

Roll No. _____

[Total No. of Pages : 2

SIVS 200 A-2K12
B.Sc. IVth Semester Degree Examination
Physics
Optics and Relativity
Paper - IV

Time : 3 Hours

Maximum Marks : 80

Instructions to Candidates:

- 1) Answer **all** questions from **section-A**.
- 2) Answer any **five** questions from **section-B** and **four** from **section-C**.

Section - A

I. Answer the following in **one or **two** sentences. (15×1=15)**

1. What is rest mass of photon?
2. Name the property of light which quantum theory cannot explain.
3. Mention a method to Produce Coherent sources.
4. Write any one use of Michelson's Interferometer.
5. What is Biprism?
6. What is Grating element?
7. Write equation for Resolving power of grating.
8. Which type of wave cannot be polarized?
9. Define optic axis in a crystal.
10. What is circularly Polarized light?
11. What are cardinal points in a lens system?
12. What is chromatic aberration?
13. Define non inertial frame of reference.
14. What is World line (Geodesic)?
15. Give an example for conversion of energy into mass.

Section - B

II. Answer any five (5×5=25)

16. State Huygen's principle, verify law of reflection for plane wave front using Huygen's principle.

17. Describe young's double slit Experiment.
18. Compare Fresnel's and Fraunhofer diffraction.
19. Explain Interference at thin film due to reflected light.
20. Give comparison between zone plate and converging lens.
21. Write a note on Huygen's eye piece.
22. Discuss negative results of Michelson - Morley Experiment.

Section - C

III. Answer any four

(4×10=40)

23. a) With relevant theory explain Newton's rings experiment to determine radius of curvature of lens. (7)
b) Determine the radius of curvature of a given planoconvex lens in Newton's ring experiment when it is exposed to the light of wavelength 5800 AU where diameter of 5th and 25th rings are 1.1 mm and 2.5 mm respectively. (3)
24. a) What is zone plate? Describe construction and working of zone plate. (7)
b) What is radius of First Zone in zone plate of focal length 50 cms for the light of wavelength 5000 AU (3)
25. a) Explain Fresnel's theory of optical activity. (6)
b) How quarter wave plate is used to distinguish.
i) Un polarized light and circularly polarized light?
ii) Partially polarized light and Elliptically polarized light? (4)
26. a) What is achromatisation? Derive equation for achromatisation when lenses are separated by distance. (6)
b) Two lenses of dispersive power 0.024 and 0.048 are used in the manufacture of an achromatic objective of focal length 100 cms. Calculate the focal length of lenses. (4)
27. a) Derive Lorents transformation equation. (7)
b) Find velocity at which length of rod appears half of its original value. (3)
28. a) State the postulates of special theory of relativity. (2)
b) Derive the concept of time dilation to show that no body can travel with velocity greater than or equal too velocity of light. (8)