CLASS 8 PHYSICS CHAPTER – 5 LIGHT ENERGY EXERCISE SOLUTIONS

Test Your Understanding [Page No. 79]

Questions : Write T for True and F for False statements.

1. Ray of light refracted into the other medium through the boundary is known as refracted ray.
Answer : True

2. The perpendicular drawn at the point of incidence on the boundary is called the normal.
Answer : True

3. Snell's Law is named after the physicist Willebrord Snelliu.
Answer : True

4. A medium which allows the ray of light to pass through it is known as transparent medium.
Answer : True

5. When a ray of light enters an optically medium, it is deviated away from normal.
Answer : False

6. A light ray moving into air from water will bend towards the normal.
Answer : False

Test Your Understanding [Page No. 90]

Question : Write T for True and F for False statements.

1. The geometrical centre of a spherical mirror is called focus.
Answer : False

2. A concave mirror always produces virtual images.
Answer : False

3. The mirror that has the silvered concave surface is called concave mirror.
Answer : True

4. Principal axis is an imaginary line that passes through the centre of curvature and pole of the spherical mirror.
Answer : True

5. The distance between pole and centre of curvature is called the focal length.
Answer : False

6. If an object is placed in between 'C' and 'F', in front of a concave mirror, the image is formed beyond C.
Answer : True

EXERCISES
[OBJECTIVE TYPES QUESTIONS]

A. Choose the correct option :

1. Which of the following is correct when a ray of light travels from an optically denser medium to rarer medium?
Answer : (a) It deviates away from normal

2. The point at which the incident ray touches the boundary separating the two media is known as :
Answer : (a) point of incidence

3. What is the speed of light?
Answer : (b) 3×10^8 ms^{-1}

4. Upright and magnified image will be formed, when the
Answer : (b) Object is located in front of F

5. Convex mirror is used in
Answer : (b) mirror of vehicle

6. The point at which the principal axis touches the surface of the mirror
Answer : (b) pole

7. The light after falling on an object, gets reflected and enters our……
Answer : (a) eyes

8. Which of the following is not a colour component of a rainbow?
Answer : (b) Grey

9. Convex mirrors form this type of image(s).
Answer : (b) Virtual

10. Which of the following performed the experiments to show that white light consists of seven colours,
Answer : (a) Newton

11. How many colours are there in the white light?
Answer : (b) Seven

B. Fill in the blanks :

1. According to law of refraction, incident ray, refracted ray and the normal to the refracting surface all lie on……plane.
Answer : same

2. When white light splits into a band of seven colours on a screen it is called a……
Answer : dispersion

3. Bouncing off of light in all directions after falling on an object is called……..
Answer : reflection

4. ……..is a phenomenon which happens when a ray of light passes from one transparent medium to another.
Answer : Refraction

5. A rainbow in the sky is a result of dispersion of light by the drops of water which act like……..
Answer : prism

6. ……..diagram is helpful to know the size, location and the type of image that is formed by a mirror.
Answer : Ray

7. ……..mirror can be used to see a much larger area than the area covered by a plane mirror.
Answer : Convex

8. In astronomical telescopes, a larger…… mirror is used to collect light from objects like stars and planets.
Answer : concave

C. Write T for True and F for False statements.

1. We don't need light to see things.
Answer : False

2. Refraction can take place in the same media if the densities of different layers vary.
Answer : True

3. Our eyes help us to see world around.
Answer : True

4. The outer surface of the spoon is known as the concave surface.
Answer : True

5. The point on the principal axis which is equidistant from all points on the reflecting surface of the mirror is called radius of curvature.
Answer : True

6. White light is a mixture of seven colours.
Answer : True

7. Virtual images are formed in locations where light rays do not actually meet.
Answer : True

8. In astonomical telescopes, a larger concave mirror is used to collect light from objects like stars and planets.
Answer : True

9. Doctors use convex mirror reflectors to produce a parallel beam of light for examining body parts such as eyes, ears, nose and throat.
Answer : False

D. Match the following :

1. Newton's disc	a. A form of invisible energy
2. Concave mirror	b. Can be obtained on a screen
3. Light	c. Convex and concave mirror
4. Spherical mirror	d. Cannot be obtained on a screen
5. Convex mirror	e. Mirror with inner curved surface
6. Real image	f. Mirror with outer curved surface
7. Virtual image	g. Light is having seven colours.

Answer : 1 – (g), 2 – (e), 3 – (a), 4 – (c), 5 – (f), 6 – (b), 7 – (d)

E. Answer the following questions in short.

1. Write any two applications of spherical mirrors.
Answer : (i) A concave mirror is used as the reflector in search lights, head lights of motor vehicles, solar cookers, torches and in table lamps.
(ii) A convex mirror is used in automobiles such as scooters, trucks and buses as rear view mirror to see the traffic behind the vehicle.

