

Project Code: EEC-102

Roll No. 202

B. TECH.

Year: 2nd Semester: 4th

MINOR TEST (EXAMINATION): 2025-2026
Electronics Material, Devices and Circuits

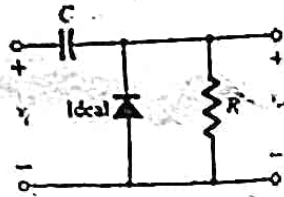
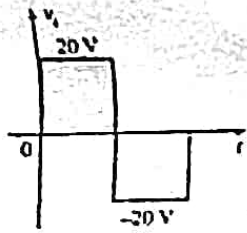
Max. Marks: 30

Time: 2 Hr.

Note: Answer all questions.

Q1.	Attempt any Three parts of the following.	Marks	CO	BL	PO	PI Code
a)	Calculate the conductivity and resistivity of n-type silicon with electron concentration 10^{16} cm^{-3} and mobility $1400 \text{ cm}^2/\text{Vs}$.	4	CO1	3	PO1	1.3.1
b)	Draw the crystal structure of N type Silicon semiconductor and demonstrate the electron and hole generation using suitable diagrams.	4	CO1	2	PO1	1.3.1
c)	Derive the expression for average DC value of voltage in full wave bridge rectifier.	4	CO2	2	PO1	1.3.1
d)	Explain the MOSFET device structure for N-channel with current voltage characteristics.	4	CO2	3	PO1	1.3.1
Q2.	Attempt any Three parts of the following.					
a)	Explain Drift and Diffusion current flows in semiconductors.	3	CO1	2	PO1	1.3.1
b)	Draw the fermi level diagram of P type, N type and intrinsic semiconductor.	3	CO1	2,3	PO1	1.3.1
c)	What is the effect of temperature on conductivity of extrinsic semiconductor? Also discuss the recombination process in semiconductors.	3	CO1	2	PO1	1.3.1
d)	In a semiconductor at thermal equilibrium, electron concentration is 10^{16} cm^{-3} . If intrinsic carrier concentration is 10^{10} cm^{-3} , calculate hole concentration.	3	CO1	3	PO1	1.3.1
Q3.	Attempt any Three parts of the following.					
a)	Plot VI characteristics of PN Junction diode. How can temperature affect this curve?	3	CO2	1,2	PO1	1.3.1
b)	Differentiate Avalanche and Zener Breakdown. How Zener diode can be used for voltage regulation circuit?	3	CO2	2	PO1	1.3.1

c)	A Ge diode carries a current of 1 mA at room temperature when a forward bias of 0.26 V is applied. Estimate the reverse saturation current at room temperature.	3	CO2	3	PO1	1.3
d)	Plot the output for the following circuit and for the given input waveform.	3	CO2	3	PO1	1.3



BL – Bloom’s Taxonomy Levels (1- Remembering, 2- Understanding, 3 – Applying, 4 – Analysing, 5 – Evaluating, 6 - Creating), CO – Course Outcomes, PO – Program Outcomes (As per Examination Reform Policy by AICTE Page No. 15)
 PI Code – Performance Indicator Code