Register No.: …… Name: ……

SAINTGITS COLLEGE OF ENGINEERING (AUTONOMOUS)

(AFFILIATED TO APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY, THIRUVANANTHAPURAM)

SECOND SEMESTER B.TECH DEGREE EXAMINATION (Special), AUGUST 2021

Course Code: **20PHT110**

Course Name: **ENGINEERING PHYSICS B**

Max. Marks: **100** **Duration: 3 Hours**

PART A

(Answer all questions. Each question carries 3 marks)

		CO
1.	What is meant by amplitude resonance? Give any two examples.	[1]
2.	With one example, distinguish between transverse and longitudinal waves	[1]
3.	Write a short note on Antireflection coating.	[2]
4.	Distinguish Fresnel and Fraunhofer classes of diffraction	[2]
5.	State and explain Heisenberg's Uncertainty principle.Give one example to prove its validity.	[3]
6.	Why the properties of nanoparticles are different?	[3]
7.	What is the significance of reverberation time?	[4]
8.	List any three properties of ultrasonic waves.	[4]
9.	Distinguish spontaneous and stimulated emission.	[5]
10.	Distinguish between step index fibre and graded index fibre	[5]

PART B

(Answer one full question from each module, each question carries 14 marks)

MODULE I

			CO	Marks
11.	a)	Write the differential equation of a forced harmonic oscillator and write its solution. Derive the expression for the amplitude and phase difference in terms of the natural frequency of the body and frequency of the applied periodic force.	[1]	(10)
	b)	If the Q- factor of an undamped tuning fork of frequency 260 Hz is 1000, calculate the relaxation time. How many oscillations the tuning fork will take in this time?	[1]	(4)

OR

			CO	Marks
12.	a)	Obtain one-dimension wave equation from the transverse vibration of stretched string. State laws of transverse vibrations.	[1]	(10)
	b)	A piece of string 50cm long is stretched by a load of 2.5kg and has a mass of 1.44g. Find the frequency of the second harmonic	[1]	(4)

MODULE II

			CO	Marks
13.	a)	Derive the expression for the diameter of the nth dark ring in Newton's ring interference pattern. Explain briefly the experimental procedure to determine the wave length of a monochromatic light.	[2]	(10)
	b)	Newton's rings are observed normally in reflected light of wavelength 589 nm. The diameter of the 10^{th} dark ring is 0.50cm. Find the radius of curvature of the lens and thickness of the film.	[2]	(4)

OR

			CO	Marks
14.	a)	Differentiate between Fresnel and Fraunhofer diffraction. Explain the diffraction due to a plane transmission grating and obtain the grating equation.	[2]	(10)
	b)	Light is incident normally on a grating 0.5 cm wide with 2500 lines. Find the angles of diffraction for the principal maxima of the two sodium lines of wavelengths 589 nm and 589.6 nm in the first order spectrum.	[2]	(4)

MODULE III

			CO	Marks
15.	a)	Formulate Schrodinger's time dependent equation.	[3]	(10)
	b)	Find the de Broglie wavelength of electron whose kinetic energy is 10KeV.	[3]	(4)

OR

			CO	Marks
16.	a)	Why do nanomaterials exhibit properties different from those of their classical counter parts? Explain the optical and electrical properties of nanomaterials.	[3]	(10)
	b)	Write any four applications of nanomaterials	[3]	(4)

MODULE IV

			CO	Marks
17.	a)	Define reverberation and reverberation time. Write any six factors affecting the acoustics of a building and their corrective measures.	[4]	(10)
	b)	The volume of a hall is $3000m^3$. It has a total absorption of $100m^2$	[4]	(4)

sabine. If the hall is filled with audience who add another 80m^2 sabine, then find the difference in reverberation time.

OR

			CO	Marks
18.	a)	What is magnetostriction effect? Explain the construction and working of an ultrosonic magnetostriction oscillator with the help of a neat diagram.	[4]	(10)
	b)	Explain the method of Non-Destructive Testing using ultrasonic waves	[4]	(4)

MODULE V

			CO	Marks
19.	a)	What is the significance of metastable level? With the help of suitable energy level diagram, explain the working of a Ruby laser.	[5]	(10)
	b)	Give any four advantages of optical fiber over conventional transmission lines?	[5]	(4)

OR

			CO	Marks
20.	a)	Explain the principle behind the guiding of light in an optical fiber? Derive an expression for acceptance angle and hence obtain numerical aperture of the given fibre having core and cladding refractive indices n_1 and n_2 respectively.	[5]	(10)
	b)	An optical fiber has a numerical aperture of 0.20 and a cladding refractive index of 1.59. Determine the acceptance angle for the fiber in water which has a refractive index of 1.33.	[5]	(4)

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