Worksheet for Term 1
Grade 10-Physics (2023-24)

Choose the correct answer:

1) An object is placed at a distance of 40cm in front of a concave mirror of a focal length of 20 cm.The image produced is:

   (a) virtual and inverted

   (b) real and erect

   (c) real, inverted and of the opposite size as that of the object

   (d) real, inverted and of the same size as that of the object

   Answer: Option (d)

2) Image formed by a convex spherical mirror is:

   (a) virtual

   (b) real

   (c) enlarged

   (d) inverted

   Answer: Option (a)

3) **Which of the following can make a parallel beam of light from a point source incident on it?**

   (a) Concave mirror as well as convex lens

   (b) Convex mirror as well as concave lens

(c) Two plane mirrors placed at 90degree to each other

(d) Concave mirror as well as concave lens

Answer: Option (a)

4) When light rays enter the eye, most of the refraction occurs at the

(a) Crystalline lens

(b) The outer surface of the cornea

(c) Iris

(d) Pupil

Answer: Option (b)

5) When white light enters a glass prism from the air, the angle of deviation is least for

(a) blue light

(b) yellow light

(c) violet light

(d) red light

Answer: Option (d)

Following questions consist of two statements – Assertion (A) and Reason (R). Answer these questions selecting the appropriate option given below:

(a) Both A and R are true and R is the correct explanation of A.

(b) Both A and R are true but R is not the correct explanation of A.

(c) A is true but R is false.

(d) A is false but R is true.

6) **Assertion(A) :** White light is dispersed into its seven-colour components by a prism.

Reason (R) : Different colours of light bend through different angles with respect to the incident ray as they pass through a prism.

Answer: Option (a)

7) **Assertion(A):** Hypermetropia is the defect of the eye in which only farther objects are seen.

Reason (R) : Hypermetropia is corrected by using converging lens.

Answer: Option (b)

8) **Assertion (A) :** Light does not travel in the same direction in all the media.

Reason (R) : The speed of light does not change as it enters from one transparent medium to another.

Answer: Option (c)

9) **Assertion(A) :** A ray of light travelling from a rarer medium to a denser medium slows down and bends away from the normal. When it travels from a denser medium to a rarer medium, it speeds up and bends towards the normal.

Reason (R) : The speed of light is higher in a rarer medium than a denser medium.

Answer: Option (d)

10) **Assertion (A) :** A ray passing through the centre of curvature of a concave mirror after reflection, is reflected back along the same path.

Reason (R) : The incident rays fall on the mirror along the normal to the reflecting surface.

Answer: Option (a)

11) (i) Write the laws of refraction.

(ii)Light enters from air to glass, having a refractive index 1.50. What is the speed of light in the glass? The speed of light in vacuum is 3 x 10^8 m/s.

12) A concave mirror produces three times magnified (enlarged) real image of an object placed at 10 cm in front of it. Where is the image located ?

Solution:

Because the image is real, so magnification m must be negative.

$$m = \frac{h'}{h} = -\frac{v}{u} = -3 \quad \text{or} \quad v = 3u$$

But $u = -10$ cm

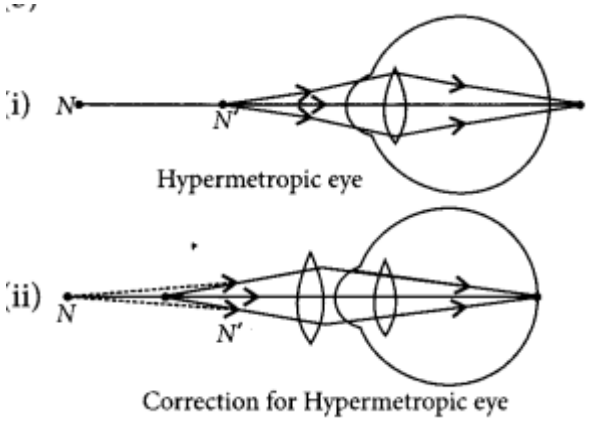
Therefore, $m = \frac{-v}{u} \Rightarrow -3 = \frac{-v}{-10}$

$\therefore$ $v = \mathbf{-30\ cm}$.

Thus the image is located at a distance of 30 cm from the mirror on the object side of the mirror.

13) If the image formed by a mirror for all positions of the object placed in front of it is always virtual and diminished, state the type of the mirror. Draw any ray diagram in support of your answer.

14) (a) List two causes of hypermetropia.
(b) Draw ray diagrams showing (i) a hypermetropic eye and (ii) its correction using suitable optical device. (2020)
Answer:
(a) Hypermetropia is caused due to following reasons:
(i) Shortening of the eyeball
(ii) Focal length of crystalline lens is too long.



15) A spherical mirror produces a magnification of -1 on a screen placed at a distance of 50 cm from the mirror.

(i)Write the type of the mirror

(ii)Find the distance of the image from the object

(iii)What is the focal length of the mirror?

(iv)Draw the diagram to show the image formation in this case.