B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2022.

First Semester

PH 3151 — ENGINEERING PHYSICS

(Common to All Branches)

(Regulations 2021)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Define Center of Mass.
2. State law of conservation of angular momentum.
3. Write down the properties of Electromagnetic waves.
4. What is polarization?
5. Define total internal reflection.
6. Differentiate between laser and ordinary light.
7. What are matter waves?
8. What is the physical significance of a wave function?
9. State the principle of resonant diode.
10. What is quantum harmonic oscillator?

PART B — (5 × 16 = 80 marks)

11. (a) State and prove parallel and perpendicular axis theorem with a neat sketch.

Or

(b) Derive the period of torsional pendulum and arrive at the equation of torsional rigidity.

12. (a) Derive the Maxwell's equations for a plane electromagnetic waves in vacuum.

Or

(b) Describe the production of plane Electromagnetic waves in detail.

13. (a) Describe the design and working of CO_2 laser with energy level diagram.

Or

(b) Derive Einstein Co-efficients for spontaneous and stimulated Emission.

14. (a) Derive Schrödinger time independent and dependent wave equations.

Or

(b) Determine the energy of a particle confined in one dimensional potential well and find the normalization of wave function to study the behavior inside the potential well.

15. (a) Explain the principle, construction and working of scanning tunneling microscope with a neat sketch.

Or

(b) Prove the Bloch theorem for particles in periodic finite potential well.
