



# PHYSICS

## BOOKS - S CHAND PHYSICS (HINGLISH)

### REFLECTION OF LIGHT

#### Solved Examples

1. The radius of curvature of a spherical mirror is 20 cm. What is its focal length?

A.  $10\text{cm}$

B.  $20\text{cm}$

C.  $40\text{cm}$

D.  $80\text{cm}$

**Answer: A**



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2. The image formed by a concave mirror is seen to be virtual, erect and larger than the object. The position of the object must then

be :

(i) between the focus and curvature.

(ii) at the centre of curvature.

(iii) beyond the centre of curvature.

(iv) between the pole of the mirror and its focus.

Choose the correct alternative.



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**3.** A concave mirror has a focal length of 10 cm.

Where should an object be placed in front

of this concave mirror so as to obtain an image which is real, inverted and same size as the object ?



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4. An object is placed at the following distances from a concave mirror of focal length 10 cm:

(a) 8 cm (b) 15 cm (c) 20 cm (d) 25 cm

Which position of the object will produce :

? (i) a diminished real image ?



(ii) a magnified real image ?

(iii) a magnified virtual image ?

(iv) an image of the same size as the object ?



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**5.** Find the size, nature and position of image formed by a concave mirror, when an object of size 1 cm is placed at a distance of 15 cm. Given focal length of mirror is 10 cm.



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6. An object  $2\text{cm}$  high is placed at a distance of  $16\text{cm}$  from a concave mirror, which produces a real image  $3\text{cm}$  high. What is the focal length of the mirror ? Find the position of the image ?



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7. A concave mirror produces three times magnified real image of an object placed at  $10\text{ cm}$  in front of it. Where is the image located ?



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8. The magnification produced by a plane mirror is  $+1$ . What does this mean ?



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9. What is the nature of the image formed by a concave mirror if the magnification produced by the mirror is  $+3$  ?



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10. What is the nature of the image formed by a concave mirror if the magnification produced by the mirror is , - 0.75 ?



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## Exercise

1. Which spherical mirror has a real focus and which one has a virtual focus ?



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2. Out of convex mirror and concave mirror, whose focus is situated behind the mirror ?



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3. Find the focal length of a concave mirror whose radius of curvature is 32 cm.



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4. If the focal length of a convex mirror is 25 cm, what is its radius of curvature ?



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5. Fill in the following blanks with suitable words.

(a) Parallele rays of light are reflected by a concave mirror to a point called the.....

(b) The focal length of a concave mirror is the distance from the .....to the mirror.

( c) A concave mirror.....rays of light  
wheres a convex mirror.....rays of light.

(d) For a convex mirror, parallel rays of light  
appear to diverge from a point called the  
.....



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6. What is a spherical mirror, ? Distinguish  
between a concave mirror and a convex mirror.



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7. Name the two types of spherical mirrors.

What type of mirror is represented by the :

(a) back side of a shining steel spoon ?

(b) front side of a shining steel spoon ?



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8. What is the relation between the focal length and radius of curvature of a spherical mirror (concave mirror or convex mirror ) ?

Calculate the focal length of a spherical mirror whose radius of curvature is 25 cm.





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9. Explain with a suitable diagram, how a concave mirror converges a parallel beam of light rays. Mark clearly the pole, focus and centre of curvature of concave mirror in this diagram.



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**10.** Describe with a suitable diagram, how a convex mirror diverges a parallel beam of light rays. Mark clearly the pole, focus and centre of curvature of convex mirror in this diagram.



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**11.** Define (a) centre of curvature (b) radius of curvature (c) pole (d) principal axis, and (e) aperture, of a spherical mirror with the help of a labelled diagram.





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12. In a convex spherical mirror, reflection of light takes place at :

- A. a flat surface
- B. a bent-in surface
- C. a bulging-out surface
- D. an uneven surface

**Answer: C**



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**13.** A diverging mirror is :

- A. a plane mirror
- B. a convex mirror
- C. a convace mirror
- D. a shaving mirror

**Answer: B**



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**14.** If  $R$  is the radius of curvature of a spherical mirror and  $f$  is its length, then :

A.  $R = f$

B.  $R = 2f$

C.  $r = \frac{f}{2}$

D.  $R = 3f$

**Answer: B**



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**15.** The focal length of a spherical mirror of radius of curvature 30 cm is:

A. 10 cm

B. 15 cm

C. 20 cm

D. 30 cm

**Answer: B**



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**16.** If the focal length of a spherical mirror is 12.5 less cm, its radius of curvature will be :

A. 25 cm

B. 15 cm

C. 20 cm

D. 35 cm

**Answer: A**



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17. A communications satellite in orbit sends a parallel beam of signals down to earth. If these signals obey the same laws of reflections as light and are to be focussed onto a small receiving aerial, what should be the best shape of the metal 'dish' used to collect them ?



