Seat Number

Nov-2015

कांजी - 032

PHYSICS PAPER - II : PHY- 242
Optics (24126)

P. Pages : 3

Time : Two Hours

Max. Marks : 40

Instructions to Candidates :

1. Do not write anything on question paper except Seat No.
2. Graph or diagram should be drawn with the black ink pen being used for writing paper or black HB pencil.
3. Students should note, no supplement will be provided.
4. All questions are compulsory.
5. Draw neat diagram wherever necessary.
6. Figures to the right indicates full marks.
7. Use of logarithmic table or electronic calculator is allowed.

1. Attempt any **eight** of the following. 8

i) Longitudinal Chromatic aberration is equal to -------- multiplied by mean focal length.

a) Dispersive power b) Resolving power
c) Concentrating power d) None of the above

ii) The condition for constructive interference is path difference equal to----------

a) $(2n+1)\lambda/2$ b) $n\lambda$
c) $(2n-1)\lambda$ d) $\frac{3n\lambda}{2}$

iiii) If V_e is velocity of an extra - ordinary light and V_o is velocity of an ordinary light in positive crystal then which of the following relation is correct.

a) $V_e < V_o$ b) $V_o \leq V_e$
c) $V_o = V_e$ d) $V_o < V_e$

iv) The spherical aberration produced by a convex lens is-------

a) Negative b) Positive
c) Infinite d) None of the above

v) Newton's rings are fringes of ----------
   a) Equal thickness b) Equal inclination
   c) Unequal thickness d) None of the above

vi) The property of a substance to rotate plane of vibration is called --------
   a) Radioactivity b) Superconductivity
   c) Optical activity d) None of the above

vii) An arrangement consisting of a large number of equidistant parallel slits of the same width is called---------
   a) Interference b) Diffraction
   c) Diffraction grating d) None of the above.

viii) Correct path difference in case of Interference due to reflected light for thin film is---------
   a) $x = 2\mu t\cos r - \lambda/2$ b) $x = 2\mu t\sin r$
   c) $x = 2\mu t\cos r + \lambda/2$ d) $x = 2\mu t\cos r - \lambda$

ix) In Fraunhoffer type of diffraction a source of light and the screen must be at a --------- distances from the diffracting obstacles.
   a) Finite b) Equal
   c) Infinite d) None of the above

x) In Michelson interferometer two mirrors M_1 and M_2 are perfectly-------
   a) Parallel b) Perpendicular
   c) Inclined d) Matched

2. Attempt **any four** of the following. 8

i) What do you mean by aberration? Give the names of different aberrations.

ii) On which principle interference in Newton's ring experiment is based?

iii) What is the Expression for the area of a half period Zone?

iv) Write an expression for minimum visibility (V_{min}). What will be its value for two interfering beams with equal intensities?

v) Define the term unpolarized light.

vi) Define power of a lens and give its unit.

3. Attempt **any two** of the following. 8

i) Discuss the phase change on reflection of light on the basis of stokes treatment.

ii) Distinguish between Fresnel's and Fraunhoffer's type diffraction.

iii) Explain polarization by reflection.

4. a) Attempt **any two** of the following. 6

i) Discuss plane polarized light and circularly polarized light

ii) A parallel beam of light is incident normally on a plane transmission grating having 4000 lines per cm. If the second order spectral line is observed at an angle of 30° calculate the wavelength of the line

iii) Explain any two methods of minimizing the spherical aberration.

b) Define specific rotation. 2

5. a) Attempt **any one** of the following. 6

i) Give construction and theory of plane transmission diffraction grating. Obtain grating equation.

ii) What is interference? What are coherent sources? Obtain an expression for the intensity distribution in the interference pattern for constructive and destructive interference.

b) What is Achromatic doublet? Explain 2

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