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SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR

(AUTONOMOUS)

B.Tech II Year I Semester Supplementary Examinations December-2021

ELECTRONIC DEVICES AND CIRCUITS

(Common to ECE & EEE)

Time: 3 hours

Max. Marks: 60

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

UNIT-I

1 a Elaborate the action of PN junction diode under forward bias and reverse bias and sketch its V-I Characteristics. L6 8M

b The reverse saturation current of a silicon PN junction diode is $10\mu\text{A}$. Solve the diode current for the forward bias voltage of 0.6V at 25°C L3 4M

OR

2 a Show that the Zener diode can act as a voltage regulator with a neat diagram L1 6M

b Explain Positive and Negative Diode Clippers with neat waveforms L2 6M

UNIT-II

3 a Draw the circuit diagram of a Full wave rectifier and with the help of waveforms describe its operation. L1 5M

b Determine the expressions for Average DC current, Average DC Voltage, RMS Value of Current, DC Power Output and AC Power input of a Half Wave Rectifier. L4 7M

OR

4 a Demonstrate the working principle of LC filter with neat diagram and derive the expression for its ripple factor. L2 6M

b Explain the volt ampere characteristics of a Tunnel diode with the help of energy band diagrams L2 6M

UNIT-III

5 a Explain the current components of PNP transistor and deduce the definitions of Emitter Efficiency, Base Transportation Factor and Large signal current gain. L2 7M

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. Find α & β of the same transistor? L1 5M

OR

6 Explain the construction and working principle of N-channel JFET. L2 12M

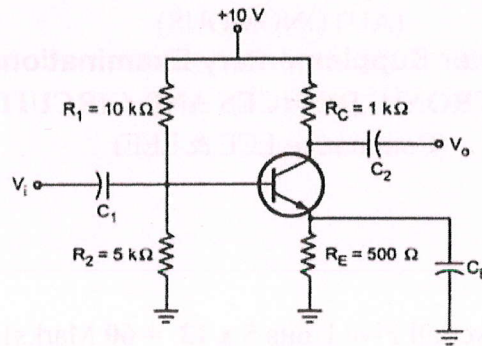
UNIT-IV

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: $V_{cc} = 15\text{V}$, $V_{CE} = 5\text{V}$, $I_C = 5\text{mA}$ and $\beta = 100$. L6 6M

OR

- 8 a Illustrate Thermistor Compensation Technique. **L2 6M**
 b For the circuit shown in Fig. $\beta = 100$ for the silicon transistor. Simplify V_{CE} and I_C . **L4 6M**



UNIT-V

- 9 a With neat diagram, develop the expressions for parameters of CE amplifier using approximate analysis. **L6 6M**
 b Examine the expressions for current gain, voltage gain, input impedance and output impedance of CB amplifier using simplified hybrid model. **L4 6M**

OR

- 10 For a CB transistor amplifier driven by a voltage source of internal resistance $R_s = 1200\Omega$, the load Impedance of $R_L = 1000\Omega$. The h parameters are $h_{ib} = 22\Omega$, $h_{rb} = 3 \times 10^{-4}$, $h_{fb} = -0.98$, $h_{ob} = 0.5\mu A/V$. Find current gain, voltage gain, input impedance and output impedance using exact analysis and approximate analysis. **L1 12M**

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