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**18.** When a spherical mirror is held towards the sun and its sharp image is formed on a piece of carbon paper for some time, a hole is burnt in the carbon paper.

(a) What is the nature of spherical mirror ?

(b) Why is a hole burnt in the carbon paper ?

(c) At which point of the spherical mirror the carbon paper is placed ?

(d) What name is given to the distance between spherical mirror and carbon paper ?

(e) What is the advantage of using a carbon paper rather than a white paper ?



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**19.** For what position of an object, a concave mirror forms a real image equal in size to the object?



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**20.** Where should an object be placed in front of the mirror so as to obtain its virtual, erect and magnified image ?



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**21.** Where should an object be held so that a concave mirror forms a real, inverted and magnified image ?



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**22.** An object is placed at the focus of a concave lens. Where will be image ?



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**23.** Where is the image formed when an object is at large distance from a concave mirror?



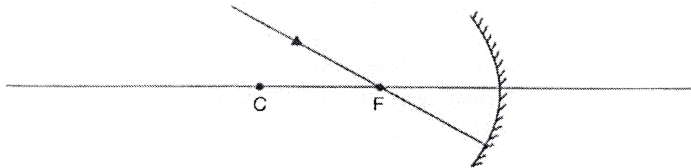
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**24.** For what position of an object, a real and diminished image is formed by a concave mirror ?



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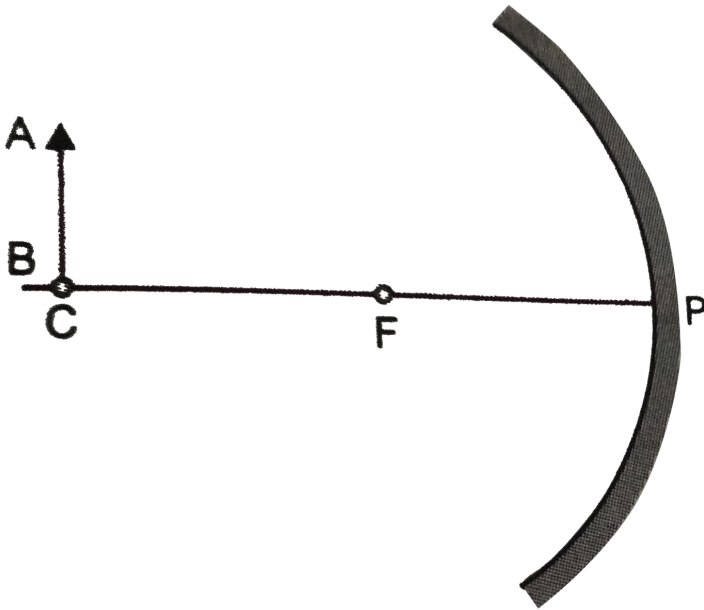
**25.** Copy this figure in your answer book and show the direction of the light ray after ray after reflection :



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**26.** Draw Fig. in your answer book and show the formation of image with the help of

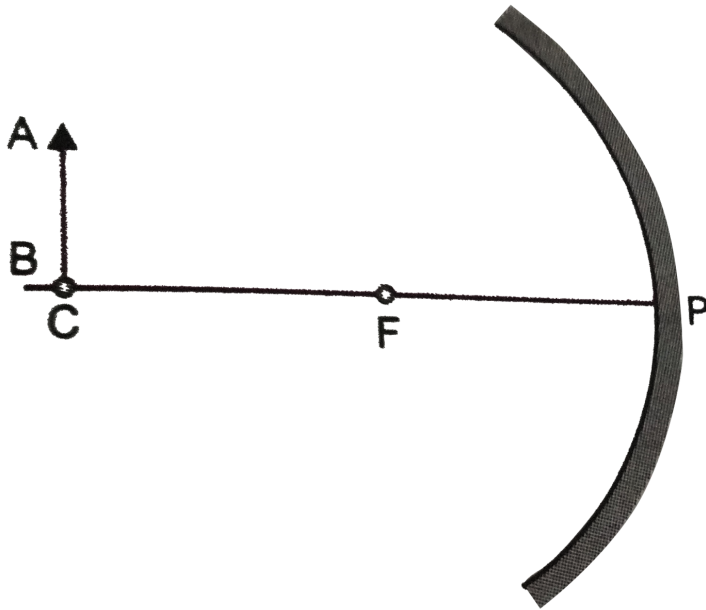
suitable rays.



