

Roll No. ....

Total No. of Pages : 2

BT-1/D11

7504

Physics-I

Paper : Phy.-101 E

Time : Three Hours]

{Maximum Marks : 100

Note :- Attempt FIVE questions in all, selecting at least ONE question from each Unit.

UNIT-I

- 1. (a) What are the essential conditions for obtaining interference of light ? Explain the formation of interference fringes by means of Fresnel's biprism and derive the expression for the fringe width. 15
- (b) How would you determine the thickness of a thin transparent sheet optically ? Explain the method. 5
- 2. (a) Give the theory of plane diffraction grating. What is meant by absent spectra ? 10
- (b) Describe the construction and working of a biquartz polarimeter. 10

UNIT-II

- 3. (a) What is population inversion ? Why it is essential for obtaining laser ? Explain the characteristics of a laser beam. 10
- (b) Describe briefly few applications of lasers. 10
- 4. (a) What is an optical fibre ? Explain the basic principle of optical fibre. 10
- (b) Define numerical aperture and acceptance angle. 5
- (c) What are single mode and multi-mode fibres ? 5

UNIT-III

- 5. (a) State Maxwell's equation for e.m. waves and derive equation for simple wave. 10
- (b) Explain Gauss's and Ampere's law . 5
- (c) What are wave guides ? Explain briefly. 5
- 6. (a) Discuss the behaviour of dielectrics in an a.c. field. What is dielectric loss factor ? 10
- (b) The dielectric constant of Neon gas at N.T.P. is 1.000134. Calculate the dipole moment induced in each atom of the gas when it is placed in an electric field of 80,000 volt/meter. Also find the atomic polarizability of neon.  
Given that :  $\epsilon_0 = 8.85 \times 10^{-12}$  coul/nt-m<sup>2</sup>, and  
Avogadro's number =  $60.23 \times 10^{26}$  atoms/kg. mol. 10

UNIT-IV

- 7. (a) What were the aims of Michelson Morley experiment ? Explain the negative results of this experiment. 15
- (b) Discuss briefly TIME DILATION. 5
- 8. Write notes on any two :
  - (i) Nuclear Reactors
  - (ii) Nuclear fission and fusion
  - (iii) Radiation detectors. 10+10