2. What is centre of curvature?
Answer : Centre of curvature is the centre of sphere of which the spherical mirror is a part. It is commonly denoted by the letter 'C'.

3. Define focal length.
Answer : The distance between the focus 'F' and the pole 'P' of a curved mirror is called focal length.

4. What type of image is obtained in real images?
Answer : The image which can be obtained on a screen is called a real image.

5. What is meant by white light dispersion?
Answer : The splitting of white light into its seven constituent colours.

6. Write the order of colours that appear in a rainbow.
Answer : The seven colours are Violet (Y), Indigo (I), Blue (B), Green (G), Yellow (Y), Orange (O) and Rted (R). They are collectively known as VIBGYOR.

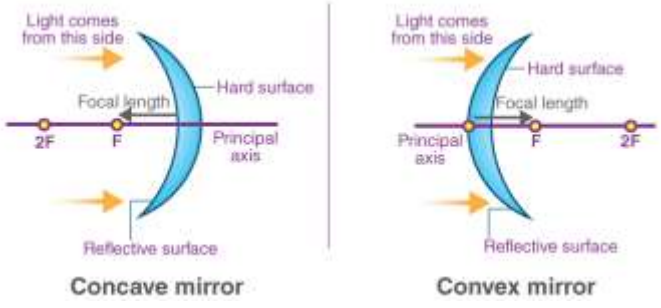
7. Explain refraction of light.
Answer : The phenomenon of bending of a ray of light when it travels from one transparent medium to another.

8. What are the different types of spherical mirrors?
Answer : There are two types of spherical mirrors –
(i) Concave mirror
(ii) Convex mirror

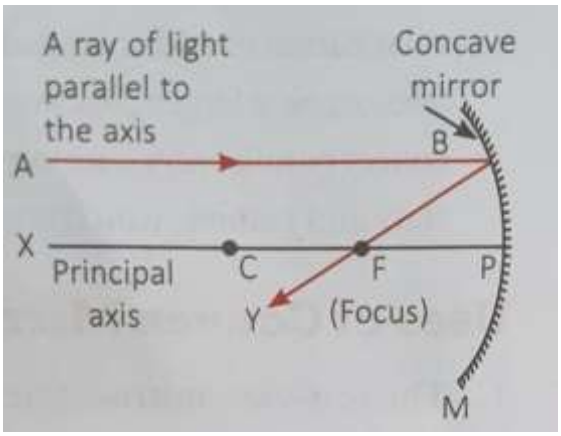
F. Answer the following questions in detail.

1. What is spectrum and dispersion of light?
Answer : Spectrum : When white light passes through a prism, it disperses into a band of seven different colours. This band of colours obtained from the dispersion of light is called a spectrum. Dispersion of light in a prism results in the formation of a spectrum.
Dispersion of light : The splitting of white light into its seven constituent colours.

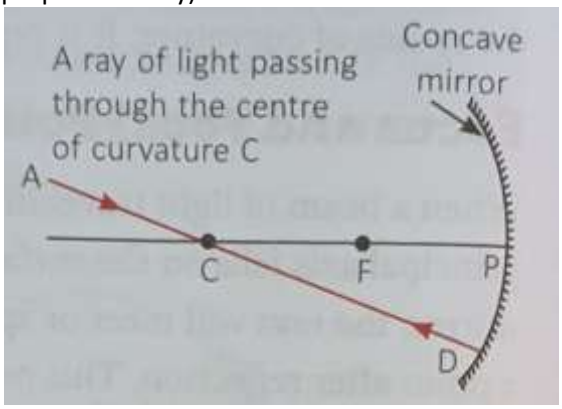
2. Write a note on spherical mirrors.
Answer : Spherical mirrors are the part of glass sphere whose inner or outer side is polished and non-reflecting. Most of the curved mirror is a spherical mirror.If the reflecting surface of a spherical mirror is concave,it is called a concave mirror. If the reflecting surface is convex,then it is a convex mirror.



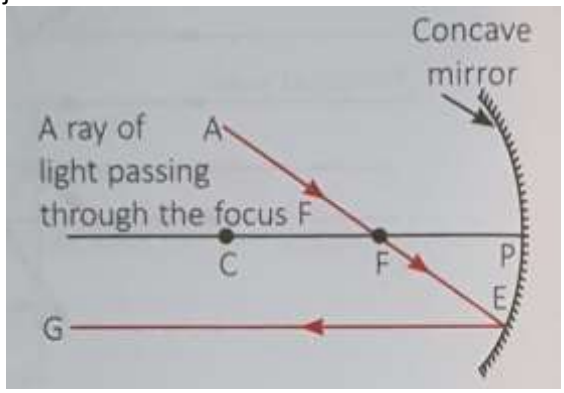
3. What are the rules of drawing ray diagram of spherical mirror?
Answer : Rules for drawing ray diagram of spherical mirrors are :
Rule 1 : A ray of light which is parallel to the principal axis of a concave mirror, passes through its focus after reflection from the mirror.



