

Reg. No.

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

B.E./B.TECH. DEGREE EXAMINATIONS, MAY 2024

First Semester

PH22152 – ENGINEERING PHYSICS*(Common to AE, CE, ME, MN & MR)***(Regulation 2022)****TIME: 3 HOURS****MAX. MARKS: 100**

COURSE OUTCOMES	STATEMENT	RBT LEVEL
CO1	Formulate general mechanics parameters and explain conservation laws in mechanics.	2
CO2	Explain the properties of fluid and thermal flow through various materials.	2
CO3	Demonstrate the production and propagation of Acoustical waves.	2
CO4	Apply fundamental laws of optics in different types of LASER and Optic fiber communication.	3
CO5	Classify and demonstrate the fundamentals of crystals and their defects in solids.	2

PART- A (20 x 2 = 40 Marks)

(Answer all Questions)

	CO	RBT LEVEL
1. Calculate the M. I. of a thin uniform rod of mass 100g and length 60 cm about an axis perpendicular to its length and passing through its centre.	1	2
2. Define Radius of Gyration. Give its unit.	1	2
3. A solid disc has a mass of 4 kg and radius 1m. Find its moment of Inertia.	1	2
4. State theorem of parallel axis.	1	2
5. State Newton's law of cooling.	2	2
6. Derive the unit in which thermal conductivity is measured.	2	2
7. How does mass density of the fluid vary with pressure and temperature?	2	2
8. A stone weight 392.4N in air and 196.2 N in water. What is the volume of the stone	2	2
9. State relation between loudness and intensity.	3	2

- | | | |
|---|---|---|
| 10. A cinema theatre has a volume of 9500 m^3 . What should be the total absorption in the theatre, if the reverberation time of 1.6 seconds is to be maintained? | 3 | 2 |
| 11. If the reverberation time is higher than the critical value, how will it affect the acoustical quality of a building? | 3 | 2 |
| 12. Mention four applications of Ultrasonic waves. | 3 | 2 |
| 13. A silica optical fiber has a core refractive index of 1.50 and a cladding refractive index of 1.47. Calculate the critical angle. | 4 | 3 |
| 14. Under which conditions a set of laser beam are said to be coherent? | 4 | 3 |
| 15. Apply the conditions necessary for stimulated emission of radiation. | 4 | 3 |
| 16. A light signal of 100 mW is injected into a fiber of length 1 km. The outcoming signal from the other end is 40 mW. What is the loss in dB? | 4 | 3 |
| 17. Distinguish between crystalline material and amorphous materials | 5 | 2 |
| 18. A crystal plane cuts at $3a, 4b$ and $2c$ distances along the crystallographic axes. Find the Miller indices of the plane. | 5 | 2 |
| 19. What are Bravais lattice? | 5 | 2 |
| 20. State the value of coordination number for HCP structure and diamond structures. | 5 | 2 |

PART- B (5 x 10 = 50 Marks)

- | | Marks | CO | RBT
LEVEL |
|---|-------|----|--------------|
| 21. (a) State and prove the principle of parallel and perpendicular axes theorem. | (10) | 1 | 2 |
| (OR) | | | |
| (b) Describe, with necessary theory, how you would determine the rigidity modulus of a wire experimentally by using the torsion pendulum. | (10) | 1 | 2 |
| 22. (a) Derive an expression for thermal conductivity of the material of a thick pipe in which a hot liquid is flowing. | (10) | 2 | 2 |
| (OR) | | | |
| (b) Explain various properties of fluids with units and how it varies with | (10) | 2 | 2 |

temperature and pressure.

23. (a) Define Magnetostriction effect and explain how it can be applied for the production of ultrasonic waves using Magnetostriction oscillator. (10) 3 2

(OR)

(b) Explain the factors which affects the good speech intelligibility in a building and its remedies. (10) 3 2

24. (a) With the help of an energy diagram, illustrate the construction and working of a four-level solid-state laser, where the Nd^{3+} ions act as the active centers. (10) 4 3

(OR)

(b) Define numerical aperture and derive an expression for the numerical aperture and angle of acceptance of fiber in terms of relative index of the core and cladding of the fibre. (10) 4 3

25. (a) Explain the No. of atoms, atomic radius, Co-ordination number and packing factor for HCP structures. (10) 5 2

(OR)

(b) (i) Derive an expression for the interplanar spacing in a cubic structure. (6) 5 2

(ii) Lattice constant of copper is 0.38 nm. Calculate the distance between (110) and (111) planes. (4) 5 2

PART- C (1 x 10 = 10 Marks)

(Q.No.26 is compulsory)

		Marks	CO	RBT LEVEL
26.	(i) Explain fiber optical communication system with a neat block diagram	(6)	4	3
	(ii) Write short note on fiber optic -displacement sensor.	(4)	4	3
