M 6389

Reg. No. : .....

Name : .....

IV Semester B.Sc. Degree (CCSS – Regular/Supple./Improv.) Examination, May 2014
CORE COURSE IN PHYSICS
4B04 PHY (Optics) (2011 and Earlier Admn.)

Time : 3 Hours Max. Weightage : 30

***Instruction** : Given in the question paper.*

SECTION – A

Choose the correct answer. **Each** bunch carries a weightage of **1** :

1. i) Interference in thin films is due to
   a) Diffraction b) Interference c) Dispersion d) None of the above
   ii) The colours seen in the peacock's feathers are due to
   a) Polarization b) Scattering of light
   c) Interference d) None of the above
   iii) Interference fringes of equal inclination is called
   a) Haidingers fringes b) Fizeau's fringes
   c) Chromatic fringes d) None of the above
   iv) The phenomenon of diffraction of light was discovered by
   a) Newton b) Huygens c) Grimaldi d) None of the above

2. i) Polarization of light proves the
   a) Particle nature of light b) Longitudinal nature of light
   c) Transverse nature of light d) None of the above
   ii) By Malu's law
   a) $I = I_0\cos^2\theta$ b) $I = I_0^2\cos^2\theta$
   c) $I^2 = I_0\cos^2\theta$ d) None of the above

P.T.O.

iii) A path difference of half a wavelength is equal to

a) 180° phase difference b) 90° phase difference

c) 270° phase difference d) None of the above

iv) When an isotropic substance of high refractive index is placed in a strong magnetic field, it becomes optically active temporarily. This property is

a) Faraday effect b) Compton effect

c) Photoelectric effect d) None of the above **(2×1=2)**

SECTION – B

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

3. What are the coherent sources ? Give two examples.
4. Give the classifications of fringes exhibited by a thin film.
5. What is meant by diffraction of light ?
6. Write down the system matrix for two thin lenses.
7. What are half period zones ? Why are they called so ?
8. Define the optic axis of a crystal.
9. What is dichroism ?
10. What is optical activity ? **(6×1=6)**

SECTION – C

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

11. Derive an expression for the effective focal length of two thin lenses separated by a distance by matrix method.
12. Explain the colour of thin film.

13. Briefly explain the principle of Michelson's interferometer.
14. What type of fringes are seen in an air wedge ? Why ?
15. Distinguish between Fresnel and Fraunhofer diffraction.
16. Compare prism spectra and grating spectra.
17. Define resolving power of grating.
18. Find the radius of the first half period zone on a zone plate, behaving like a convex lens of focal length 60 cm. (λ =6000 Å)
19. What is a Polaroid ? Mention its uses.
20. What is quarter wave plate ? Why is it called so ?
21. Briefly explain the optical activity of a substance.
22. Write a short note on Kerr effect. **(9×2=18)**

SECTION – D

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

23. What are Newton's rings ? How are they obtained ? Derive an expression for the diameter of the rings, and how it is used find the wavelength of light.
24. Give an account of the phenomenon and the related theory of diffraction due to a straight edge. **(1×4=4)**

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