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**27.** Draw Fig. in your answer book and show the formation of image with the help of

suitable rays.



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**28.** Which type of mirror could be used as a dentist's mirror ?



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**29.** The mirror used for the head light of a car is



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**30.** Explain why, a ray of light passing through the centre of curvature of a convex mirror gets reflected back along the same path.



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**31.** What is the minimum number of rays required for locating the image formed by a concave mirror for an object ? Draw a ray diagram to show the formation of a virtual image by a concave mirror.



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**32.** With the help of a ray diagram, determine the position, nature and size of the image

formed of an object placed at the centre of curvature of a concave mirror.



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**33.** Describe with the help of a diagram, the nature, size and position of the image formed when an object is placed beyond the centre of curvature of a concave mirror.



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**34.** If an object is placed at a distance of 8 cm from a concave mirror of focal length 10 cm, discuss the nature of the image formed by drawing the ray diagram.



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**35.** Draw a ray diagram showing how a concave mirror can be used to produce a real, inverted and diminished image of an object.



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**36.** Which mirror is used as a torch reflector ?

Draw a labelled diagram to show how a torch reflector can be used to produce a parallel beam of light. Where is the bulb placed in relation to the torch reflector ?



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**37.** State where an object must be placed so that the image formed by a concave mirror is :

(a) erect and virtual.

(b) at infinity.

( c) the same size as the object.



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**38.** With the help of a labelled ray diagram, describe how a converging mirror can be used to give an enlarged upright image of a object.



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**39.** Make labelled ray diagrams to illustrate the formation of :

(a) a real image by a converging mirror.

(b) a virtual image by a converging mirror.

Mark clearly the pole, focus, centre of curvature and object in each case.



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**40.** Which type of mirror is used in a solar furnace ? Support your answer with reason.





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**41.** Name the type of mirror used by dentists.

How does it help ?



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**42.** Which property of concave mirror is utilized for using them as shaving mirrors ?



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**43.** Give two uses of concave mirrors. Explain why you would choose concave mirrors for these uses.



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**44.** (a) Draw ray-diagrams to show the formation of images when the object is placed in front of a concave mirror (converging mirror) :

(i) between its pole and focus

(ii) between its centre of curvature and focus



Describe the nature, size and position of the image formed in each case.

(b) State one use of concave mirror based on the formation of image as in case (i) above.



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**45.** The real image formed by a concave mirror is larger than the object when the object is :

A. at a distance equal to radius of curvature

- B. at a distance less than the focal length
- C. between focus and centre of curvature
- D. at a distance greater than radius of curvature

**Answer: C**



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**46.** The real image formed by a concave mirror is smaller than the object if the object is :

A. between centre of curvature and focus

B. at a distance greater than radius of curvature

C. at a distance equal to radius of curvature

D. at a distance equal to focal length

**Answer: B**



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**47.** The image formed by a concave mirror is virtual, erect and magnified. The position of object is :

A. at focus

B. between focus and centre of curvature

C. at pole

D. between pole and focus

**Answer: D**



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**48.** The image formed by a concave mirror is real, inverted and of the same size as the object. The position of the object must then be :

A. at the focus

B. between the centre of curvature and focus

C. at the centre of curvature

D. beyond the centre of curvature

**Answer: C**



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**49.** The image formed by a concave mirror is real, inverted and highly diminished (much smaller than the object ). The object must be :

- A. between pole and focus
- B. at focus
- C. at the centre of curvature
- D. at infinity

**Answer: D**



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**50.** The angle of incidence for a ray of light passing through the centre of curvature of a concave mirror is :

A.  $45^\circ$

B.  $90^\circ$

C.  $0^\circ$

D.  $180^\circ$

**Answer: C**



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**51.** In the concave reflector of a torch, the bulb is placed :

