

Roll No.

1983

B.E. 1st Semester

Examination - December, 2009

PHYSICS - I

Paper : Phy-101-E

Time : Three Hours] [Maximum Marks : 100

Before answering the question, 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 : Attempt any *five* questions in all, taking at least *two* questions from each Section.

SECTION - A

1. (a) What are Newton's rings ? Explain the formation of Newton's ring in reflected light. 15
- (b) In a Newton's ring experiment, the diameter of the 5th ring was 0.336×10^{-2} m and the diameter of 15th ring was 0.590×10^{-2} m. Find the radius of curvature of the plano convex lens if the wavelength of light used is 5890 \AA . 5

2. (a) Differentiate between Fraunhofer and Fresnel diffraction. 5
- (b) Explain mathematically, the phenomenon of diffraction through single slit. 15
3. (a) Describe a Nicol's prism. Showing clearly how it is constructed and what is its action? 12
- (b) Explain, how a quarter wave plate and half wave plate could be constructed? 8
4. Write short notes on the following :
- (a) Population inversion 5
- (b) Angle of acceptance 5
- (c) He-Ne Laser 10

SECTION - B

5. Define damped harmonic oscillations. Write differential equation for a damped harmonic oscillator. Solve the differential equation and discuss all cases of oscillatory motion. 20
6. (a) Explain, how could Maxwell correct Ampere's law in its general form? 10
- (b) Derive equation of a simple plane wave. 10
7. (a) Show that $\vec{D} = \epsilon_0 \vec{E} + \vec{P}$ where the symbols have their usual meaning. 5
- (b) Derive Lorentz transformation equation of relativity. 15

8. (a) Distinguish between fission and fusion. Describe the principle, construction and working of a nuclear reactor. 10
- (b) Write short notes on Scintillation counter. 10
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