Sub Code: R2321043 **R23** **Set No. 1**

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY-GURAJADA VIZINAGARAM
II B. Tech I Semester Regular/Supply Examinations, November – 2025
ELECTRONIC DEVICES AND CIRCUITS
(ECE)

Time: 3 hours **Max. Marks: 70**

Question paper consists of Part A, Part B.
Part A is compulsory, Answer all questions.
In Part B, Answer any one question from each unit.

PART-A **(20 Marks)**

1	a)	Define depletion region in a PN junction.	[2]
	b)	Write the equation for diode current and explain its terms	[2]
	c)	What is the Early effect?	[2]
	d)	List the advantages of a transistor as a switch.	[2]
	e)	Write two differences between JFET and MOSFET.	[2]
	f)	What is pinch-off voltage?	[2]
	g)	What are stability factors?	[2]
	h)	Define thermal runaway.	[2]
	i)	Write the main features of a CE amplifier.	[2]
	j)	Define hybrid-π model.	[2]

PART-B **(50 Marks)**

Unit-1

2	a)	Demonstrate the construction and working of a PN junction diode with energy band diagrams.	[5]
	b)	Explain the construction and working of LED, LCD, and photodiode.	[5]
		(OR)	
3	a)	Demonstrate the operation full-wave rectifier with filters for waveform.	[5]
	b)	Discuss different breakdown mechanisms in a diode with neat diagrams.	[5]

Unit-2

4	a)	Describe the input and output characteristics of CB, CE, and CC configurations.	[5]
	b)	Explain the operation and characteristics of a phototransistor.	[5]
		(OR)	
5	a)	Describe the working of a transistor as a switch and list the switching times.	[5]
	b)	Explain the Ebers-Moll model of a transistor.	[5]

Unit-3

6	a)	Demonstrate the construction, operation, and characteristics of a JFET.	[5]
	b)	Explain the construction and working of depletion and enhancement-type MOSFETs.	[5]
		(OR)	
7	a)	Compare BJT and JFET in terms of operation and characteristics.	[5]
	b)	Describe the operation of CMOS and Bi-CMOS inverter circuits.	[5]

Unit-4

8	a)	Demonstrate FET biasing methods and their stabilization.	[5]
	b)	Discuss about the need for biasing in detail.	[5]
		(OR)	
9	a)	Derive the expression for stability factors S, S′, and S″.	[5]
	b)	Discuss bias compensation techniques using diodes and thermistors.	[5]

Unit-5

10	a)	Explain the h-parameter model and analyze a CE amplifier using it.	[5]
	b)	Derive voltage gain and input/output impedance for CB and CC amplifiers.	[5]
		(OR)	
11	a)	Compare BJT amplifier configurations based on gain and impedance.	[5]
	b)	Illustrate the small-signal model of a FET and analyze CS, CG, and CD amplifiers.	[5]