- A. between the pole and focus of reflector
- B. at the focus of reflector
- C. between focus and centre of curvature of reflector



D. at the centre of curvature of reflector

**Answer: B**



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**52.** The focal length of a small concave mirror is 2.5 cm. In order to use this concave mirror as a dentist's mirror, the distance of tooth from the mirror should be :

A. 2.5 cm

B. 1.5 cm

C. 4.5 cm

D. 3.5 cm

**Answer: B**



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**53.** An object is 100 mm in front of a concave mirror which produces an upright image (erect image). The radius of curvature of the mirror is :

- A. less than 100 mm
- B. between 100 mm and 200 mm
- C. exactly 200 mm
- D. more than 200 mm

**Answer: D**



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**54.** A virtual, erect and magnified image of an object is to be produced with a concave mirror of focal length 12 cm. Which of the following

object distance should be chosen for this purpose ?

(i) 10 cm

(ii) 15 cm

(iii) 20 cm

Given reasons for your choice.

A. N/A

B. N/A

C. N/A

D. N/A

**Answer: 10 cm; Because it is less than focal**

length



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**55.** A concave mirror has a focal length of 25 cm. At which of the following distance should a person hold his face from this concave mirror so that it may act as a shaving mirror ?

(a) 45 cm

(b) 20 cm

25 cm

(c) 25 cm

(d) 30 cm

Give reason for your choice.

A. N/A

B. N/A

C. N/A

D. N/A

**Answer: 20 cm**



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**56.** An object is placed at the following distances from a concave mirror of focal length 15 cm, turn by turn :

(a) 35 cm

(b) 30 cm

( c) 20 cm

(d) 10 cm

Which position of the object will produce :

A. a magnified real image ?

B. a magnified virtual image ?

C. a diminished real image ?

D. an image of same size as the object ?

**Answer:**



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**57.** According to the "New Cartesian Sign Convention" for mirrors, when sign has been given to the focal length of :

(i) a concave mirror ?

(ii) a convex mirror ?



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**58.** Which type of mirror has :

(a) positive focal length ?

(ii) negative focal length ?



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**59.** What is the nature of a mirror having a focal length of, +10 cm ?



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**60.** What kind of mirror can have a focal length of, -20 cm ?



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**61.** In case of spherical mirrors, all distances are measured from..... .



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**62.** What sign (+ve or -ve) has been given to the following on the basis of Cartesian Sign

Convention ?

(a) Height of a real image .

(b) Height of a virtual image.



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**63.** Sign Convention



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**64.** Giving reasons, the 'signs' (positive or negative) which can be given to the following :

(a) object distance

(b) image distances

( c) image distances

(u) for a concave mirror or convex mirror

(v) for a concave mirror (v) for a convex mirror



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## **65. Sign Convention**

A. focal length of concave mirror is positive

and that of convex mirror is negative

B. focal length of the both concave and convex mirrors is positive

C. focal length of both concave and convex mirrors is negative and that of convex mirror is positive

D. focal length of concave mirror is negative and that of convex mirror is positive

**Answer: D**



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**66.** One of the following does not apply to a concave mirror. This is :

A. focal length is negative

B. image distance can be positive or negative

C. image distance is always positive

D. height of image can be positive or negative

**Answer: C**



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**67.** If a magnification of, -1 (minus one) is to be obtained by using a converging mirror, then the object has to be placed :

- A. (a) between pole and focus
- B. (b) at the centre of curvature
- C. (c) beyond the centre of curvature
- D. (d) at infinity

**Answer: A**



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**68.** In order to obtain a magnification of,  $-0.6$  (minus 0.6 ) with a concave mirror, the object must be placed :

- A. at the focus
- B. between pole and focus
- C. between focus and centre of curvature
- D. beyond the centre of curvature



**Answer: A**



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**69.** An object is placed at a large distance in front of a concave mirror of radius of curvature 40 cm. The image will be formed in front of the mirror at a distance of :

A. 20 cm

B. 30 cm

C. 40 cm

D. 50 cm

**Answer: A**



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**70.** Magnification produced by a rear view mirror fitted in vehicles

A. is equal to one

B. is less than one

C. is more than one

D. can be more or less than one depending  
on the position of object

**Answer: A**



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**71.** Between which two points of concave  
should an object be placed to obtain a  
magnification of :

(a) -3, (b) +2.5, (c ) -0.4



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**72.** At what distance from a concave mirror of focal length 10 cm should an object be placed so that :

(a) its real image is formed 20 cm from the mirror ?

