PH-101/1843

B. Tech. (Semester-I) Exam.–2015

Engineering Physics

Time : Three Hours
Maximum Marks : **100**

Note : Attempt questions from all sections.

SECTION - A

(Short-answer Type Questions)

Note : Attempt **any Ten** questions. Each question carries 4 marks. 10×4=40

1. Differentiate between inertial and non-inertial frames of reference with the help of suitable example of each.

2. State the Einstein's postulates of special theory of relativity and deduce lorentz transformation equations.

3. An object-50 meter long is in flying mode apppears to be 49.5 meters to an observer on the ground. Find the speed of object.

[P. T. O.

4. Prove the relation $E^2-p^2c^2 = mo^2c^4$ When symbols have their usual meanings.

5. Show that the formation of interference fringes is in accordance with the law of conservation of energy.

6. A thin film illuminated by white light is observed in reflected light. Explain the distribution of colours.

7. Explain Ray light's criterion of resolution. Define limit of resolution.

8. What is meant by plane polarized and elliptical polarized light.

9. A 5% solution of cane suger placed in a tube of length 40cm, causes the optical rotation of 20°. How much length of 10% solution of the same substance will cause 35° rotation.

10. Differentiate between spontaneous and stimulated emission.

11. Explain the working of Ruby laser with energy level diagram.

12. Differentiate between single mode index fibre and multimode index fibre.

13. Compute the numerical apertune and the acceptance angle of an optical fibre from the following data :

$\mu_1 = 1.48$ (Core)

$\mu_2 = 1.46$ (Cladding)

14. Write some advantages and dis-advantages of optical fibres over co-axial cables.

15. Discuss the salient features of holography with some applications.

SECTION - B

(Long Answer type questions)

Note : Attempt **any three** questions. Each question carries 20 marks. 3x20=60

3x10 = 30

1. Write & explain Lorentz transformation equations and hence explain Lorentz fitzgerald contraction and time dilation.

2. Describe and explain the formation of Newton's rings in reflected monochromatic light. Explain why Newton's rings are circular?

3. Describe the main features of double slit-Fraunhofor's diffraction pattern with a suitable diagram. Explain the effect of increasing slit width and decreasing wavelength on diffraction pattern.

4. Describe the construction and working principle of a nicol prism. Explain how it can be used as a polarizer and as an analyser.

5. Discuss the basic principle of communication in optical fibre and explain the propagation of light in single mode, and graded index fibre.

6. Write short notes on any two of the following :
   (a) Mass energy equivalence
   (b) Fresnel's theory of optical activity
   (c) Interference in wedge shaped films
   (d) Image on hologram.

experiment