

- Instructions:** i) All the answers must be in the same order.  
ii) Scientific calculators are allowed.

## Section-A

Answer all the questions

5x1M=5M

1. The path difference between two interfering waves at a point (say Q) is  $\lambda/6$ . The ratio of intensity at Q and intensity at the central maximum (O) is  
(a)  $3/4$  (b)  $1/4$  (c)  $1/5$  (d)  $1/6$
2. If the tube length of astronomical telescope is 105 cm and magnification is 20 for normal adjustment. Find the focal length of the objective.  
(a) 100 cm (b) 10 cm (c) 20 cm (d) 25 cm
3. The angle of minimum deviation ( $D_m$ ) for an equilateral glass prism is  $30^\circ$ . Refractive index of the prism is -----.
4. The lens used to correct astigmatism \_\_\_\_\_  
(a) Bi - convex lens (b) Bi-concave lens (c) Bi-focal lens (d) cylindrical lens
5. Two charges of equal magnitude and at a distance 'r' exert a force F on each other. If the charges are halved and distance between them is doubled, then the new force acting on each charge is  
(a)  $F/8$  (b)  $F/4$  (c)  $4F$  (d)  $F/16$

## Section-B

Answer any two questions

2x5M= 10M

6. (a) Draw a neat labeled diagram of a Compound microscope and derive expression for total magnification. [3M]  
(b) The near point of a Hypermetropia person is 75 cm from the eye. What is the power of the lens required? [2M]
7. (a) Describe Young's Double slit experiment. Determine (a) positions of bright and dark fringes and hence (b) fringe width. [3M]  
(b) A parallel beam of light of wavelength 500 nm falls on a narrow slit and the resulting diffraction pattern is observed on a screen at 1m away. The first minima is at a distance of 2.5 mm from the centre of the screen. Find width of the slit. [2M]
8. (a) State (i) Coulomb's law (ii) Malus' Law (iii) Brewster's law. [3M]  
(b) Assume that light of wavelength  $6000 \text{ \AA}$  is coming from a star. What is limit of resolution of a telescope whose objective has a diameter of 100 inch? [2M]