(b) its virtual image is formed 20 cm from the mirror ?



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**73.** If a concave mirror has a focal 10 cm, find the two positions where an object can be placed to give, in each case, an image twice the height of the object .



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**74.** A mirror forms an image which is 30 cm from an object and twice its height.

(a) Where must the mirror be situated ?

What is the radius of curvature ?

( c ) Is the mirror convex or concave ?



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**75.** What type of image/images are formed by :

(a) a convex mirror ?

(b) a concave mirror ?



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**76.** Which mirror has a wider field of view ?



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**77.** If you want to see an enlarged image of your face, state whether you will use a concave mirror or a convex mirror ?



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**78.** Which mirror always produces a virtual, erect and diminished image of radius

curvature 30 cm. State the position of its image.



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**79.** An object is placed at a long distance in front of a convex mirror of radius of curvature 30 cm. State the position of its image.



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**80.** Name the spherical mirror which can produce a real and diminished image of an object.



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**81.** Name the spherical mirror which can produce a virtual and diminished image of an object.



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**82.** One wants to see a magnified image of an object in a mirror. What type of mirror should one use ?



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**83.** Name the mirror which can give :

(a) an erect and enlarged image of an object.

(b) an erect and diminished image of an object.



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**84.** What type of mirror could be used :

(a) as a shaving mirror ?

(b) as a shop security mirror ?



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**85.** Which type of mirror is usually used as a rear-view mirror in motor cars ?



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**86.** What kind of mirrors are used in big shopping centres to watch the activities of the customers ?



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**87.** A ray of light going towards the focus of a convex mirror becomes parallel to the principal axis after reflection from the mirror. Draw a labelled diagram to represent this situation.





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**88.** Fill in the following blank with a suitable word :

A ray of light which is parallel to the principal axis of a convex mirror, appears to be coming from.....after reflection from the mirror.



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**89.** Why does a driver prefer to use a convex mirror as a rear-view mirror in a vehicle ?



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**90.** Why can you not use a concave mirror as a rear-view mirror in vehicles ?



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**91.** Where would the image be formed by a convex mirror if the object is placed :

(a) between infinity and pole of the mirror ?

(b) at infinity ?

Draw labelled ray-diagrams to show the formation of image in both the cases.



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**92.** The shiny outer surface of a hollow sphere of aluminium of radius 50 cm is to be used as a mirror :

- (a) What will be the focal length this mirror ?
- (b) Which type be the focal length of this mirror ?

( c) State whether this spherical mirror will diverge of converge light rays.



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**93.** What is the advantage of using a convex mirror as a rear-view mirror in vehicles as compared to a plane mirror ? Illustrate your answer with the help of labelled diagrams.



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**94.** Can a convex mirror form a real image!

Explain.



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**95.** What would your image look like if you stood close to a large :

(a) convex mirror ?

(b) concave mirror ?

Give reasons for your answer.



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**96.** Which of the following are concave mirrors and which convex mirror ?

Shaving mirrors, Car headlight mirror, Searchlight mirror, Driving mirror, Dentist's inspection mirror, Torch mirror, Staircase mirror in a double-decker bus, Make-up mirror, Solar furnace mirror, Satellite TV dish, Shop security mirror.



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**97.** How will you distinguish between a plane mirror, a convex mirror and a concave mirror without touching them?

A. By varying the position of object and seeing its image

B. By seeing only one image of an object

C. By observing image of a candle kept at 15 cm

D. Cannot be identified without touching

**Answer: A**



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**98.** If the radius of curvature of a spherical mirror is 20 cm, what is its focal length ?



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**99.** (a) Draw a labelled ray diagram to show the formation of image in a convex mirror when the object is at infinity. Mark clearly the pole

and focus of the mirror in the diagram.

(b) State three characteristics of the image formed in this case.

( c) Draw diagram to show how a convex mirror can be used to give a large field of view.



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**100.** (a) Draw a labelled ray diagram to show the formation of image in a convex mirror when the object is at infinity. Mark clearly the pole and focus of the mirror in the diagram.

