



Reg. No. : .....

Name : .....



M 8572

**IV Semester B.Sc. Degree (CCSS – Reg./Supple./Imp.)**

**Examination, May 2015**

**CORE COURSE IN PHYSICS**

**4B04 PHY : Optics**

**(2012 Admn. Onwards)**

Time : 3 Hours

Max. Weightage : 30

**SECTION – A**

(Choose the correct answer. **Each** Bunch carries a Weightage of 1.)

1. i) Interference is based on the principle of
 

a) Malu's law	b) Grating law
c) Superposition of light waves	d) None of the above
  
- ii) The cracks in a glass piece appear coloured, when seen under sunlight. This is due to
 

a) Interference	b) Scattering of light
c) Polarization	d) None of the above
  
- iii) Haidingers fringes are
 

a) Fizeau's fringes	b) Fringes of equal inclination
c) Fringes of equal thickness	d) None of the above
  
- iv) During the interference, the law of conservation of energy is
 

a) holds good	b) not satisfied
c) not applicable	d) none of the above

P.T.O.



2. i) Polarization of light proves the
- Particle nature of light
  - Longitudinal nature of light
  - Transverse nature of light
  - None of the above
- ii) Bending of light rays at the edges and corners of an obstacle is
- Refraction
  - Diffraction
  - Double refraction
  - None of the above
- iii) Find the radius of the first half period zone on a zone plate, be having like a convex lens of focal length 60 cm. ( $\lambda = 6000 \text{ \AA}$ ).
- 0.6 mm
  - 0.6 cm
  - 60 mm
  - None of the above
- iv) When an isotropic substance of high refractive index is placed in a strong magnetic field, it becomes optically active temporarily. This property is
- Faraday effect
  - Compton effect
  - Photoelectric effect
  - None of the above

## SECTION - B

(Answer **any six**. Each question carries a weightage of 1.)

- What are nodal planes ?
- Establish the relation between path difference and phase difference of waves.
- Write a short note on Fraunhofer diffraction of light.
- Explain the colour of thin film.
- How will you test the planeness of glass plate ?
- What is meant by Rayleigh's criterion ?
- What is meant by plane polarized light ?
- What is optical activity ?



## SECTION - C

(Answer **any nine**. Each question carries a weightage of 2.)

- Obtain system matrix for two thin lenses separated by a distance.
- What are coherent sources ?
- Briefly explain the formation of Newton's rings.
- Discuss the principle of Michelson's interferometer.
- Distinguish between Interference and diffraction.
- Describe the construction of a zone plate.
- In Newton's ring experiment the diameter of the 4<sup>th</sup> dark ring is 0.34 cm using a light of wavelength 589.3 nm. Calculate the radius of the curvature of the convex lens.
- Give an account of polarization of light waves.
- What is a Polaroid ? Mention its uses.
- What is Half wave plate ? Why is it called so ?
- Explain the phenomenon of double refraction.
- Explain the working of a Nicol prism.

## SECTION - D

(Answer **any one**. Each question carries a weightage of 4.)

- Describe with the necessary theory the construction and working of a plane transmission grating. How it is used to determine the wavelength of monochromatic light ?
- Discuss the interference in wedge shaped film and obtain an expression for the fringe width and determine the thickness the diameter of a wire.