M 6390

Reg. No. : .....

Name : .....

IV Semester B.Sc. Degree (CCSS – Regular/Supple./Improv.) Examination, May 2014
CORE COURSE IN PHYSICS
4B04 PHY : Optics (2012 Admn.)

Time: 3 Hours Max. Weightage : 30

SECTION – A

(Choose the correct answer; **Each** bunch carries weightage of **1**.)

1. i) To obtain sustained interference pattern, we require two sources called
   a) Non coherent sources b) Coherent sources
   c) Ordinary sources d) None of the above
   ii) The centre of the Newton's rings in the reflected system is usually
   a) Dark b) Bright
   c) Partially bright d) None of the above
   iii) Interference fringes of equal thickness is called
   a) Haidingers fringes b) Fizeau's fringes
   c) Chromatic fringes d) None of the above
   iv) Nodal points are two points on the axis such that the relative angular magnification is
   a) Zero b) Unity
   c) Greater than unity d) None of the above

2. i) The transverse nature of light is shown by
   a) Interference b) Dispersion c) Polarization d) None of the above
   ii) When an ink dot made on a paper is seen through a calcite crystal, how many images are seen ?
   a) Two images b) One image c) No image d) None of the above

iii) A phase difference of 180° of equal to

a) Half a wavelength b) Quarter to a wavelength

c) One wavelength d) None of the above

iv) The grating law is

a) $\sin\theta = Nn\lambda$ b) $\tan\theta = \mu$

c) $\sin\theta = n\lambda$ d) None of the above **(2×1=2 Wt.)**

SECTION – B

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

3. State and explain the superposition principle.
4. What are the fringes of equal inclination ? Why they are called so ?
5. Why Newton's rings are circular in shape ?
6. What are the unit planes ?
7. Calculate the system matrix for a lens placed in air and made of glass of refractive index 1.5 and radii of curvature 50 cm each.
8. Can sound waves be polarized ?
9. Explain absent spectra.
10. What is meant by Rayleigh's criterion ? **(6×1=6 Wt.)**

SECTION – C

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

11. Derive an expression for system matrix.
12. Give an account of the colours in thin films.
13. Explain the principle of Michelson's interferometer.

14. A glass wedge of an angle 0.01 radian is illuminated by monochromatic light of wavelength 6000 Å falling normally on it. At what distance from the edge of the wedge will be 10^{th} fringe be observed by reflected light ?
15. Distinguish between interference and diffraction.
16. What is grating ? How is it made ?
17. Write a short note on Fraunhofer diffraction.
18. Find with respect to a point 50 cm, distant, for wavelength 500 nm, how many half period zones are contained in a circular hole of radius 1 mm.
19. What is a Polaroid ? Mention its uses.
20. What is half wave plate ? Why is it called so ?
21. Explain the optical activity of a substance.
22. Draw the intensity distribution curve for the diffraction obtained by a single slit. **(9×2=18 Wt.)**

SECTION – D

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

23. Describe with necessary theory the phenomenon of diffraction at a straight edge.
24. Define resolving power. Derive an expression for the resolving power of a prism. How will you increase the resolving power of a prism ? **(1×4=4 Wt.)**

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