(b) State three characteristics of the image formed in this case.

( c) Draw diagram to show how a convex mirror can be used to give a large field of view.



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**101.** The image formed by a spherical mirror is virtual. The mirror will be.

A. concave

B. convex

C. either concave or convex

D. matallic

**Answer: A**



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**102.** Whatever be the position of the object, the image formed by a mirror is virtual, erect and smaller than the object. The mirror them must be :

A. plane

B. convcave

C. convex

D. either concave or convex

**Answer: C**



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**103.** The mirror used by a dentist to examine the teeth of a person is :



A. convex

B. concave

C. plane

D. any one of the above

**Answer: B**



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**104.** If the image formed is always virtual, the mirror can be :

A. concave or convex

B. concave or plane

C. convex or plane

D. only convex

**Answer: D**



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**105.** A concave mirror cannot be used as :

A. a magnifying mirror

B. a torch reflector

C. a dentist's mirror

D. a rear view mirror

**Answer: D**



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**106.** A boy is standing in front of and close to a special mirror. He find the image of his head bigger than normal, the middle part of his body of the same size, and his legs smaller

than normal. The special mirror is made up of three types of mirrors in the following order from top downwards:

A. Convex, Plane, Concave

B. Plane, Convex, Concave

C. Concave, Plane, Convex

D. Convex, Concave, Plane

**Answer: A**



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**107.** The mirror which can form a magnified image of an object is :

A. convex mirror

B. plane mirror

C. convace mirror

D. both convex and concave mirrors

**Answer: A**



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**108.** For what position of an object, a concave mirror forms a real image equal in size to the object?

A. convex

B. concave

C. plane

D. either concave or concave

**Answer: A**



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**109.** Consider two statements A and B given below :

A : real image is always inverted

B : virtual image is always erect

Out of these two statements :

A. only A is true

B. only B is true

C. both A and B are true

D. none is true

**Answer: C**

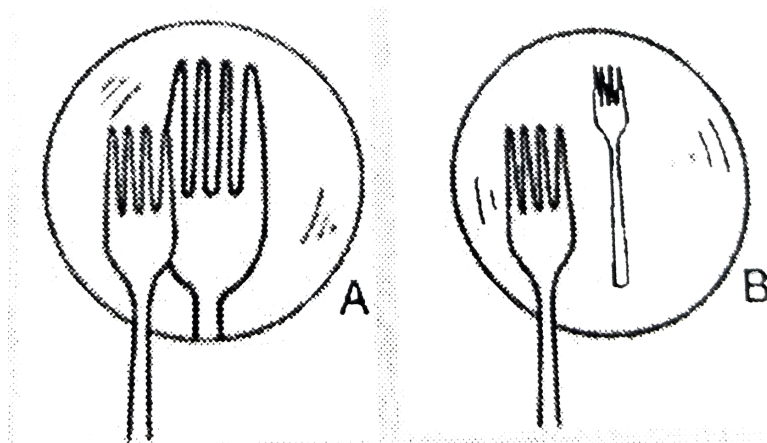


**110.** The diagrams show the appearance of a fork when placed in front of and closed to two mirrors A and B, turn by turn.

(a) Which mirror is convex ?

(b) Which mirror is concave ?

Give reasons for your choice.

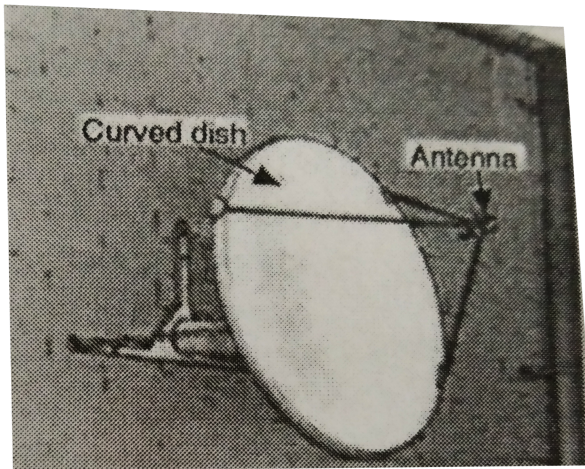






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**111.** The diagram shows a dish antenna which is used to receive television signals from a satellite. The antenna (signal detector) is fixed at the focus of the curved dish.



