Name :	
Roll No. :	A Description of Conductor
Invigilator's Signature :	

CS/B.Optm/SEM-2/BO-201/2013 2013 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.

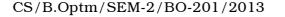
GROUP – A

(Multiple Choice Type Questions)

- 1. Choose the correct alternatives for any *ten* of the following : $10 \times 1 = 10$
 - i) Holography is an application field of
 - a) interference of light
 - b) diffraction of light
 - c) polarisation of light
 - d) refraction of light.
 - ii) Laser is a coherent source of light.
 - a) True
 - b) False.
 - iii) If the number of lines/cm of a grating increases, the resolving power of the grating
 - a) increases b) decreases
 - c) remains constant d) becomes zero.

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- iv) In Fraunhoffer diffraction the incident wavefront is
 - a) Plane b) Elliptical
 - c) Circular
- v) To demonstrate the phenomena of interference we require
 - a) 2 sources which emit radiation of nearly same frequency

d)

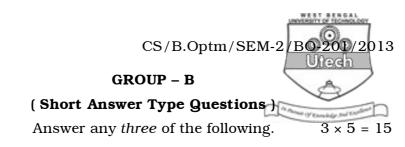
None of these.

- b) 2 sources which emit radiation of same frequency
- c) 2 sources which emit radiation of different wavelengths
- d) none of these.
- vi) For transmitted light the central Newton's ring is
 - a) dark b) bright
 - c) coloured d) none of these.
- vii) Young's double slit experiments are based on
 - a) division of wavefront b) division of amplitude
 - c) both (a) & (b) d) none of these.
- viii) In simple harmonic motion, kinetic energy of the particle is zero at mean position but still it crosses this point due to its
 - a) Momentum b) Potential energy
 - c) Inertia d) Restoring force.
- ix) Which of the following phenomena proves the transverse nature of light ?
 - a) Diffraction b) Polarization
 - c) Interference d) Dispersion.
- x) The *e*-ray in a crystal disobeys the laws of
 - a) reflection b) refraction
 - both (a) & (b) d) interference.
- xi) The characteristic of SHM

c)

- a) velocity is directly proportional to amplitude
- b) velocity is inversely proportional to amplitude
- c) acceleration directly proportional to amplitude
- d) both (b) & (c).

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- 2. a) What is hologram?
 - b) How can you reconstruct the image from a hologram ? 2 + 3
- 3. a) What is the difference between the fringe pattern produced by Lloyd's single mirror and Fresnel's bi-prism?
 - b) What do you mean by resolving power of an optical instrument ? 3 + 2
- 4. Compare between prism spectra and grating spectra.

5.	Distinguish between the following :	$2\frac{1}{2} + 2\frac{1}{2}$
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- a) Positive crystal and Negative crystal
- b) Interference and diffraction.

GROUP – C

(Long Answer Type Questions)

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

- 6. a) What is the full form of LASER ?
 - b) Explain the terms spontaneous emission, stimulated emission and spontaneous absorption.
 - c) Explain, the basic principles involved in laser action.
 - d) Describe Ruby laser. 1 + 3 + 5 + 6

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- 7. a) Compare between Corpuscular theory and wave theory of light.
 - b) Explain rectilinear propagation of light by corpuscular theory of light.
 - c) State Huygens principle. Obtain the laws of reflection
 (plane wavefront at plane surface) by wave theory of light.
 3 + 3 + 2 + 7
- 8. a) Define coherent sources of light.
 - b) Deduce the condition of constructive and destructive interference.
 - c) State the relation between path difference and phase difference.
 - d) In Young's double slit experiment the separation of the slits is 1.9 mm and the fringe spacing is 0.31 mm at a distance of 1 m from the slits. Calculate the wavelength of light. 2 + 8 + 2 + 3
- 9. a) Write the construction of nicol prism.
 - b) Write short notes on half wave and quarter wave retardation plate.
 - c) Write working of Ruby Laser.
 - d) State Brewster's law. Find the angle of polarization for the crown glass of refractive index 1.52.

4 + 4 + 3 + 2 + 2

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