03GZPHT121122404

Reg No .:

Name:

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

Course Code: GZPHT121

Course Name: PHYSICS FOR PHYSICAL SCIENCE AND LIFE SCIENCE

Max. Marks: 60

Duration: 2 hours 30 minutes

Pages:

PART A

	(Answer all questions. Each question carries 3 marks)	CO	Marks
1	What is stimulated emission? Give equation for rate of stimulated emission.	1	(3)
2	Compare step index and graded index fibers.	1	(3)
3	What are the equations for constructive and destructive interference in thin	2	(3)
	films in reflected system.		
4	Distinguish between Fresnel and Fraunhofer classes of diffraction.	2	(3)
5	Define wavefunction? Give its physical significance.	3	(3)
6	Define Heisenberg's uncertainty principle and write the three uncertainty	3	(3)
	relations		
7	State the laws of transverse vibrations in a stretched string.	4	(3)
8	What is Non-Destructive Testing (NDT)? Write any one of the advantages	4	(3)
	of NDT.		

PART B

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

Module-1

9	a)	Explain construction and working of Ruby laser.	1	6
10	b)	What is meant by population inversion? Why is it necessary for lasing action?	1	3
	a)	Define Numerical Aperture of an optical fibre. With a neat diagram derive an expression for Numerical Aperture of a step index fibre.	1	6
	b)	Calculate acceptance angle of an optic fibre having core refractive index 1.45 and cladding refractive index 1.4.	1	3
		Module-2		
11	a)	Explain with necessary theory, the formation of Newton's rings and derive	2	6

the expression for radius of nth dark ring in the interference pattern.

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In a Newton's rings experiment the diameter of the 15th ring was found to be b) 2 0.59 cm and that of the 5th ring was 0.336 cm. If the radius of the planoconvex lens is 100 cm, calculate the wavelength of light used.

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- Define transmission grating? With a neat diagram, represent the path a) difference occurred for diffracted light in grating and derive grating equation.
- What is the highest order spectrum which may be seen with monochromatic b) light of wavelength 600 nm by means of a diffraction grating with 5000 lines/cm?

Module-3

Starting from a plane wave equation, derive Schrodinger's time dependent a) 3 6 wave equation. b) An electron is accelerated through a potential difference of 200 Volts. Find 3 3 the de-Broglie wavelength of electron. Assume Charge of electron 1.6×10^{-19} C, mass of the electron 9.1×10^{-31} kg and h= 6.625×10^{-34} Js. Derive energy eigenvalues and energy eigen function for a particle confined a) 3 9 in an infinite square well potential. Module-4 Discuss the propagation of a transverse wave along a stretched string and 6 a) 4 derive the expression for velocity of wave. b) A piece of wire 60 cm length is stretched by a load of 9.8 N. Its mass is 4 3 2.5g. Calculate the fundamental frequency. Explain any three factors affecting acoustics of buildings and the remedial 6 4 a) methods. What is piezoelectric effect? Write any two medical applications of 4 3 b)

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ultrasonic waves.

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