A. What is the purpose of the dish ?

B. Should it be concave or convex ?

C. Where should the antenna be positioned to receive the strongest possible signals ?

D. Explain what change you would expect in the signals if a larger dish was used.

**Answer: A**



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**112.** A man standing in front of a special mirror finds his image having a very small head, a fat body and legs of normal size, What is the shape of :

- (a) top part of the mirror ?
- (b) middle part of the mirror ?
- ( c) bottom reasons for your choice.

Give reasons for your choice.



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**113.** Two big mirrors A and B are fitted side by side on a wall. A man is standing at such a distance from the wall that he can see the erect image of his face in both the mirrors. When the man starts walking towards the mirrors, he finds that size of his face in mirror A goes on increasing but that in mirror B remains the same.

A. mirror A is concave and mirror B is convex

B. mirror A is plane and mirror B is concave

C. mirror A is concave and mirror B is plane

D. mirror A is convex and mirror B is  
concave

**Answer: C**



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**114.** An object is kept at a distance of 5 cm in front of a convex mirror of focal length 10 cm. Calculate the position and magnification of the image and state nature.



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**115.** An object is placed at a distance of 10 cm from a convex mirror of focal length 5 cm.

(i) Draw a ray-diagram showing the formation of image.

(ii) State two characteristics of the image formed.

(iii) Calculate the distance of the image from mirror.



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**116.** An object is placed at a distance of  $6\text{cm}$  from a convex mirror of focal length  $20\text{cm}$ . Locate the position and nature of the image.



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**117.** An object is placed  $20\text{ cm}$  in front of a mirror is found to have image  $15\text{ cm}$  (a) in front of it, (b) behind the mirror. Find the focal length of the mirror and the kind of mirror in each case.





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**118.** An arrow 2.5 cm high is placed at a distance of 25 cm from a diverging mirror of focal length 20 cm. Find the nature, position and size of the image formed.



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**119.** A convex mirror used for rear view on an automobile has a radius of curvature of 3.00 m. If a bus is located at 5.00 m from this



mirror, find the position, nature and magnification of the image.



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**120.** A diverging mirror of radius of curvature 40 cm forms an image which is half the height of the object. Find the object and image positions.



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**121.** The radius of curvature of a convex mirror used as a rear view mirror in a moving car is 2.0 m. A truck is coming from behind it at a distance of 3.5 m. Calculate (a) position, and (b) size, of the image relative to the size of the truck. What will be the nature of the image ?



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**122.** (a) Draw a diagram to represent a convex mirror. On this diagram mark principal axis,

principal focus F and the centre of curvature C

if the focal length of convex mirror is 3 cm.

(b) An object 1 cm tall is placed 30 cm in front of a convex mirror of focal length 20 cm. Find the size and position of the image formed by the convex mirror.



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**123.** A shop security mirror 5.0 m from certain items displayed in the shop produces one-tenth magnification.

(a) What is the type of mirror ?

(b) What is the radius of curvature of the mirror ?



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**124.** An object is placed 15 cm from (a) a converging mirror, and (b) a diverging mirror, of radius of curvature 20 cm. Calculate the image position and magnification in each case.



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**125.** An object 20 cm from a spherical mirror gives rise to a virtual image 15 cm behind the mirror. Determine the magnification of the image and the type of mirror used.



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**126.** Define the principal focus of a concave mirror.



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**127.** The radius of curvature of a spherical mirror is 20 cm. What is its focal length?



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**128.** Name a mirror that can give an erect and enlarged image of an object.



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**129.** If the radius of curvature of a spherical mirror is 20 cm, what is its focal length ?



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**130.** Find the focal length of a concave mirror whose radius of curvature is 32 cm.



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



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**132.** A ray of light travelling in air enters obliquely into water. Does the light ray bend towards the normal or away from the normal ?  
Why ?



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**133.** Light enters from air into a glass plate having refractive index 1.50. What is the speed of light in glass? The speed of light in vacuum is  $3 \times 10^8 \text{ ms}^{-1}$ .





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**134.** Find out from Table on page 225 the medium having highest optical density. Also find the medium with lowest optical density.



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**135.** You are given kerosene, turpentine and water. In which of these does the light travel fastest ?



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**136.** The refractive index of diamond is 2.42.

What is the meaning of this statement ?



