O.P.Code: 20EC0402	R20	H.T.No.									

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)
B.Tech II Year I Semester Regular & Supplementary Examinations December-2023
ELECTRONIC DEVICES AND CIRCUITS
(Electronics and Communication Engineering)

Time: 3 Hours **Max. Marks: 60**

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

UNIT-I

1	a	A PN junction germanium diode has a reverse saturation current of 10μA at the room temperature of 270C. It is observed to be 30μA, when the room temperature is increased. Calculate the new room temperature.	CO2	L3	6M
	b	Analyze the current components of a PN Junction Diode and derive the diode current equation.	CO2	L4	6M

OR

2	a	Derive the expression for transition capacitance of a PN Junction Diode.	CO2	L3	6M
	b	Explain Breakdown mechanisms in PN Junction Diode.	CO3	L2	6M

UNIT-II

3	a	Draw the circuit symbol of Varactor diode, give its characteristics.and list its applications.	CO1	L1	6M
	B	With neat circuit diagram and waveforms, explain the operation of Full Wave Rectifier with Capacitor filter and derive the expression for its ripple factor.	CO3	L3	6M

OR

4	a	A Full Wave Rectifier circuit is fed from a transformer having a center-tapped secondary winding. The RMS voltage from either end of secondary to center tap is 30V. If the diode forward resistance is 2Ω and that of the half secondary is 8Ω, for a load of 1 KΩ. Calculate DC power delivered to the load, efficiency of rectification and Transformer Utilization Factor (TUF) of secondary.	CO5	L4	6M
	b	Give the classification of LCD based on construction and explain. List the advantages and applications of LCD.	CO1	L2	6M

UNIT-III

5	a	Explain the characteristics of N-Channel enhancement type MOSFET.	CO1	L2	6M
	b	Compare the performance of JFET with MOSFET.	CO1	L1	6M

OR

6	a	Evaluate the relation between α and β of a Transistor.	CO2	L3	5M
	b	With a neat diagram, explain how a transistor acts as an amplifier.	CO3	L1	7M

UNIT-IV

7	a	Define transistor biasing and explain the need for biasing.	CO2	L1	3M
	b	Derive the expression for Stability Factor, Sf. from Collector current equation.	CO3	L4	4M
	c	Explain the concept of DC and AC Load lines and discuss the criteria for fixing the Q-point.	CO3	L2	5M

OR

8	a	Estimate the condition for achieving Thermal Stability.	CO4	L2	6M
	b	If the various parameters of a CE amplifier which uses the self bias method are VCC=12v, R1=10KΩ,R2=5KΩ,Rc=1KΩ, RE=2KΩ & β=100, find the operating point. Assume Si Transistor.	CO6	L3	6M

UNIT-V

9	a	Derive expressions for Ai, Ri, Av and R0 for a Common Collector Amplifier using simplified hybrid model.	CO5	L3	6M
	b	A voltage source of internal resistance, Rs = 900Ω drives a CC amplifier using load resistance RL=2000Ω. The CE h parameters are hfe=60, hie=1200Ω, hoe = 25μA/V and hre = 2 x 10-4. Calculate AI, Ri, Av and R0 using approximate analysis.	CO6	L4	6M

OR

10	a	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.	CO4	L4	6M
	b	Draw the small signal model of FET.	CO2	L1	6M

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