

Oct-2012

Seat Number

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कदंब - 069

**PHYSICS PAPER - II : PHY-242**

**Optics**

**(New) (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. Answer sheet should be written with black ink only. Graph or diagram should be drawn with the same pen being used for writing paper or black HB pencil.
3. Students should note, no supplement will be provided.
4. All questions are compulsory and carry equal marks. Figures to the right indicates full marks.
5. Draw neat diagrams wherever necessary.
6. Use of logarithmic table or electronic calculator is allowed.

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

**8**

- i) The unit of power of lens is .....
  - a) Meter
  - b) Diopter
  - c) Candela
  - d) Watt
- ii) The condition for achromatism of two thin lenses of different materials separated by a finite distance is .....
  - a)  $\frac{1}{f} = \frac{1}{f_1} + \frac{1}{f_2} - \frac{d}{f_1 f_2}$
  - b)  $\frac{w_1}{f_1} + \frac{w_2}{f_2} = 0$
  - c)  $d = \frac{w_1 f_2 + w_2 f_1}{w_1 + w_2}$
  - d)  $d = \frac{f_1 + f_2}{2}$
- iii) Interferometer works on the principle of .....
  - a) Diffraction
  - b) Polarization
  - c) Rectilinear propagation
  - d) Interference
- iv) Interference in Newton's rings experiment takes place by .....
  - a) Division of amplitude
  - b) Division of wave front
  - c) Change of path
  - d) None of the above







- f) Calculate the power of combination of two thin lenses each of focal length 10 cm and placed 10 cm apart.

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

- Explain phase change on reflection using stokes treatment.
- Explain rectilinear propagation of light.
- Give the construction and theory of Half wave plate.

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

- State the types of fringes in Michelson interferometer. Explain the formation of circular fringes.
- Explain positive type of crystal.
- Explain plane polarized light and circularly polarized light.

b) State any two applications of Michelson interferometer. 2

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

- Define resolving power of grating. Describe with suitable diagram.

- Two thin lenses of focal lengths  $f_1$  and  $f_2$  are separated by a distance  $d$ . Prove that the focal length of combination 'f' is given by

$$\frac{1}{f} = \frac{1}{f_1} + \frac{1}{f_2} - \frac{d}{f_1 f_2}.$$

b) Define achromatism. State the condition for achromatism of two thin lenses of focal length  $f_1$  and  $f_2$  and having dispersive powers  $w_1$  and  $w_2$  respectively. 2

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