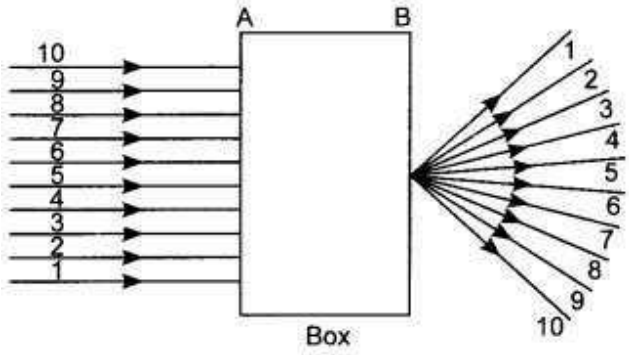
LIGHT REFLECTION AND REFRACTION

Question Bank

Multiple Choice Questions – (1 Mark each)

1. Identify the mirror used by a dentist to examine a small cavity in a patient's teeth?
   a) Convex mirror
   b) Plane Mirror
   c) Concave Mirror
   d) Any spherical mirror
2. A beam of light is incident through the holes on side A and emerges out of the holes on the other side B as shown in the figure below:



Which of the following could be inside the box?
   a) Concave lens
   b) Rectangular glass slab
   c) Prism
   d) Convex lens
3. When an object is kept within the focus of a concave mirror, an enlarged image is formed behind the mirror. This image is:
   a) Real
   b) Inverted
   c) virtual and inverted
   d) virtual and erect
4. Rays from sun converge at a point 15 cm in front of a concave mirror. Where should an object be placed so that size of its image is equal to that of the object?
   a) 30 cm in front of a mirror

b) 15 cm in front of a mirror

c) Between 15 cm and 30 cm in front of a mirror

d) More than 30 cm in front of a mirror

5. Magnification produced by a rear-view mirror fitted in vehicles:

a) is less than one

b) is more than one

c) is equal to one

d) can be more than one or less than one depending upon the position of the object in front of it.

6. You are provided four convex lens of focal length 10 cm, 20 cm.30 cm and 40 cm. which out of these four lenses will converge light the most and the least? Select the row containing the correct answer and reason:

	Convex lens that will converge the light most	Convex lens that will converge the light least	Reason
a)	f = 10 cm	f = 40 cm	A convex lens of shorter focal length bends the light rays through large angles
b)	f = 40 cm	f = 20 cm	A convex lens of larger focal length bends the light rays through large angles
c)	f = 40 cm	f = 30 cm	Converging power is same for all convex lens
d)	f = 10 cm	f = 20 cm	A convex lens of shorter focal length bends the light rays through smaller angles

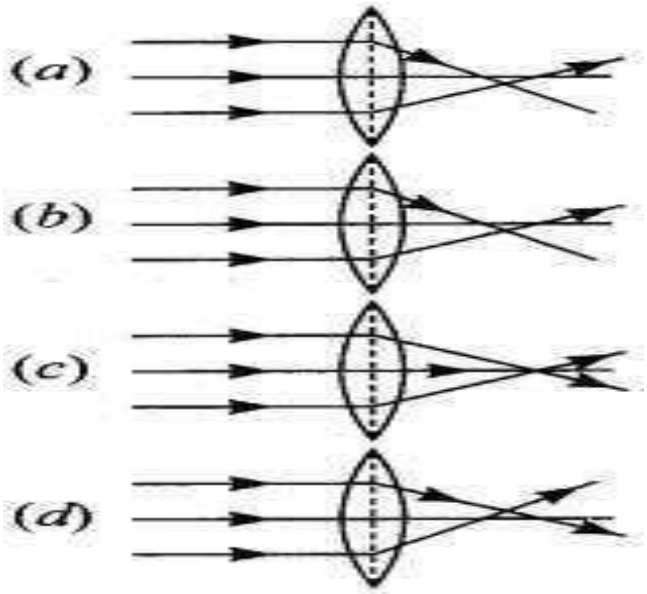
7. A student focused the image of a candle flame on a white screen using a convex lens. He noted down the position of the candle, screen and the lens as under:

Position of candle- 26 cm
Position of convex lens- 50 cm
Position of screen- 90 cm
Select the row containing the correct values as per sign convention:

	Object distance(u) cm	Image Distance (v) cm	Focal length(f)
a)	- 26 cm	- 50 cm	+ 30 cm

b)	- 26 cm	- 40 cm	- 15 cm
c)	- 24 cm	- 40 cm	+ 15 cm
d)	- 24 cm	+ 40 cm	+ 15 cm

8. The distance between the optical center and point of convergence is called focal length in which of the following cases?



9. Select the correct statement from given below regarding refraction of light when light is incident from a medium A having refractive index 1.85 on a glass slab having refractive index 1.50.

