Reg No.:_

Name:

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY B.Tech Degree S1 (S) Examination May 2025 (2024 Scheme)

Course Code: GBPHT121

Course Name: PHYSICS FOR ELECTRICAL SCIENCE

Max. Marks: 60

Duration: 2 hours 30 minutes

Pages: 2

		PART A		
		(Answer all questions. Each question carries 3 marks)	CO	Marks
1		Write a short note on intrinsic semiconductor. How does the intrinsic carrier	1	(3)
		concentration vary with temperature?		
2		Explain reverse biasing of p-n junction.	1	(3)
3		Distinguish between avalanche breakdown and Zener breakdown.	2	(3)
4		Explain the working of PIN photodiode.	2	(3)
5		Mention any 6 applications of superconductors.	3	(3)
6		What are the three electric vectors in dielectrics? Obtain the relation between them.	3	(3)
7		Define population inversion in the context of lasers. How is it achieved?	4	(3)
8		Using neat labelled diagram differentiate between step index and graded	4	(3)
		index optical fibers.		
		PART B Answer any one full question from each module, each question carries 9 ma	rks)	
		Module -1		
9	a)	Derive an expression for density of holes in the valence band of an intrinsic	1	(9)
		semiconductor by assuming Fermi-Dirac distribution and show that the		
		intrinsic carrier density is independent of Fermi level.		
10	a)	Derive diode equation.	1	(6)
	b)	Draw the V-I characteristics of a p-n junction.	1	(3)

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Module -2

11	a)	With a neat circuit diagram explain the working of a half wave rectifier.	2	(6)
		Obtain the expression for its efficiency.		
	b)	An ac supply of $230V$ is applied to a centre tap full wave rectifier circuit	2	(3)
		through a transformer of turn ratio 10:1. Find the dc output voltage.		
12	a)	Explain the construction and working of a solar cell. Draw its characteristics	2	(6)
		curve.		
	b)	Write a short note on stringing of solar cell.	2	(3)
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		Module -3		
13	a)	With the help of graph and suitable examples compare type I and type II	3	(6)
		super conductors.		
	b)	Explain Meissner effect. Prove that a superconductor is a perfect diamagnet.	3	(3)
14	a)	Write a short note on Dielectric constant, Dielectric losses and Dielectric	3	(6)
		break down.		
	b)	Calculate the relative permittivity of KCl, when it is subjected to an electric	3	(3)
		field of strength 500V/m and the resulting polarisation is $4X10^{-8}C/m^2$		
		Module -4		
15	a)	Explain the construction and working of a Ruby laser.	4	(9)
16	a)	Describe the principle of light propagation in optical fibers and derive the	4	(9)
		expression for numerical aperture.		
