

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)

B.Tech I Year II Semester Regular & Supplementary Examinations August-2023

ELECTRONIC DEVICES AND CIRCUITS

(Electrical & Electronics Engineering)

Time: 3 Hours

Max. Marks: 60

(Answer all Five Units 5 x 12 = 60 Marks)

UNIT-I

- 1 a Sketch the V-I Characteristics of a PN Junction Diode and illustrate its action under forward bias and reverse bias. CO3 L2 6M
b Construct the positive and negative diode clippers and explain with neat waveforms. CO4 L3 6M

OR

- 2 a Analyze the current components of a PN junction diode and derive the diode current equation. CO2 L4 6M
b Show that the Zener diode can act as a voltage regulator with a neat circuit diagram. CO4 L2 6M

UNIT-II

- 3 a Draw the circuit diagram of a Full Wave rectifier and with the help of waveforms describe its operation. CO4 L3 6M
b Demonstrate the working principle of LC filter with neat circuit diagram and derive the expression for its ripple factor. List the advantages and disadvantages. CO3 L2 6M

OR

- 4 a Derive the expressions for average DC voltage, RMS value of voltage, DC output power and AC input power for a Half Wave Rectifier. CO5 L3 6M
b Explain the Volt-Ampere (V-I) characteristics of a Tunnel Diode with the help of energy band diagrams and List its applications. CO3 L2 6M

UNIT-III

- 5 a Explain the construction of NPN transistor with a neat diagram. CO1 L2 6M
b With the help of neat diagram, explain the construction and operation of N-channel enhancement type MOSFET. CO2 L2 6M

OR

- 6 a Evaluate the relation between α and β of a Transistor. CO1 L3 6M
b Illustrate the Input and Output characteristics of BJT in CC Configuration. CO3 L2 6M

UNIT-IV

- 7 a Estimate the condition for achieving Thermal Stability. CO4 L2 6M
b Calculate the values of Resistors in a fixed bias circuit using the following specifications: $I_{CQ}=9.2\text{mA}$, $V_{CEQ}=4.4\text{V}$, $h_{fe}=1115$, $V_{BE}=0.7\text{V}$ & $V_{CC}=9\text{V}$ CO6 L3 6M

OR

- 8 a Explain the concept of DC and AC Load lines and discuss the criteria for fixing the Q-point. CO3 L2 6M
b Determine the expression for stability factor, S for fixed bias circuit and list its disadvantages. CO5 L3 6M

UNIT-V

- 9 a Draw the hybrid model for a transistor in CE configuration and derive its hybrid parameters. CO2 L3 6M
b Draw the circuit diagram of JFET Common Source amplifier with CO5 L3 6M

voltage divider bias for bypassed R_s and determine the expression for input impedance, output impedance and voltage gain.

OR

- 10 a A voltage source of internal resistance, $R_s = 900\Omega$ drives a CC amplifier using load resistance $R_L = 2000\Omega$. The CE h parameters are $h_{fe} = 60$, $h_{ie} = 1200\Omega$, $h_{oe} = 25\mu A/V$ and $h_{re} = 2 \times 10^{-4}$. Calculate A_i , R_i , A_v and R_o using approximate analysis. **CO5 L3 6M**

- b Define JFET parameters and establish relation between them. **CO2 L2 6M**

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