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Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

B.Tech Degree S2 (S) / S1 (Challenge Course) Examination December 2025 / January 2026 (2024 Scheme)

Course Code: GAPHT121
Course Name: PHYSICS FOR INFORMATION SCIENCE

Max. Marks: 60 Duration: 2 hours 30 minutes

PART A

(Answer all questions. Each question carries 3 marks)

		CO	Marks
1	What are the main drawbacks of classical free electron theory?	CO1	(3)
2	Define superconductivity. Explain the significance of critical field on superconductors.	CO1	(3)
3	Show that electron is not existed inside the nucleus, using Heisenberg's uncertainty principle.	CO2	(3)
4	Write the normalisation condition for a wavefunction and mention its significance.	CO2	(3)
5	Differentiate between n-type and p-type semiconductors with their Fermi level diagram.	CO3	(3)
6	Explain Knee voltage and Breakdown voltage of p-n junction diode with V-I graph.	CO3	(3)
7	Differentiate between a Zener diode and an ordinary p-n junction diode.	CO4	(3)
8	Give three applications of Photodiode.	CO4	(3)

PART B

(Answer any one full question from each module, each question carries 9 marks)

Module -1

9	a)	Define Fermi-Dirac distribution function. Mention its significance	CO1	(3)
	b)	Explain the classification of materials on the basis of band theory. Draw energy band diagrams for each type of materials.	CO1	(6)
10	a)	Write a note on i) Meissner effect	CO1	(6)

ii) BCS theory

	b)	Lead in the superconducting state has a critical temperature of 6.2K at zero magnetic field and a critical field of 8.5 T at 0K. Determine the critical field at 4.2K.	CO1	(3)

Module -2

11	a)	Derive time independent Schrodinger wave equation.	CO2	(6)
	b)	Write a note on quantum mechanical tunnelling.	CO2	(3)
12	a)	Obtain energy eigen values and eigen functions for a particle confined in a one-dimensional infinite square well potential.	CO2	(9)

Module -3

13	a)	Obtain an expression for the density of holes in the valence band of an intrinsic semiconductor.	CO3	(6)
	b)	Explain the effect of temperature on intrinsic carrier concentration?	CO3	(3)
14	a)	Explain the mechanism of charge flow across a p-n junction when it is forward biased and reverse biased. Discuss its V-I characteristics.	CO3	(9)

Module -4

15	a)	Explain the principle and working of Tunnel diode with suitable diagram. Draw and explain its V-I characteristics.	CO4	(6)
	b)	Mention any three applications of Tunnel diode.	CO4	(3)
16	a)	Explain the construction and working of Solar cell. Draw its I-V characteristics.	CO4	(6)
	b)	Write a note on stringing of solar cells.	CO4	(3)

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