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**137.** Define one diopetre of power of a lens.



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**138.** A convex lens forms a real and inverted image of a needle at a distance of  $50\text{cm}$  from it. Where is the needle placed in front of the convex lens if the image is equal to size of the object ? Also, find the power of the lens.



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**139.** Find the power of a concave lens of focal length  $2\text{m}$ .



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**140.** Which one of the following materials cannot be used to make a lens ?

A. water

B. glass

C. plastic

D. clay

**Answer: A**



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**141.** The image formed by a concave mirror is observed to be virtual, erect and larger than the object. Where should be the position of the object?

- A. between the principal focus and the centre of curvature
- B. at the centre of curvature
- C. beyond the centre of curvature
- D. between the pole of the mirror and its principal focus.

**Answer: A**



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**142.** Where should an object be placed in front of a convex lens to get a real to get real image of the size of the object ?

- A. at the principal
- B. at twice the focal length
- C. at infinity

D. between the optical centre of the lens  
its principal focus

**Answer: A**



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**143.** A spherical mirror and a thin spherical lens have each a focal length of  $-15\text{cm}$ . The mirror and lens are likely to be

A. both concave

B. both convex

C. the mirror is concave and the lens is convex

D. the mirror is convex but the lens is concave

**Answer: A**



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**144.** No matter how far you stand from a spherical mirror, your image appears erect.

The mirror is likely to be

A. plane

B. concave

C. convex

D. either plane or convex

**Answer: D**



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**145.** Which of the following lenses would you prefer to use while reading small letters found in a dictionary ?

- A. A convex lens of focal length 50 cm
- B. A concave lens of focal length 50 cm
- C. A convex lens of focal length 5 cm
- D. A concave lens of focal length 5 cm

**Answer: C**



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**146.** We wish to obtain an erect image of an object, using a concave mirror of focal length 15 cm. What should be the range of distance of the object from the mirror? What is the nature of the image? Is the image larger or smaller than the object? Draw a ray diagram to show the image formation in this case.



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**147.** Name the type of mirror used in the following situations :

(a) Head lights of a car.

(b) Side rear view mirror of a vehicle.

(c) Solar furnace.

Support your answer with reason.



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**148.** One half of a convex lens is covered with a black paper. Will this lens produce a complete

image of the object? Verify your answer experimentally. Explain your observations.



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**149.** An object  $5\text{cm}$  in length is held  $25\text{cm}$  away from a converging lens of focal length  $10\text{cm}$ . Draw the ray diagram and find the position, size and the nature of the image formed.



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**150.** A concave lens of focal length 15 cm forms an image 10 cm from the lens. How far is the object from the lens ? Draw the ray diagram.



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**151.** An object is placed at a distance of 10cm from a convex mirror of focal length 15cm. Find the position and nature of the image ?



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**152.** The magnification produced by a plane mirror is  $m = +1$ . What does this mean ?

- A. Image formed is smaller than object
- B. Image formed is larger than object
- C. Image formed is of same size as of object
- D. Image formed is inverted

**Answer: C**



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**153.** An object  $5.0\text{cm}$  in length is placed at a distance of  $20\text{cm}$  in front of a convex mirror of radius of curvature  $30\text{cm}$ . Find the position of image, its nature and size.



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**154.** An object of size  $7.0\text{cm}$  is placed at  $27\text{cm}$  in front of a concave mirror of focal length  $18\text{cm}$ . At what distance from the mirror, should a screen be placed, so that a sharp



focussed image can be obtained ? Find the size and nature of the image ?



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**155.** Find the focal length of a lens of power  $-2.0D$ . What type of lens is this ?



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**156.** A doctor has prescribed lens of power  $+1.5D$ . Find the focal length of the lens. Is the

prescribed lens diverging or converging ?



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## Multiple Choice Questions Mcqs

1. In order to obtain a magnification of,  $-1.5$  with a concave mirror of focal length  $16\text{ cm}$ , the object will have to be placed at a distance :

A. between  $6\text{ cm}$  and  $16\text{ cm}$

B. between  $23\text{ cm}$  and  $16\text{ cm}$

C. between 48 cm and 32 cm

D. beyond 64 cm

**Answer: A**



**View Text Solution**

## Very Short Answer Type Questions

1. State whether the following statement is true or false :

convex mirror can be used as a shop security mirror ?



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