

(b) Discuss the components of a optical fiber. Also discuss its types. 15

7. (a) What are *three* electric vectors in dielectrics. Find relation between them. 10

(b) Find an expression for energy stored in electrostatic field. 10

SECTION - D

8. What are postulates of special theory of relativity using them derive equation of variation of mass with velocity. Also discuss time dilation. 20

9. (a) Write a note on BCS theory of superconductivity. 10

(b) Describe meissner effect. Distinguish between type - I and type - II superconductors. 10

24003-35650-(P-4)(Q-9)(15) (4)

Roll No.

24003

B. Tech. Ist Semester

Examination – December, 2015

PHYSICS - I

Paper : Phy-101-F

Time : Three Hours] [Maximum Marks : 100

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

Note : Question No. 1 is *compulsory*. Students have to attempt *five* question in total selecting at least *one* question from each Section. Each question carries equal marks.

1. (a) Why Newton's rings are circular? 2
- (b) What are Fresnel's half period zones? 2
- (c) Which of the polari meters (i) half shade (ii) bi-quartz is more sensitive and why? 2

24003-35650-(P-4)(Q-9)(15)

P. T. O.

- (d) Calculate the coherence time for a laser beam for which the band width is $\Delta\nu = 3000$ Hz. 2
- (e) What is temporal coherence? 2
- (f) Calculate acceptance angle of optical fiber with $\mu_{\text{core}} = 1.62$ and $\mu_{\text{clad}} = 1.52$. 2
- (g) What are multimode step index fiber? 2
- (h) Explain the term dielectric relaxation. 2
- (i) The mass of a moving electron is 11 times its rest mass. Find its kinetic energy. 2
- (j) Give some names of high temperature super conducting materials. 2

SECTION - A

2. Explain the formation of interference fringes by means of Fresnel's bi-prism when a monochromatic source of light is used and derive the expression for the fringe width. How will you measure the wavelength of monochromatic light using bi-prism method? 20
3. (a) What is a zone plate? Show that zone plate has multiple foci. 16

24003-35650-(P-4)(Q-9)(15) (2)

- (b) A parallel beam of sodium light is allowed to be incident normally on a plane grating having 5000 lines/cm and a second order spectral line is observed to be deviated through 30° . Calculate the wavelength of light used. 4

SECTION - B

4. (a) Give the construction and working of a Lorentz half shade polarimeter. What is its main drawback? 14
- (b) Write a note on Quarter and Half wave plate. 6
5. (a) Discuss the essential requirements for producing laser action. Describe a semiconductor laser. 14
- (b) What are the specialities of a laser light. 6

SECTION - C

6. (a) Calculate the refractive indices of core and cladding material of a fiber from following data N. A = 0.22, $\Delta = 0.012$, where N. A = Numerical aperture Δ = Fractional refractive index. 5

24003-35650-(P-4)(Q-9)(15) (3)

P. T. O.