   I. Light will bend towards the normal in the glass slab.

   II. Emergent ray will be parallel to the refracted ray.

   III. Speed of light will be more in glass slab as compared to the medium A.

   IV. Angle of refraction will be more than angle of incidence.

   a) Both I and II

   b) Both II and III

   c) Both II and IV

   d) Both III and IV

10. If the real image of a candle flame formed by a lens is three times the size of the flame and the distance between lens and image is 80 cm, at what distance should the candle be placed from the lens?

    a) – 80 cm

b) – 40 cm

c) – 40/3 cm

d) – 80/3 cm

11. A converging lens forms a three times magnified image of an object, which can be taken on a screen. If the focal length of the lens is 30 cm, then distance of the object from the lens is:

a) – 55 cm

b) -50 cm

c) – 45 cm

d) -40 cm

12. While looking at the diagram Nalini concluded the following:

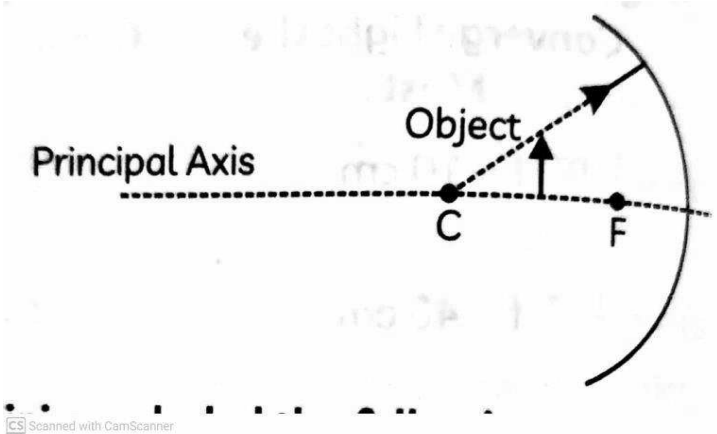
i. The image of the object will be a virtual one.

ii. The reflected ray will travel along the same path as the incident ray but in opposite direction.

iii. The image of the object will be inverted.

iv. This is a concave mirror and hence the focal length will be negative.

Which one of the above statements are correct?



a) (i) and (ii)

b) (i) and (iii)

c) (ii),(iii) and (iv)

d) (i), (ii), (iii) and (iv)

13. The refractive index of flint glass is 1.65 and that for alcohol is 1.36 with respect to air. What is the refractive index of the flint glass with respect to alcohol?

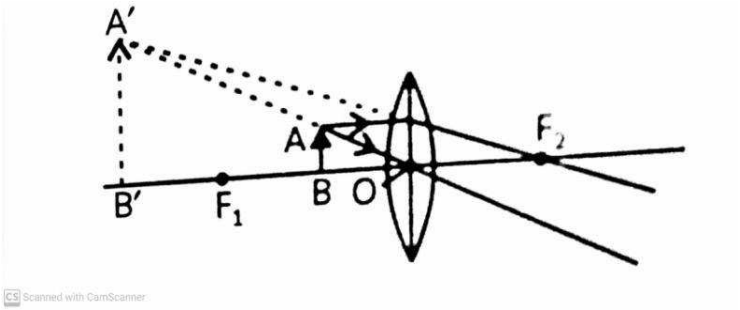
    a) 0.82

    b) 1.21

    c) 1.11

    d) 1.01

14. The lens has focal length of 10 cm. The object of 2 mm is placed at a distance of 5 cm from the pole.



Find the height of the image.

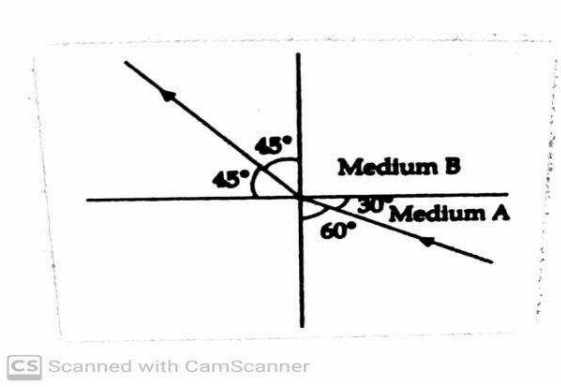
    a) 4 cm

    b) 6.67 cm

    c) 4 mm

    d) 3.33 mm

15. Below figure shows a ray of light as it travels from medium A to medium B. Refractive index of the medium B relative to medium A is :



    a) √3/√2

    b) √2/√3

c) 1/√2

d) √2

16. The refractive index of medium A is 1.5 and that of medium B is 1.33. If the speed of light in air is 3 X 10^8 m/s, what is speed of light in medium A and B respectively?

