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

**B.Tech I Year II Semester Supplementary Examinations May-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 Draw the ideal diode characteristics and give its circuit symbol. L1 4M  
 b Examine the forward resistance of a PN junction diode when the forward current is 5mA at T = 300 K. Assume Silicon diode. L4 4M  
 c Define Breakdown voltage and give the circuit symbol for Zener Diode. L2 4M

OR

- 2 a Illustrate the action of PN junction diode under forward bias and reverse bias and sketch its V-I Characteristics. L2 6M  
 b What is a Clamper circuit? Describe positive and negative clampers with neat circuit diagrams. L1 6M

**UNIT-II**

- 3 a Inspect 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 6M  
 b Draw the circuit diagram of a Full wave rectifier and with the help of waveforms describe its operation. L1 6M

OR

- 4 a With neat circuit diagram and waveforms, illustrate the construction and working of Bridge rectifier. L2 4M  
 b Dissect the construction and working principle of CLC or  $\pi$  section filter along with derivation for its ripple factor. L4 8M

**UNIT-III**

- 5 a Interpret the operation of NPN transistor with a neat diagram. L2 6M  
 b With neat diagram, Interpret the Input and Output characteristics of a BJT in CB Configuration. L2 6M

OR

- 6 a If the base current in a transistor is 20 $\mu$ A when the emitter current is 6.4mA, what are the values of  $\alpha$  and  $\beta$ ? Also calculate the collector current. L1 6M  
 b Compare the performance of JFET with MOSFET. L2 6M

**UNIT-IV**

- 7 a Define Transistor Biasing and explain the need for Biasing. L1 6M  
 b Explain Collector to Base bias of a Transistor with neat circuit diagram. L2 6M

**OR**

- 8 **a** Define Stability Factor S. Derive the stability factor S for collector to base bias of BJT. **L1 6M**
- b** An NPN Transistor if  $\beta = 50$  is used in common emitter circuit with  $V_{CC}=10V$  and  $R_C= 2K \Omega$ . The bias is obtained by connecting  $100K \Omega$  resistor from collector to base. Find the Quiescent point and stability Factor. **L3 6M**

**UNIT-V**

- 9 **a** Examine the expressions for current gain, voltage gain, input impedance and output impedance of CB amplifier using simplified hybrid model. **L4 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  $h_{re} = 2 \times 10^{-4}$ . Solve  $A_i$ ,  $R_i$ ,  $A_v$  and  $R_O$  using approximate analysis. **L3 6M**

**OR**

- 10 **a** Determine the parameters  $A_i$ ,  $R_i$ ,  $A_v$  and  $R_O$  of Common Collector Amplifier using simplified hybrid model analysis. **L5 6M**
- b** Develop the expression for current gain, voltage gain, input impedance and output impedance for Common Emitter Amplifier with Emitter Resistor using simplified hybrid model. **L3 6M**

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