

## **Impetus Learning**

## PART COMPLETION TEST

## Class 12 - Physics

## Time Allowed: 1 hour and 30 minutes

**Maximum Marks: 40** 

The refractive index of glass is  $1 \cdot 520$  for red light and  $1 \cdot 525$  for blue light.  $\delta_1$  and  $\delta_2$  be angles of minimum 1. deviation for red and blue light respectively in a prism of this glass, then

a) 
$$\delta_1=\delta_2$$

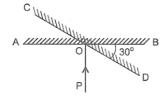
b) 
$$\delta_1 < \delta_2$$

c)  $\delta_1$  can be less than or greater than  $\delta_2$ ,

d) 
$$\delta_1 > \delta_2$$

depending upon the values of  $\delta_1$  and  $\delta_2$ .

2. Figure shows PO as the ray of light incident normally on the mirror AB. The mirror is then turned through 30° to [1] the position CD. What will be the angle between the incident ray and the reflected ray?

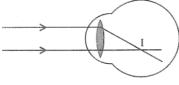


a) 120°

c) 15°

d) 60°

3. In the figure, the image is formed of retina. The eye has: [1]



Human eye

a) myopia

b) colour blindness

c) hypermetropia

d) astigmatism

The graph drawn with object distance along abscissa & image as ordinate for a convex lens is 4.

[1]

a) straight

b) circle

c) rectangular hyperbola

d) parabola

5. An equi-convex crown glass lens has a focal length 20 cm for violet rays. Here  $\mu_{
m v}=1.5~\&~\mu_{
m r}=1.47$  . Its [1] focal length for red rays is

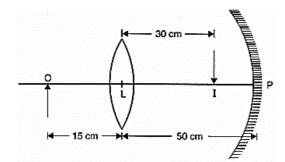
a) 24.85 cm

b) 20.82 cm

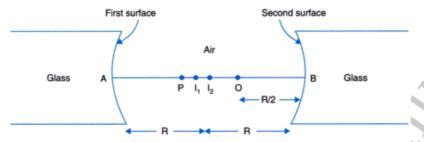
c) 21.28 cm

d) 22.85 cm

6. The direct image formed by the lens (f = 10 cm) of an object placed at O, and that formed after reflection from [2] the spherical mirror are formed at same point O. What is the radius of curvature of the mirror?



- 7. At what angle should a ray of light be incident on the face of a prism of refracting angle 60° so that it just suffers [3] total internal reflection at the other face? The refractive index of the material of the prism is 1.524
- 8. Two concave glass refracting surfaces, each with radius of curvature R = 35 cm and refractive index  $\mu = 1.5$ , [3] are placed facing each other in air as shown in figure. A point object O is placed at a distance of R/2 from one of the surfaces as shown. Find the separation between the images of O formed by each refracting surface.



- 9. Find the two possible positions of an object kept in front of a lens of +5.0 D, so that the image formed in both cases is four times magnified. [3]
- 10. Read the source given below and answer the following questions:

A prism is a portion of a transparent medium bounded by two plane faces inclined to each other at a suitable angle. A ray of light suffers two refractions on passing through a prism and hence deviates through a certain angle from its original path. The angle of deviation of a prism is,  $\delta = (\mu - 1)A$ , through which a ray deviates on passing through a thin prism of small refracting angle A.

If  $\mu$  is refractive index of the material of the prism, then prism formula is,  $\mu=rac{\sin(A+\delta_m)/2}{\sin A/2}$ 

- i. For which colour, angle of deviation is minimum?
  - a. Red
  - b. Yellow
  - c. Violet
  - d. Blue
- ii. When white light moves through vacuum
  - a. all colours have same speed
  - b. different colours have different speeds
  - c. violet has more speed than red
  - d. red has more speed than violet.
- iii. The deviation through a prism is maximum when angle of incidence is
  - a. 45°
  - b. 70°
  - c. 90°
  - d. 60°

[5]

