

Reg. No: 

|  |  |  |  |  |  |  |  |  |  |
|--|--|--|--|--|--|--|--|--|--|
|  |  |  |  |  |  |  |  |  |  |
|--|--|--|--|--|--|--|--|--|--|

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

**B.Tech I Year II Semester Regular & Supplementary Examinations October-2022**

**ELECTRONIC DEVICES AND CIRCUITS**

(Electrical and Electronics Engineering)

Time: 3 hours

Max. Marks: 60

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

**UNIT-I**

- 1 a Analyze the current components of a PN Junction Diode and derive the diode current equation. **L4 6M**
- b The reverse saturation current of a silicon PN Junction Diode is  $10\mu\text{A}$ . Find the diode current for the forward bias voltage of  $0.6\text{V}$  at  $25^\circ\text{C}$ . **L3 6M**

**OR**

- 2 a Explain the Positive and Negative Diode Clippers with circuit diagram and waveforms. **L2 6M**
- b What is a Clamper circuit? Describe about positive and negative clampers with neat circuit diagram. **L1 6M**

**UNIT-II**

- 3 a Derive the expressions for Average DC current, RMS Value of Current, DC Power Output and AC Power input for a Full Wave Rectifier. **L3 6M**
- b Demonstrate the working principle of LC filter with neat circuit diagram and evaluate the expression for its ripple factor. List the advantages and disadvantages. **L5 6M**

**OR**

- 4 a Demonstrate the construction, working and characteristics of UJT with neat diagram. List the applications. **L2 6M**
- b Explain the construction, working principle and characteristics of LED with neat diagram. List the advantages and applications. **L6 6M**

**UNIT-III**

- 5 a With neat sketches, explain the Input and Output characteristics of a BJT in CE Configuration. **L3 6M**
- b For a transistor, the leakage current is  $0.1\mu\text{A}$  in CB configuration, while it is  $19\mu\text{A}$  in CE configuration. Evaluate  $\alpha$  &  $\beta$  of the transistor. **L5 6M**

**OR**

- 6 a Explain the characteristics of N-Channel JFET and define JFET parameters. **L2 6M**
- b Compare the performance of JFET with MOSFET. **L4 6M**

**UNIT-IV**

- 7 a Define Stability Factor S. Derive the stability factor, S for collector to base bias of BJT. L1 6M
- b Design a collector to base bias circuit for the specified conditions:  $V_{CC} = 15V$ ,  $V_{CE} = 5V$ ,  $I_C = 5mA$  and  $\beta = 100$ . L6 6M

OR

- 8 a Illustrate Thermistor Compensation Technique for stabilization against variations in Q-point. L3 6M
- b Explain Thermal Runaway, Thermal Resistance and Thermal Stability. L2 6M

**UNIT-V**

- 9 a Using low frequency h-parameter model, Evaluate the expressions for voltage gain, current gain, input impedance and output admittance for a BJT Amplifier in CB configuration. L6 6M
- b Differentiate between CE, CB and CC amplifiers. L4 6M

OR

- 10 a Derive expressions for  $A_i$ ,  $R_i$ ,  $A_v$  and  $R_o$  for a Common Collector Amplifier using simplified hybrid model. L3 6M
- b 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  $h_{re} = 2 \times 10^{-4}$ . Evaluate  $A_i$ ,  $R_i$ ,  $A_v$  and  $R_o$  using approximate analysis. L5 6M

\*\*\* END \*\*\*