

End Semester Examinations - 2015-16 Even Semester - May 2016

14PH1001 Applied Physics

Set B

Time : 3 hrs
Total Marks: 100

1. (a) Find the de Broglie wavelength of an flying object of mass 170 tonnes travelling at a speed of 100 km/h (4 Marks)

(b) State the fundamental assumptions made by Schrodinger and derive the Schrodinger time independent wave equation.(16 Marks)

OR

2. a) State and explain Heisenberg uncertainty principle (4 Marks).
- b) Explain the application of Schrödinger wave equation to a particle in an infinite one dimensional potential well and find the eigen function and eigen values. (16Marks)

3. a) Write a short note on stimulated emission. (4 Marks)
- b) Explain the construction, principle, and working of Nd:YAG laser with necessary energy level diagrams. (16 Marks)

OR

4. a) State the principle of holography. Draw the diagram for the hologram recording process (4 Marks)
- b) Explain in detail the mode of vibration of CO₂ molecule, construction, principle and working of CO₂ laser with energy level diagram. (16 Marks)
5. a) Calculate the numerical aperture of an optical fiber if the refractive indices for core and cladding are 1.65 and 1.45 respectively (4 Marks)
- b) Explain the classification of optical fiber based on their modes of transmission and refractive index profile with neat diagrams? (16 Marks)

OR

6. a) Explain the principle of optical fiber with suitable diagram. (4 Marks)
- b) Explain the terms acceptance angle and numerical aperture. Derive an expression for acceptance angle in terms of numerical aperture. (16 Marks)
7. a) Define and differentiate intensity and loudness. (4 Marks)
- b) State and explain any four factors affecting the acoustics of an auditorium. What are the remedies to overcome these problems? (16 Marks)

OR

8. a) A ferromagnetic bar of length 20 cm and density $7.1 \times 10^3 \text{ kg m}^{-3}$ and Youngs modulus of the bar is $10.2 \times 10^{11} \text{ Nm}^{-2}$ is used in magnetostriction oscillator. Find the frequency of the ultrasonic wave generated by the oscillator. (4 Marks)
- b) What is piezoelectric effect? Explain the procedure of producing ultrasonic waves using piezoelectric method. (16 Marks)
9. a) What is Meissner effect? Explain the same with a neat diagram. (4 Marks)
- b) What are superconductors? Explain in detail type I and type II superconductors with necessary graphs. (16 Marks)