a) 2 X 10^8 m/s and 1.33 X 10^8 m/s

b) 1.33 X 10^8 m/s and 2 X 10^8 m/s

c) 2.25 X 10^8 m/s and 2 X 10^8 m/s

d) 2 X 10^8 m/s and 2.25 X 10^8 m/s

17. A negative sign in the magnification value indicates that the image is _____

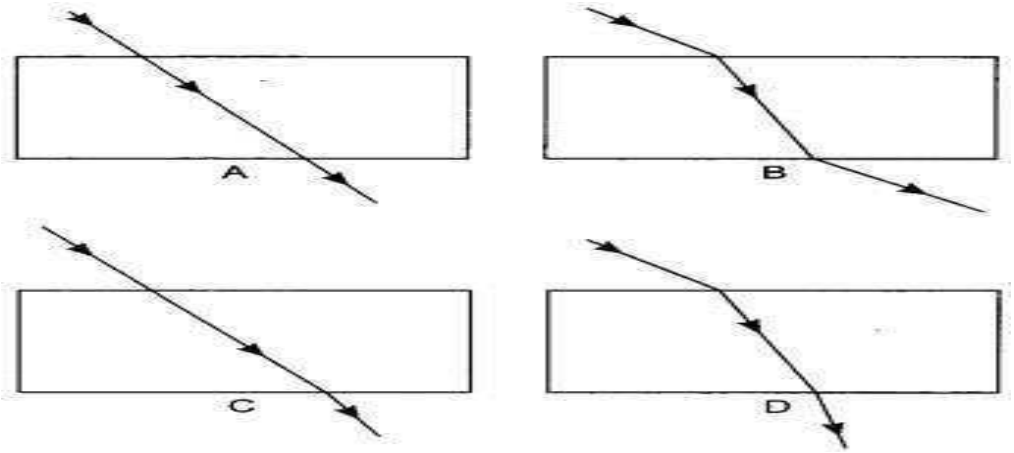
a) Real and inverted

b) Real and erect

c) Virtual and erect

d) Virtual and inverted

18. The path of a ray of light coming from air passing through a rectangular glass slab traced by four students are shown as A, B, C and D in figure. Which one of them is correct?



a) A

b) B

c) C

d) D

19. Parag along with his friends were experimenting with a concave mirror. They tried to focus the sun's rays at a piece of paper and observed that paper started to burn after some time.

Rays from the sun converge at a point 15 cm in front of a concave mirror. Where should an object be placed so that the size of its image is equal to the size of the object?

a) 15 cm in front of the mirror

b) 30 cm in front of the mirror

c) Between 15 cm and 30 cm in front of the mirror

d) More than 30 cm in front of the mirror

20. Magnifying power of a concave lens is

a) always < 1

b) always > 1

c) always = 1

d) can have any value

ASSERTION REASON QUESTIONS

In the following questions, a statement of Assertion(A) is followed by a statement of Reason(R). Mark the correct choice as:

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

b) **Both A and R are true and R is NOT the correct explanation of A.**

c) **A is true but R is false.**

d) **A is false but R is true.**

1. **Assertion**(A) : The word **AMBULANCE** on the hospital vans is written in the form of its mirror image in inverted form.

   Reason(R): The image formed in a plane mirror is same size of the object.

2. **Assertion**(A): Light travels faster in glass than in air.

   Reason(R) : Glass is denser than air.
3. **Assertion**(A): A convex lens has real focus.

   Reason(R) : All light rays pass through the focus of a convex lens after refraction.
4. Assertion(A): A ray of light passing through the center of curvature of a concave mirror is reflected back along the same path.

   Reason(R) : The incident ray, reflected ray and the normal at the point of incidence lie on the same plane.
5. Assertion(A): Power of a concave lens is negative.

   Reason(R) : A concave lens has a virtual focus.
6. Assertion(A): If the rays are diverging after emerging from a lens, the lens must be concave.

   Reason(R) : The convex lens can give diverging rays.
7. Assertion(A): Refractive index of glass with respect to air is different for red light and violet light.

   Reason(R) : Refractive index of a pair of media depends on the wave length of the light used.
8. Assertion(A): Refractive index has no units.

   Reason(R) : The refractive index is a ration of two similar quantities.
9. Assertion(A): The image formed by a concave mirror is certainly real if the object is virtual.

   Reason(R) : The image formed by a concave mirror may be real or virtual depending on the position of the object.
10. Assertion(A): when a concave mirror is held under water, its focal length will increase.

    Reason(R) : The focal length of a concave mirror is independent of the medium in which it is placed.

SOLUTIONS

MCQs

1. c
2. d
3. d
4. a
5. a
6. a
7. a
8. c

9. d
10. d
11. d
12. c
13. b
14. c
15. a
16. d
17. a
18. b
19. b
20. a

ASSERTION REASON QUESTIONS

1. b
2. d
3. c
4. b
5. a
6. d
7. a
8. a
9. b
10. d