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SIVS 184 A-2K13

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 B and four from C

Section - A

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

1) What is speed of photon.
2) Name the property of light, which quantum theory explains.
3) What is Bi-Prism.
4) Write an use of Michelson's Intereferometer
5) Define R.P. of Grating.
6) What is Quarter Wave Plate.
7) What is Babinets Compensator
8) What is abberation of Lens.
9) Define Inertial frame.
10) What is Grating Element.
11) What is polarimeter.
12) Write an expression for R.P. of Telescope.
13) Write an Importance of Michelson-Morely experiment.
14) Give an example of conversion of mass into Energy.
15) What is world point.

Section - B

II. Answer any **five**. **(5×5 =25)**

16) State Huygen's Principle, verify law of reflection for plane wave front.

17) Define and Explain relation between phase velocity and group velocity.

18) What are co-herent sources. Mention conditions for sustained interference

19) Compare Fresual's and Fraun hoffer diffraction.

20) Write a note on Minkowaski - space

21) State and Prove Brewesters law.

22) Write a note on Ramsden eye-piece.

Section - C

III. Answer any **four**. **(4×10 =40)**

23) a) Describe with relevant theory an experiment to determine diameter of thin wire forming air- wedge.

b) A wedge shaped air film of length 5 cm is illuminated with light of wave length 5800 A° If the fringe width is 0.01mm. Calculate diameter of wire? **(7+3)**

24) a) What is Zone-Plate? Describe construction and working of Zone-plate.

b) What is radius of second zone-plate of focal-length 16cm for light of wave length 5000A° **(8+2)**

25) How do you produce

a) Plane polarised light

b) Circularly polarised light.

c) Elliptically polarized light

Calculate specific rotation of solution of length 20cm with concentration 50% rotating plane of polarisation by 10°. **(8+2)**

26) What are Cardinal points in lens system. Explain? What is spherical abberation? How do you minimize it. **(10)**

27) Derive Lorentz's transformation equation? A rod of 1 metre long moving with velocity of 0.6C. Calculate its length as it appears to observer. **(8+2)**

28) a) State the postulates of special theory of relativity.

b) Derive concept of time-dilation to show that nobody can travel with velocity greater or equal to velocity of light. **(2+8)**
