

Roll No. ....

Total Pages : 03

**BT-I/D-21**

**41002**

PHYSICS–I

PHY-101E

Time : Three Hours]

[Maximum Marks : 100

**Note :** Attempt *Five* questions in all, selecting at least *one* question from each Unit. All questions carry equal marks.

**Unit I**

1. (a) Discuss theory of Plane transmission grating and derive condition for secondary maxima and minima. **15**  
(b) Calculate number of lines/cm on grating having diffraction angle of  $30^\circ$  for wavelength  $5000 \text{ \AA}$  in second order. **5**
2. (a) Describe the construction and working of Michelson's interferometer. How will you measure the difference in sodium doublet lines ? **15**  
(b) Describe the construction and working of Biquartz polarimeter. **5**

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## **Unit II**

3. (a) Explain temporal and spatial coherence of Laser beam. Give description of Semiconductor laser. **15**  
(b) Describe the various applications of Laser. **5**
4. (a) What do you mean by acceptance angle and numerical aperture in optical fiber ? Derive the relation between them. **10**  
(b) What do you mean by optical fiber ? Describe different modes of optical fibre. **10**

## **Unit III**

5. (a) State and derive Maxwell's equations and give their physical significance. **15**  
(b) What do you understand by a Waveguide ? **5**
6. (a) Define Electric field intensity, Polarization vector, Electric displacement vector and derive the relation between them. **15**  
(b) Discuss the behaviour of dielectrics in an alternating field. **5**

## **Unit IV**

7. (a) What are the postulates of special theory of relativity ? Derive Lorentz transformation equations. Also show that a moving clock appears to go slow. **15**

- (b) Calculate the speed of a particle if its mass is 4 times its rest mass. **5**
- 8.** (a) Describe the construction and working of Scintillation counter. **10**
- (b) Distinguish between nuclear fission and nuclear fusion. **10**