Progressive Education Society's
Modern College of Arts, Science & Commerce Ganeshkhind, Pune – 16
(Autonomous)
End Semester Examination: April 2024
Faculty: Science and Technology

Program: B.Sc. Code (Gen03) **Semester: IV** **SET: B**
Program (Specific): General B.Sc. **Course Type: Core course**
Class: S.Y.B. Sc. (Gen) **Max. Marks: 35**
Name of the Course: Optics
Course Code: 23-PHY-242 **Time: 2Hr**
Paper: II

Instructions to the candidate:

1) ***There are 4 sections in the question paper. Write each section on separate page.***
2) ***All Sections are compulsory.***
3) ***Figures to the right indicate full marks.***
4) ***Draw a well labeled diagram wherever necessary.***
5) ***Use of calculator and log table is allowed.***

SECTION: A

Q1) Answer the following (<u>any 5</u>) **5**

i) State Lens Maker's with significance of each term.
ii) What is the condition of achromatism for two thin coaxial lenses separated by a distance?
iii) What is Rayleigh's criterion?
iv) Why Newton's rings are circular?
v) What is the polarizing angle if critical angle for a light ray in glass is 40^0?
vi) Why Huygen's eyepiece is called negative eyepiece?
vii) What is the radius of curvature of a plane glass plate?

SECTION: B

Q2) Answer the following (<u>any 5</u>) **10**

i) Explain what do you understand by total internal reflection.
ii) In an eyepiece, generally why the field lens is larger in diameter, while eye lens is small?

iii) Draw ray diagram for longitudinal chromatic aberration.

iv) Two thin lenses of focal lengths 10 cm and 6 cm are placed co-axially at a certain distance apart. Calculate the distance between the lenses if these lenses form an achromatic combination.

v) A converging lens of power 25 D is used as a simple microscope. Calculate the magnifying power, if the distance of distinct vision is 25 cm.

vi) What is plane diffraction grating? Define grating element.

vii) Glass plate is to be used as a polarizer. Find the angle of polarization for it. Also find the angle of refraction if R.I. for glass is 1.54.

SECTION: C

Q3) Answer the following (<u>any 4</u>) **12**

i) What is an equivalent lens?

Two thin convex lenses having focal lengths 15 cm and 30 cm are placed coaxially 20 cm apart. Find the equivalent focal length of the system.

ii) Define magnifying power of a simple microscope. Draw ray diagram for the simple microscope.

iii) Distinguish between interference and diffraction.

iv) What is Fraunhoffer's diffraction? Explain with a ray diagram.

v) Describe the phenomenon of double refraction in uniaxial crystals.

vi) Write a note on 'Nicol prism'.

SECTION: D

Q4) Answer the following (<u>any 2</u>) **8**

i) With the help of a neat ray diagram, derive an expression for optical path difference for interference due to refracted (Transmitted) light.

ii) Write a short note on Rayleigh's criterion for resolution.

iii) What is distortion? Explain the two types of distortion.

iv) Draw a ray diagram to show image formation in compound microscope. Obtain an expression for its magnifying power.

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