Course Code: 23EC3T01

BONAM VENKATA CHALAMAYYA INSTITUTE OF TECHNOLOGY & SCIENCE

(AUTONOMOUS)

II - B. Tech I-Semester Supplementary Examinations (BR23), Mar - 2026

ELECTRONIC DEVICES AND CIRCUITS (ECE)

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)	Define mobility of charge carriers	(2M)	CO1	BL1
b)	Define transition and diffusion capacitance	(2M)	CO1	BL1
c)	Draw the characteristics of tunnel diode	(2M)	CO2	BL1
d)	What is the efficiency of Full-wave rectifier?	(2M)	CO2	BL1
e)	What is punch-through effect?	(2M)	CO3	BL1
f)	What are the applications of phototransistor	(2M)	CO3	BL2
g)	Write the advantages of CE amplifier.	(2M)	CO4	BL1
h)	Compare CB and CE configurations.	(2M)	CO4	BL2
i)	Draw the symbol of Enhancement MOSFET	(2M)	CO5	BL1
j)	What are the MOSFET devices over BJT?	(2M)	CO5	BL2

PART–B (5X10 = 50M)

2a.	Explain the Fermi–Dirac distribution function and discuss the Fermi level in intrinsic and extrinsic semiconductors.	5(M)	CO1	BL3
b.	Explain the mobility and conductivity of semiconductors and derive the relationship between them.	5(M)		
	(OR)			
3a.	Explain the energy band diagram of a PN junction under equilibrium condition and discuss the formation of the depletion region.	5(M)	CO1	BL2
b.	Derive the diode current equation and explain the significance of each parameter involved.	5(M)		
4a.	Explain the principle of operation of a Light Emitting Diode (LED) and discuss its advantages and applications.	5(M)	CO2	BL2
b.	Compare Zener diode, photodiode, and LED in terms of operation and applications.	5(M)		
	(OR)			
5a.	Explain the operation of a Zener diode as a voltage regulator with a suitable circuit diagram.	5(M)	CO2	BL2
b.	Describe the V–I characteristics of a UJT and explain the concept of intrinsic stand-off ratio.	5(M)		

6a.	Explain the input and output characteristics of a transistor in Common Emitter (CE) configuration.	5(M)	CO3	BL3
b.	Describe the fixed bias circuit and derive the expression for collector current.	5(M)		
	(OR)			
7a.	Discuss the need for biasing in transistor circuits and explain how biasing stabilizes the operating point.	5(M)	CO3	BL3
b.	Describe the self-bias (voltage divider bias) method and explain why it provides better stability.	5(M)		
8a.	Draw and explain the hybrid equivalent circuit model of a transistor.	5(M)	CO4	BL2
b.	Describe the conversion of h-parameters from one transistor configuration to another.	5(M)		
	(OR)			
9a.	Derive the voltage gain expression of a Common Emitter (CE) amplifier using h-parameters.	10(M)	CO4	BL3
10a	Describe the drain characteristics and transfer characteristics of a JFET.	5(M)	CO5	BL3
b.	Compare JFET and MOSFET devices in terms of structure, operation, and applications.	5(M)		
	(OR)			
11a	Describe the basic concept of CMOS technology and explain its advantages.	5(M)	CO5	BL4
.b.	Compare common source, common gate, and source follower amplifiers.	5(M)		

****