

[This question paper contains 4 printed pages.]

**1901**

Your Roll No. ....

**B.Sc. Prog. / I**

**E**

**PH-101 – PHYSICS**

*Time : 3 Hours*

*Maximum Marks : 75*

*(Write your Roll No. on the top immediately  
on receipt of this question paper.)*

*Attempt any five questions in all including  
Question No. 1 which is compulsory.*

1. Attempt any five : (5×3)
- (a) State Kapler' laws of planetary motion.
  - (b) Draw I-V characteristics of a solar cell.
  - (c) What do you understand by universal gate ?  
Convert NAND gate to OR gate.
  - (d) Define degree of freedom with examples.
  - (e) State the postulates of Einstein's special theory  
of relativity.
  - (f) What is the principal for measuring the blood  
pressure ?

P.T.O.

- (g) What is the Essential conditions for sustained interference ?
- (h) What is the difference between Fresnel and Frannhoffer diffraction ?
2. (a) State and prove work energy theorem. (7)
- (b) Show that if the total linear momentum of a system of particles is conserved the centre of mass is either moving with constant velocity or is at rest. (5)
- (c) Explain Hooke's law. What are the limitations of the law ? (3)
3. (a) Describe the Michelson-Morley experiment and explain the physical significance of the negative results. (10)
- (b) A spaceship moving away from the earth with velocity  $0.5c$  fires a rocket whose velocity relative to spaceship is  $0.8c$ .
- (i) away from the earth
- (ii) towards the earth.
- What will the velocity of the rocket be as observed from the earth in the both cases. (5)

4. (a) What are the important properties of a simple harmonic oscillator? Why is simple harmonic motion considered to be a fundamental periodic motion? Show that the time period of a simple harmonic oscillation is given by

$$T = 2\pi \sqrt{\frac{\text{displacement}}{\text{acceleration}}} \quad (10)$$

- (b) A particle of mass 100 gm is placed in a field potential  $U = 5x^2 + 10$  ergs/g. Find the frequency. (5)
5. (a) Discuss the phenomena of Fraunhofer diffraction a single slit and obtain the condition for first minimum in the diffraction pattern. (7)
- (b) Describe the construction of Nicol Prism and how it acts as a polarizer and as analyzer. (8)
6. (a) Explain the working of an operational amplifier as integration. (5)
- (b) Explain with circuit diagram the characteristic of a p-n junction under forward and Reverse bias. (5)
- (c) Find the resolving power of telescope. (5)

7. (a) Define the coefficient of viscosity. Derive Poiseuille's equation for the rate of flow of a liquid flowing in a horizontal capillary tube. (8)
- (b) Explain the working of a half adder and a full adder circuits. Give their truth table. (7)
8. Write short notes on any **three** of the following :
- (a) Vander waal's Interaction
- (b) Lissajoues figures
- (c) Capacitance of AXON
- (d) Malus law (5×3)