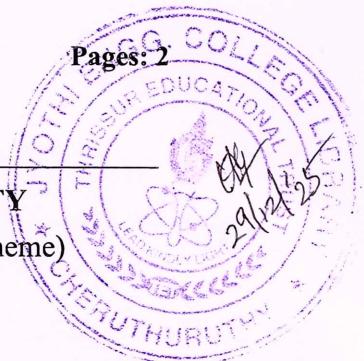


Reg No.:

Name: \_\_\_\_\_

**APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY**  
 B.Tech Degree S1 (R,S) Examination December 2025 (2024 Scheme)



**Course Code: GBPHT121**

**Course Name: PHYSICS FOR ELECTRICAL SCIENCE**

Max. Marks: 60

Duration: 2 hours 30 minutes

**PART A**

*(Answer all questions. Each question carries 3 marks)*

1	Explain the formation of depletion region in a p-n junction.	1	(3)
2	Explain the shift of fermi level in n type semiconductor.	1	(3)
3	Compare Zener breakdown and Avalanche breakdown	2	(3)
4	Explain the working of PIN diode	2	(3)
5	Differentiate between type I and type II superconductors.	3	(3)
6	What is meant by polarization in dielectrics? Name different types of polarization.	3	(3)
7	What is meant by population inversion? How population inversion can be achieved in a laser system?	4	(3)
8	Explain the principle of propagation of light in an optical fibre.	4	(3)

**PART B**

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

**Module -1**

9	a) Derive an expression for the density of electrons in conduction band.	1	(9)
10	a) Derive an expression for fermi energy level in intrinsic semiconductor. b) Explain V-I characteristics of a p-n junction when forward biased.	1	(5)
		1	(4)

**Module -2**

11	a) With neat labelled diagram explain the working of i) centre tap full wave rectifier and ii) full wave bridge rectifier. b) Give any three applications of Zener diode	2	(6)
		2	(3)

12 a) Explain the working of solar cell and photo diode. 2 (6)  
 b) Give any six applications of LED. 2 (3)

**Module -3**

13 a) What is meant by Meissner Effect? 3 (3)  
 b) Explain critical temperature and critical field for a superconductor. 3 (3)  
 c) Give any three applications of superconductors. 3 (3)

14 a) What is meant by internal fields in liquids and solids? 3 (3)  
 b) Derive an expression for internal field for a cubic crystal. 3 (6)

**Module -4**

15 a) With neat labelled diagram explain the construction and working of Ruby laser. 4 (9)

16 a) Draw the block diagram of fibre optic communication system. 4 (3)  
 b) Give any three applications of optical fibres. 4 (3)  
 c) Calculate the maximum value of angle of incidence that a ray can make with the axis of the step index fibre, so that it gets guided through the fibre. Refractive indices for core and cladding are 1.61 and 1.5 respectively.

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