M

**UNIT-II**

- 4 a With neat circuit diagram, explain the Input and Output characteristics of a BJT in CC Configuration. CO4 L2 5M
- b Derive the stability factors  $S_{\beta}$ ,  $S'_{\beta}$  and  $S''_{\beta}$  of a BJT self-bias. CO4 L2 5M

OR

- 5 a With neat circuit diagram, explain the Input and Output characteristics of a BJT in CB Configuration. CO4 L3 5M
- b Explain Collector to Base bias of a Transistor with neat circuit diagram. CO4 L2 5M

**UNIT-III**

- 6 a Discuss the purpose of small-signal analysis in BJT circuits. CO1 L2 5M
- b Evaluate the small-signal voltage gain  $A_v$ ,  $R_i$  and  $R_o$  of a common-emitter amplifier. CO4 L4 5M

OR

- 7 a List out the characteristics of CE amplifier with emitter resistance. CO1 L1 6M
- b Identify the significance of the base-emitter resistance in the T-model. CO2 L3 4M

**UNIT-IV**

- 8 a Explain the construction & operation of an enhancement type NMOS Transistor. CO2 L2 6M
- b Discuss the characteristic parameters of the JFET and show the relation among the JFET parameters  $\mu$ ,  $r_d$  and  $g_m$ . CO3 L2 4M

OR

- 9 a Plot the V-I Characteristics of an n-channel enhancement MOSFET. CO2 L2 5M
- b Explain the concept of modeling of Body Effect. CO2 L2 5M

**UNIT-V**

- 10 a Define the MOSFET Transconductance  $g_m$  with mathematical expression. CO5 L1 5M
- b Illustrate the MOSFET Transconductance  $g_m$  with graphical construction. CO5 L3 5M

OR

- 11 a A MOSFET is to operate at  $I_D = 0.1$  mA and is to have  $g_m = 1$  mA/V. If  $K'n = 50 \mu A/V^2$ , Compute the required W/L ratio and the over drive voltage. CO3 L3 5M
- b Build the equivalent circuit with the MOSFET represented by its T-Model. CO5 L3 5M

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