

Seat Number

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April 2015



खडक - 071

PHYSICS PAPER - II (NEW) : 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 right indicates full marks.
7. Use of logarithmic table or electronic calculator is allowed.

1. Attempt any eight of the following.

8

- i) Power of lens is
 - a) Inversely proportional to f
 - b) Directly proportional to f
 - c) Independent of f
 - d) None of the above
- ii) Deviation produced in violet rays by lens is
 - a) Greater than red colour
 - b) Less than red colour
 - c) Equal to blue colour
 - d) Greather than blue colour
- iii) Newton's ring's are rings of
 - a) Equal inclination
 - b) Equal thickness
 - c) Enequal thickness
 - d) None of the above

- iv) The condition for constructive interference is
- Path difference equal to $(2n+1) \frac{\lambda}{2}$
 - Path diff. is equal to $n\lambda$
 - Path difference equal to $(2n-1) \lambda$
 - Path diff. is equal to $\frac{3n\lambda}{2}$
- v) Bending of the ray's at the edges or corner of the obstacle is called.....
- Polarization
 - Interference
 - Diffraction
 - Retraction
- vi) Thickness of the half wave plate is given by.....
- $t = \frac{\lambda}{2(\mu_o - \mu_e)}$
 - $t = \frac{2\lambda}{2(\mu_o - \mu_e)}$
 - $\frac{\lambda}{(\mu_o - \mu_e)}$
 - $2(\mu_o - \mu_e)$
- vii) The property of a substance to rotate plane of a vibration is called.....
- Optical activity
 - Radioactivity
 - Superconductivity
 - None of the above
- viii) Velocity of ordinary ray's in positive crystals is than extraordinary ray's.
- Less
 - Greater
 - Equal
 - Very Very less
- ix) In Newton's ring expt wavelength of light (λ) is given by.....
- $\lambda = \frac{D_m^2 - D_n^2}{4(m-n)R}$
 - $\lambda = \frac{D_m^2 + D_n^2}{4(m-n)R}$
 - $\frac{D_m^2 - D_n^2}{2(m-n)R}$
 - $\lambda = \frac{D_m^2 + D_n^2}{(m-n)R}$
- x) In Fraunhofer's type of diffraction the source of light and the screen must be at a distances from the diffracting obstacles.
- Finite
 - Equal
 - Infinite
 - None of the above

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

8

- Define power of a lens. Give its unit.
- State principle of Michelson interferometer.
- Define Diffraction.

- d) What is optical activity ?
- e) Write the formula for determination of wavelength in case of Newton's rings.
- f) A grating has 15000 lines per inch. What is the grating element ?
3. Attempt any two of the following. 8
- a) In a Michelson interferometer 200 triangles cross the field of view when the movable mirror is displaced through 0.0589 mm. Calculate the wavelength of monochromatic light used.
- b) Describe double retraction in a uniaxial crystal.
- c) Show that the area of half period zone is equal to $\pi b\lambda$.
4. a) Attempt any two of the following. 6
- i) Explain polarization by reflection.
- ii) Explain any two methods of minimizing the spherical aberration.
- iii) Describe intensity distribution due to a single slit in Fraunhofer diffraction.
- b) State different types of aberrations. 2
5. a) Obtain the condition for destructive interference in a thin wedge shaped film. 6

OR

Give principle and working of polarimeter with suitable diagram.

- b) What is the shape of the Fringes obtained in a wedge - shaped film ? 2
