Code No. : 12034 (A)

VASAVI COLLEGE OF ENGINEERING (Autonomous), HYDERABAD
B.E. (CBCS) II-Semester Main Examinations, January-2021
Applied Physics
(Mechanical)

Time: **2** hours

Max. Marks: **60**

Note: Answer any NINE questions from Part-A and any THREE from Part-B

Part-A (9 × 2 = 18 Marks)

Q. No.	Stem of the question	M	L	CO	PO
1.	Define compound pendulum. A compound pendulum having moment of inertia, I about the point of suspension is displaced by a small angle θ from the equilibrium position. Write the equation of motion.	2	3	1	1,2,12
2.	What is quality factor? Define lightly damped, heavily damped and critically damped oscillators in terms of quality factor.	2	2	1	1,2,12
3.	Writ the conditions for constructive and destructive interference	2	1	2	1,2,12
4.	Light of wavelength 5500A° falls normally on a slit of width 22 x 10⁻⁵ cm. Calculate the angular position of first two minima on either side of central maxima.	2	2	2	1,2,12
5.	Explain the characteristics of a laser beam.	2	1	3	1,2,12
6.	Explain the terms numerical aperture and acceptance angle of an optical fiber.	2	1	3	1,2,12
7.	Define intensity of sound and what is its unit?	2	1	4	1,2,12
8.	Mention any four applications of ultrasonic waves	2	2	4	1,2,12
9.	Write at least four applications of cryogenic liquids.	2	2	5	1,2,12
10.	Write any four properties of liquid helium?	2	5	5	1,2,12
11.	Define simple harmonic motion and name the physical parameters that characterize a simple harmonic motion.	2	1	1	1,2,12
12.	Write a note on double refraction.	2	1	2	1,2,12
Part-B (3 × 14 = 42 Marks)					
13. a)	Write the equation of motion of a damped harmonic oscillator. Obtain an expression how the energy of a damped harmonic oscillator changes as a function of time and damping constant.	8	3	1	1,2,12
b)	The amplitude of an oscillator of frequency 200 per second falls to 1/10 of its initial value after 2000 cycles. Calculate (i) its relaxation time (ii) its quality factor (iii) time in which its energy falls to 1/10 of its initial value (iv) damping constant.	6	4	1	1,2,12

14.	a)	Obtain the conditions for the interference of light reflected by a thin parallel film.	7	3	2	1,2,12
	b)	Describe Fraunhofer's diffraction due to single slit and deduce the position of the maxima and minima.	7	3	2	1,2,12
15.	a)	Describe the construction and working of a ruby laser.	8	3	3	1,2,12
	b)	Write the differences between step index multimode fiber and graded index multimode fiber.	6	2	3	1,2,12
16.	a)	What is reverberation time? Using Sabine's formulae explain how the sound absorption coefficient of a material is determined.	7	4	4	1,2,12
	b)	What is magnetostriction? Briefly explain how the ultrasonic waves are produced using a magnetostrictive oscillator.	7	3	4	1,2,12
17.	a)	Define inversion temperature, Boyle temperature and critical temperature. What is the relation between them?	7	2	5	1,2,12
	b)	Briefly explain how low temperatures can be obtained using adiabatic demagnetization.	7	3	5	1,2,12
18.	a)	Define resonance. Sketch how the sharpness of a resonance curve changes with the quality of damping.	7	2	1	1,2,12
	b)	Explain the construction and working of nicol prism.	7	2	2	1,2,12
19.		Answer any *two* of the following:				
	a)	Can we have two-level laser? Justify your answer.	7	5	3	1,2,12
	b)	Explain various factors affecting architectural acoustics and their remedies.	7	2	4	1,2,12
	c)	Explain the liquefaction of air through Linde process.	7	3	5	1,2,12

M: Marks;   L: Bloom's Taxonomy Level;   CO: Course Outcome;   PO: Programme Outcome

S. No.	Criteria for questions	Percentage
1	Fundamental knowledge (Level-1 & 2)	56
2	Knowledge on application and analysis (Level-3 & 4)	37
3	*Critical thinking and ability to design (Level-5 & 6) (*wherever applicable)	7

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