Course Code: 23EC5E01

BONAM VENKATA CHALAMAYYA INSTITUTE OF TECHNOLOGY & SCIENCE

(AUTONOMOUS)

III - B. Tech I-Semester Supplementary Examinations (BR23), Mar/Apr - 2026

ELECTRONIC DEVICES AND CIRCUITS (EEE, CSE-AI&DS, AI&ML)

Time: 3 hours Max. Marks: 70

Question Paper consists of Part-A and Part-B
Answer ***ALL*** *the question in* ***Part-A and Part-B***

PART–A (10X2 = 20M)

		Marks	CO	BL
1. a)	State the hall effect.	(2M)	CO1	BL1
b)	Write the diode current equation.	(2M)	CO1	BL1
c)	Draw the V-I Characteristics of SCR.	(2M)	CO2	BL1
d)	Define filters.	(2M)	CO2	BL1
e)	Define Punch through voltage.	(2M)	CO3	BL1
f)	Define transconductance (g_m) of a FET.	(2M)	CO3	BL1
g)	What is the need for biasing.	(2M)	CO4	BL1
h)	Define self-biasing.	(2M)	CO4	BL1
i)	Discuss the two-port network.	(2M)	CO5	BL1
j)	Draw the equivalent hybrid model for CE amplifier	(2M)	CO5	BL1

PART–B (5X10 = 50M)

2a	Derive the continuity equation for electrons and holes in a semiconductor.	5(M)	CO1	BL3
b.	Explain the Fermi–Dirac distribution function. How does Fermi level vary in intrinsic and extrinsic semiconductors.	5(M)	CO1	BL2
	(OR)			
3a.	Describe the formation of a depletion region in an open-circuited PN junction with diagrams.	5(M)	CO1	BL2
b.	Draw and explain the V–I characteristics of a PN junction diode.	5(M)	CO1	BL3
4a.	Compare avalanche and Zener breakdowns.	5(M)	CO2	BL3
b.	Explain the working of SCR.	5(M)	CO2	BL2
	(OR)			
5a.	A Half-wave rectifier has a load of 3.5 kΩ, if the diode resistance and secondary coil resistance together having a resistance of 800Ω and input voltage has a sinusoidal voltage peak value 240 Calculate a) I_m, I_{avg}, I_{rms}, b) dc power output (P_{dc}).	5(M)	CO2	BL3
b.	Derive an expression for ripple factor for a full-wave rectifier with capacitor filter.	5(M)	CO2	BL3

6a.	Explain about the CB configuration and its input, output characteristics in detail.	10(M)	CO3	BL2
	(OR)			
7a.	Explain the construction and operation of a JFET with neat diagrams.	5(M)	CO3	BL2
b.	Compare JFET and MOSFET.	5(M)	CO3	BL3
8a.	Explain the need for biasing? What are the factors affecting the Q-point in BJT.	5(M)	CO4	BL2
b.	Derive expressions for stability factors (S, S′, S″)..	5(M)	CO4	BL3
	(OR)			
9a.	Explain thermal runaway.	5(M)	CO4	BL2
b.	Discuss about bias compensation using sensistors.	5(M)	CO4	BL2
10a	Derive the expressions for voltage gain, current gain, Input impedance, output impedance, voltage gain with respect to source and current gain with respect to source for generalized transistor amplifier at low frequencies.	10(M)	CO5	BL3
	(OR)			
11a	Draw the simple hybrid model of transistor. What are the conditions to use simple hybrid model.	5(M)	CO5	BL3
b.	Compare transistor CE, CB and CC amplifiers.	5(M)	CO5	BL3

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