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Total No. of Pages : 02

Total No. of Questions : 07

B.Sc.(CS) (2013 & Onwards) (Sem.-3)

OPTICS

Subject Code : BCS-303

Paper ID : [A3137]

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**1. Answer briefly :**

- a) In interference with white light fringe width of red coloured fringes is double than that of violet coloured. Why?
- b) Give the conditions to produce good interference fringes.
- c) Distance between two slits is 0.1 mm and the width of the fringes formed on the screen is 5 mm. if the distance between the screen and the slit is one metre calculate the wavelength of light used.
- d) Discuss the applications of Michelson Interferometer.
- e) Why camera lenses are coated with thin film of magnesium fluoride?
- f) What is the radius of first zone of a zone plate of focal length 0.2 m for a light of wavelength 5000\AA ?
- g) Why is diffraction of sound waves more evident in our daily life than that of light wave?
- h) Why X-rays cannot be diffracted by ordinary diffraction grating?
- i) State and explain Malus law.
- j) Define Resolving power.

SECTION-B

2. Explain the effect of introducing a thin plate of glass in the path of one of the interfering beams in biprism experiment. Calculate the displacement of fringes. Show how the method can be used for finding the refractive index, thickness of the plate and wavelength of light used .
3. Discuss the formation of Newton's rings by reflected light. Describe the experimental arrangement and give necessary theory. What are Newton's rings circular?
4. Describe the principle, construction and working of Michelson Interferometer. Explain how circular fringes are produced in Michelson Interferometer.
5. Explain the meaning of Fresnel's half period zones. Why are they so called? What is the phase difference between wavelets from successive half period zones? What are the factors on which the amplitude of light waves from a half period zone at the observation point depend?
6. What is plane diffraction grating? Define grating element. Derive the conditions for secondary maxima and secondary minima.
7. Explain how the state of polarization of given beam of light can be determined with the help of nicol prism and quarter wave plate.