



Name :
Roll No. :
Invigilator's Signature :

**CS/B.OPTM/SEM-2/BO-201/2011
2011**

PHYSICAL OPTICS – II

Time Allotted : 3 Hours

Full Marks : 70

The figures in the margin indicate full marks.

Candidates are required to give their answers in their own words as far as practicable.

GROUP – A

(Multiple Choice Type Questions)

1. Choose the correct alternatives for any *ten* of the following :

10 × 1 = 10

- i) Polarization is not seen with sound, because the waves are
 - a) longitudinal
 - b) transverse
 - c) not electromagnetic waves
 - d) of long wavelength.

- ii) If monochromatic light falls on Young's double slit, the central fringe
 - a) disappears
 - b) is coloured
 - c) is white
 - d) changes position.

CS/B.OPTM/SEM-2/BO-201/2011



iii) Which of the following phenomena proves the transverse nature of light ?

- a) Dispersion
- b) Polarization
- c) Interference
- d) None of these.

iv) Light wave is

- a) a radio wave
- b) an elastic wave
- c) an electromagnetic wave.

v) In fraunhoffer diffraction, the incident wavefront is

- a) Plane
- b) Spherical
- c) Cylindrical
- d) None of these.

vi) Young's experiment establishes that

- a) light consists of wave
- b) light consists of particles
- c) light is neither particle nor wave
- d) light is both particle and wave.

vii) Polaroid glass is used in sunglasses because

- a) it reduces light intensity to half
- b) it is cheaper
- c) it has good colour
- d) it is fashionable.



- viii) Newton postulated his corpuscular theory on the basis of
- a) Newton's rings
 - b) Rectilinear propagation of light
 - c) Dispersion of white light into colours
 - d) Colour of thin film.
- ix) The transverse nature of light is shown by
- a) interference of light b) refraction of light
 - c) polarisation of light d) dispersion of light.
- x) Wavelength of a LASER beam can be used as a standard of
- a) Time b) Temperature
 - c) Angle d) Length.
- xi) Diffraction pattern is obtained from a wire. With the increase in the diameter of the wire, the fringe width
- a) decreases
 - b) increases
 - c) remain the same
 - d) first decreases, then increases.

GROUP – B

(Short Answer Type Questions)

Answer any *three* of the following.

3 × 5 = 15

2. Write short note on Hologram.
3. Write short note on Anti-reflection coating.
4. Write short note on Coherent sources.
5. How can you distinguish — Plane polarized, circularly polarized and unpolarised light from a light under test ?

CS/B.OPTM/SEM-2/BO-201/2011



GROUP – C

(Long Answer Type Questions)

Answer any *three* of the following. $3 \times 15 = 45$

6. Define wave front ? Compare between corpuscular theory and wave theory. State Huygens' principle. Obtain the laws of reflection of plane wave front at plane surface on the basis of wave theory of light. $2 + 3 + 2 + 8$
7. What are coherent sources of light ? Establish the relationship between phase difference and path difference. State the condition of permanent interference of light. Derive the condition for constructive & destructive interface from the analytical treatment of interference of light. $2 + 2 + 3 + 8$
8. Distinguish between plane, circular, elliptical polarization. Explain the construction and working of ruby laser. State Brewster's law. Find the angle of polarization of light for the material of RI 1.5. $5 + 6 + 2 + 2$
9. i) Explain the difference between Newton's rings formed by transmission & reflection, respectively.
- ii) State Brewster's law.
- iii) Given that the refractive index of water is 1.33 with respect to air, calculate the Brewster angle for light incident on
- a) water surface from air
- b) from inside the water.
- iv) Also find the angle of refraction in each cases when light is incident at the Brewster angle. $3 + 3 + 6 + 3$