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Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

B.Tech Degree S2 (R,S) Examinations April 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	Define conduction band and valence band.	CO1	(3)
2	What is the significance of critical temperature and critical field for superconductors?	CO1	(3)
3	What are matter waves? Write down the expression for de Broglie wavelength.	CO2	(3)
4	What is meant by wavefunction in quantum mechanics? Explain the physical significance of wave function.	CO2	(3)
5	Distinguish between intrinsic and extrinsic semiconductors.	CO3	(3)
6	Draw the V-I characteristics of a p-n junction diode and explain the features	CO3	(3)
7	Differentiate between avalanche breakdown and Zener breakdown.	CO4	(3)
8	Explain the working of LED. Give two applications of LED.	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	(4)
	b)	Explain variation of Fermi function with temperature.	CO1	(5)
10	a)	Explain BCS theory of Superconductivity.	CO1	(4)
	b)	Distinguish between Type I and Type II superconductors.	CO1	(5)

Module -2

11	a)	Obtain Schrodinger's time dependent equation starting from plane wave equation for a particle moving in the x-direction.	CO2	(6)
	b)	Calculate the wavelength of an electron accelerated through a potential of 200 volts. (mass of electron: 9.1×10^{-31}kg)	CO2	(3)
12	a)	State Heisenberg's uncertainty principle. Using uncertainty principle, prove i) Absence of electron inside the nucleus ii) Natural line broadening	CO2	(9)

Module -3

13	a)	Define Fermi energy and Fermi level.	CO3	(2)
	b)	Derive an expression for Fermi energy in intrinsic semiconductor. Discuss the position of Fermi level in an intrinsic semiconductor.	CO3	(3)
	c)	Explain the variation in the position of Fermi level with temperature in n type and p type semiconductors.	CO3	(4)
14	a)	Explain the formation of p-n junction with the energy band diagram.	CO3	(5)
	b)	Derive Diode equation.	CO3	(4)

Module -4

15	a)	With a neat diagram explain the working of Half wave rectifier and Full wave bridge rectifier.	CO4	(6)
	b)	The applied input ac power to a half wave rectifier is 200 watts. The dc output power obtained is 75 watts. What is the rectifier efficiency?	CO4	(3)
16	a)	Explain the construction and working of Junction photodiode and PIN photodiode with suitable diagrams.	CO4	(6)
	b)	Write any three applications of Photodiode.	CO4	(3)

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