

**PH 3151 — ENGINEERING PHYSICS**

**(Common to All Branches)**

**(Regulations 2021)**

**Time : Three hours**

**Maximum : 100 marks**

**Answer ALL questions.**

**PART A — ( $10 \times 2 = 20$  marks)**

1. State parallel axis theorem.
2. How center of mass is determined for rigid body and regular shape?
3. Write down the wave equation.
4. Define the term radiation pressure.
5. Distinguish between progressive waves and stationary waves.
6. Calculate the wavelength of light emission from GaAs whose band gap is 3 eV.
7. Define Compton effect and Compton shift.
8. State Eigen value and Eigen function.
9. What is meant by tunneling effect?
10. What is finite potential well in quantum mechanics?

**PART B — ( $5 \times 16 = 80$  marks)**

11. (a) Derive the relation between rotational kinetic energy and moment of inertia and give a short note on moment of inertia of a diatomic molecule.

**Or**

- (b) Describe the principle, construction and working of gyroscope and mention its application in various field.

12. (a) Discuss the source of electromagnetic waves and also mention the properties of electromagnetic waves.

Or

- (b) Derive Maxwell's equations in differential and integral form.

13. (a) Explain simple harmonic motion and discuss its characteristics. Hence derive the wave equation for standing waves.

Or

- (b) Outline the principle, construction and working of an Nd-YAG laser. List any three characteristics, advantages and applications of Nd-YAG laser.

14. (a) Give the theory of Compton effect and explain briefly about its experimental verification?

Or

- (b) Using Schrodinger's time independent wave equation normalize the wave function of electron trapped in a one-dimensional potential well.

15. (a) Explain the microscopic technique which use quantum tunneling principles to scan the samples with focused electron beam.

Or

- (b) Describe the Bloch's theorem for particles in a periodic potential and give a note on Kronig Penney model and the origin of energy bands.
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