

Roll No.

Total No. of Pages : 02

Total No. of Questions : 16

B.Sc.(Computer Science) (2013 & Onwards) (Sem.–3)

OPTICS

Subject Code : BCS-303

M.Code : 71775

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTION TO CANDIDATES:

1. **SECTION-A is COMPULSORY** consisting of **TEN** questions carrying **TWO** marks each.
2. **SECTION-B** contains **SIX** questions carrying **TEN** marks each and a student has to attempt any **FOUR** questions.

SECTION-A

Answer briefly:

- 1) The amplitude of light waves emerging from two slits in Young's experiment is in the ratio of 1: 2. Find the intensity ratio of the interference pattern.
- 2) Differentiate between interference by division of wavefront and by division of amplitude.
- 3) What are the conditions for the two sources to be coherent?
- 4) What should be the thickness of a non-reflecting layer to be deposited on glass surface corresponding to wavelength 6000 \AA ? Refractive index of the layer is 1.35.
- 5) Why do we prefer a convex lens of large radius of curvature for producing Newton's rings?
- 6) Why is diffraction of sound waves more evident in our daily life than that of light wave?
- 7) Compare the performance of zone plate with that of a converging lens.
- 8) Find the maximum number of orders available with a diffraction grating.
- 9) Explain plane of polarization and plane of vibration for plane polarized light.
- 10) When a beam of light is polarized, does its intensity vary?

SECTION-B

- 11) Find an expression for fringe width in case of Young's double slit experiment. Prove that in case of interference dark and bright bands are of equal width.
- 12) Prove that in Newton's rings experiment (a) diameter of dark rings are proportional to square root of natural integral numbers and (b) diameter of bright rings are proportional to square root of odd integral numbers.
- 13) How do you obtain localized fringes in Michelson's interferometer? How will you use Michelson's interferometer to determine the thickness and refractive index of thin transparent sheet?
- 14) What is a Zone plate? Show that the radii of its half period zones are proportional to the square root of natural numbers.
- 15) What is plane diffraction grating? Derive an expression for the resolving power of a plane diffraction grating.
- 16) On the basis of electromagnetic theory of light show that light incident on a transparent medium at Brewster's polarizing angle gives reflected and refracted rays at right angles to each other.

NOTE: Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.