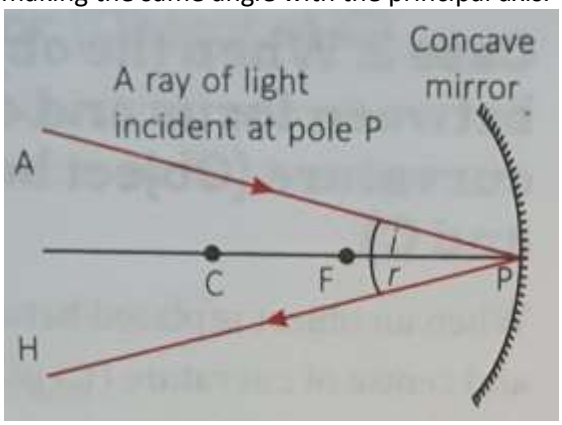
Rule 2 : A ray of light passing through the centre of curvature of a concave mirror is reflected back along the same path (because it strikes the mirror normally or perpendicularly).



Rule 3 : A ray of light passing through the focus of a concave mirror becomes parallel to the principal axis after reflection. This rule is just the reverse case of the first rule.



Rule 4 : A ray of light which is incident at the pole of a concave mirror is reflected back making the same angle with the principal axis.



4. How real image is different from virtual image?
Answer : A real image occurs where rays converge, whereas a virtual image occurs where rays only appear to diverge. Real images can be produced by concave mirrors and converging lenses, only if the object is placed further away from the mirror/lens than the focal point, and this real image is inverted.

5. What do you understand by refractive index? Explain with an example.
Answer : When a ray of light suffers refraction at the boundary separating two media, the ratio of sine of angle of incidence to sine of angle of refraction is called the refractive index for the second medium with respect to the first medium.
For example : The refractive index of glass with respect to air is nearly 1.5. Thus, the speed of light in glass is approximately 23 times of that in air.

6. Write the uses of concave and convex mirrors.
Answer : Uses of Concave Mirror :
(i) Concave mirror are used in headlights of motor vehicles, torches and in lighthouses to produce parallel beam of light.
(ii) Concave mirrors are also used as shaving mirrors.
(iii) Concave mirrors are also used by dentists to observe the teeth of patients as they give an enlarged view. Doctors also use concave mirror reflectors to examine eyes, ears and throat.

Uses of Convex Mirrors :

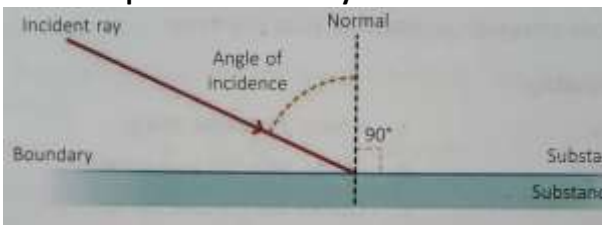
(i) The rear-view mirrors fitted on the sides of a vehicle help the driver to see the vehicles approaching from behind. These mirrors are convex mirrors.

(ii) In shopping complexes and large shops to keep an eye on customers and shoplifters if any. They are also called anti-theft mirrors.

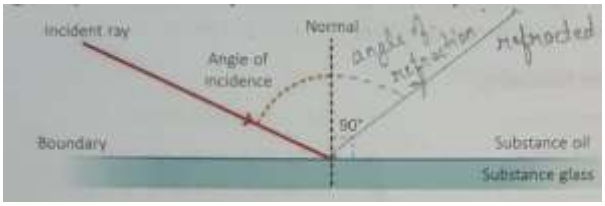
(iii) In street lamps, it is used to diverge the light over a wide area.

Picture-Based Questions

Look at the given picture carefully and draw the subsequent refracted ray.



Answer :



Application-based Questions

1. Why does ksy at sunset and sunrise appear to be orange-red coloured?

Answer : Because red cololur has longest wavelength in visible spectrum.

2. If we pass a monochromatic ray of light through a prism, will it undergo dispersion and split into constituent colours?

Answer : No, it will not disperse because it's a beam of single wavelength.

WORKSHEET

Complete the table for the images formed by a concave mirror.

Position of Object	Position of Image	Size of Image	Nature of Image
Within focus (between pole P and focus F)	Behind the mirror	Enlarged	Virtual and erect
At focus	At infinity	Highly enlarged	Real and inverted
Between F and C	Beyond C	Enlarged	Real and inverted
At C	At C	Equal to object	Real and inverted
Beyond C	Between F and C	Diminished	Real and inverted
At infinity	At focus F	Highly diminished	Real and inverted