	1.644).	
	a. 3.864°	
	b. 4.595°	
	c. 7.259°	
	d. 1.252°	
	v. A ray of light falling at an angle of 50° is refracted through a prism and suffers minimum deviation. If the	
	angle of prism is 60°, then the angle of minimum deviation is	
	a. 45°	
	b. 75°	
	c. 50°	
	d. 40°	
11.	In a Young's double slit experimental arrangement shown here, if a mica sheet of thickness t and refractive index	[1]
	$\mu$ is placed infront of the slit $S_1$ , then the path difference ( $S_1P$ - $S_2P$ ):	
	S <sub>1</sub>	
	31	
	82	
	Slit Screen	
	a) decreases by $(\mu$ - 1)t b) increases by $\mu$ t	
	c) does not change d) increases by $(\mu$ - 1)t	
12.	The idea of secondary wavelets for the propagation of a wave was first given by:	[1]
	a) Newton b) Maxwell	
	c) Fresnel d) Huygens	
13.	The refractive index of glass with respect to water is 1.125. If the speed of light in water is $2.25 \times 10^8$ ms <sup>-1</sup> then	[2]
	calculate the speed of light in glass.	
14.	A beam of light consisting of two wavelengths 600 nm and 500 nm is used in a Young's double slit experiment.	[3]
	The slit separation is 1.0 mm and the screen is kept 0.60 m away from the plane of the slits. Calculate:	
	a. the distance of the second bright fringe from the central maximum for wavelength 500 nm, and	
	b. the least distance from the central maximum where the bright fringes due to both the wavelengths coincide.	
15.	White light is incident on a soap film at an angle of $\sin^{-1} \frac{4}{5}$ and the reflected light on examination by the	[3]
	spectroscope shows dark bands. The consecutive dark bands correspond to wavelengths 6100 $\overset{\circ}{A}$ and 6000 $\overset{\circ}{A}$ . If	
	the refractive index of the film is $\frac{4}{3}$ , calculate its thickness.	
16.	<b>Assertion (A):</b> Coloured spectrum is seen when we look through a muslin cloth.	[1]
	<b>Reason (R):</b> It is due to the diffraction of white light on passing through fine slits.	
	a) Both A and R are true and R is the correct b) Both A and R are true but R is not the	
	explanation of A. correct explanation of A.	
. =-	c) A is true but R is false.  d) A is false but R is true.	[1]
17.	<b>Assertion (A):</b> To observe diffraction of light, the size of the obstacle/aperture should be of the order of 10 <sup>-7</sup> m.	[1]
	<b>Reason (R):</b> 10 <sup>-7</sup> is the order of the wavelength of visible light.	

iv. What is the deviation produced by a prism of angle  $6^{\circ}$ ? (Refractive index of the material of the prism is

a) Both A and R are true and R is the correct b) Both A and R are true but R is not the explanation of A. correct explanation of A. c) A is true but R is false. d) A is false but R is true. 18. **Assertion (A):** We cannot get a diffraction patterns from a wide slit illuminated by monochromatic light. [1] **Reason (R):** In the diffraction pattern, all the bright bands are not of the same intensity. a) Both A and R are true and R is the correct b) Both A and R are true but R is not the explanation of A. correct explanation of A. c) A is true but R is false. d) A is false but R is true. Sketch a graph between the frequency of incident radiations and stopping potential for a given photosensitive 19. [3] material. What information can be obtained from the value of intercept on the potential axis? A source of light of frequency greater than the threshold frequency is placed at a distance of 1 m from the cathode of a photo-cell. The stopping potential is found to be V. If the distance of the light source from the cathode is reduced, explain giving reasons, what change will you observe in the i. photoelectric current, ii. stopping potential? Draw the graph showing the variation of photoelectric current with anode potential of a photocell for 20. [3] 1. the same frequencies but different intensities  $I_3 > I_2 > I_1$  of incident radiation, and 2. the same intensity but different frequencies  $\nu_1>\nu_2>\nu_3$  of incident radiation.