Reg. No: | | | | | | | | | | |

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR

(AUTONOMOUS)

B.Tech I Year II Semester Regular Examinations November-2021

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	Define cutin voltage of a PN Junction diode and give its values for Si and Ge diodes.	L1	4M
	b	When a reverse bias is applied to a germanium PN junction diode, the reverse saturation current at room temperature is 0.3μA. Determine the current flowing in the diode when 0.15V forward bias is applied at room temperature.	L5	4M
	c	Mention the importance of Diode Clipper and list its applications.	L2	4M
		OR		
2	a	Analyze the current components in a PN diode and determine the expression for diode current equation.	L4	6M
	b	Draw and explain the V-I characteristics of Zener diode. Show that the Zener diode can act as a voltage regulator with a neat diagram.	L1	6M

UNIT-II

3	a	Draw the circuit diagram of a Half wave rectifier and explain its operation with the help of waveforms.	L1	6M
	b	Determine the expressions for Average DC current, Average DC Voltage, RMS Value of Current, DC Power Output and AC Power input of a Full Wave Rectifier.	L5	6M
		OR		
4	a	A 5KΩ load is fed from a bridge rectifier connected across a transformer secondary whose primary is connected to 460V, 50 Hz supply. The ratio of number of primary turns to secondary turns is 2:1.Estimate dc load current, ripple voltage and PIV rating of diode.	L5	4M
	b	Demonstrate the working principle of LC filter with neat diagram and derive the expression for its ripple factor.	L2	8M

UNIT-III

5	a	Explain the current components of PNP transistor, the Emitter Efficiency, Base Transportation Factor and Large signal current gain.	L2	6M
	b	Evaluate the relation between α, β and ϒ of a Transistor.	L5	6M
		OR		
6	a	With the help of neat diagram, explain the operation and characteristics of n-channel Enhancement type MOSFET.	L2	6M
	b	Compare the performance of BJT with FET.	L2	6M

UNIT-IV

7	a	Explain the concept of DC and AC Load lines and discuss the criteria for fixing the Q-point.	L2	6M
	b	Design the circuit ,for given Q-point values are to be ICQ=1mA and VCEQ=6V .Assume that VCC=10V, β=100 and VBE=(on)=0.7V	L4	6M
		OR		
8	a	List the different types of Biasing a Transistor and explain the Fixed Bias of a Transistor.	L4	6M
	b	Design a collector to base bias circuit for the specified conditions: Vcc =15V, VCE = 5V, IC = 5mA and β = 100.	L6	6M

UNIT-V

9	a	Why hybrid model is used for the analysis of BJT amplifier at low frequencies? Draw the hybrid model for CE transistor and derive the hybrid parameters.	L3	6M
	b	For a CB transistor amplifier driven by a voltage source of internal resistance Rs = 1200Ω, the load Impedance of RL = 1000Ω. The h parameters are hib = 22Ω, hrb = 3 x 10-4, hfb = - 0.98, hob = 0.5μA/V. Find current gain, voltage gain, input impedance and output impedance using exact analysis and approximate analysis.	L5	6M
		OR		
10	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 CE configuration.	L5	6M
	b	A CE amplifier is driven by a voltage source of internal resistance Rs =1000Ω and the load impedance of RC=2kΩ. The h-parameters are hie=1.3k, hfe=55, hoe = 22μA/V and hre = 2 x10-4. Neglecting biasing resistors, Estimate the value of current gain, voltage gain, input impedance, output impedance for the value of Emitter Resistor RE =200Ω inserted in the emitter circuit.	L5	6M

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