Worksheet 10.3

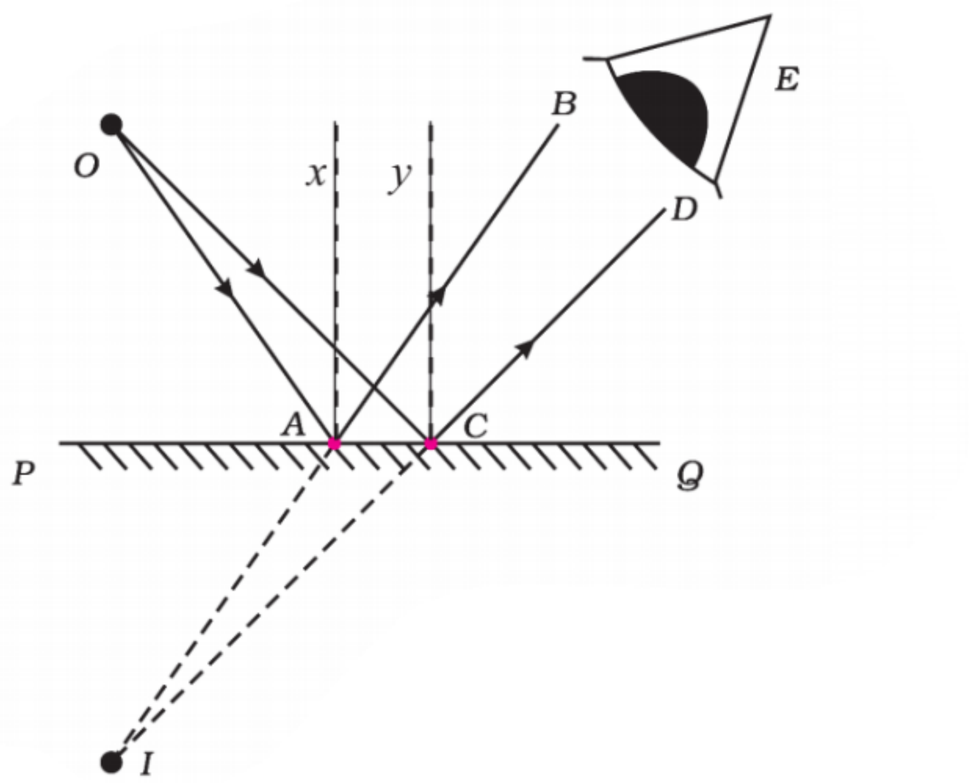
Marks - 25

Case study based questions

10th Science

Light - Reflection and Refraction

Passage - 1 **5 Marks**



Arrange a source of light at a point O in front of a plane mirror. Consider that OA and OC are two rays of light incident obliquely on the mirror. According to the laws of reflection the reflected rays AB and CD can be drawn with respect to the normals x and y. If the rays are extended backwards, they meet at a point I.

Q 1. Is the image is formed at I?

(1) YES
(2) NO

Q 2. The distance from the mirror to the object and the image from the mirror is

(1) Equal
(2) Greater

---

(3) Less
(4) Impossible to say

Q 3. Is the image real or virtual?

(1) Real
(2) Virtual

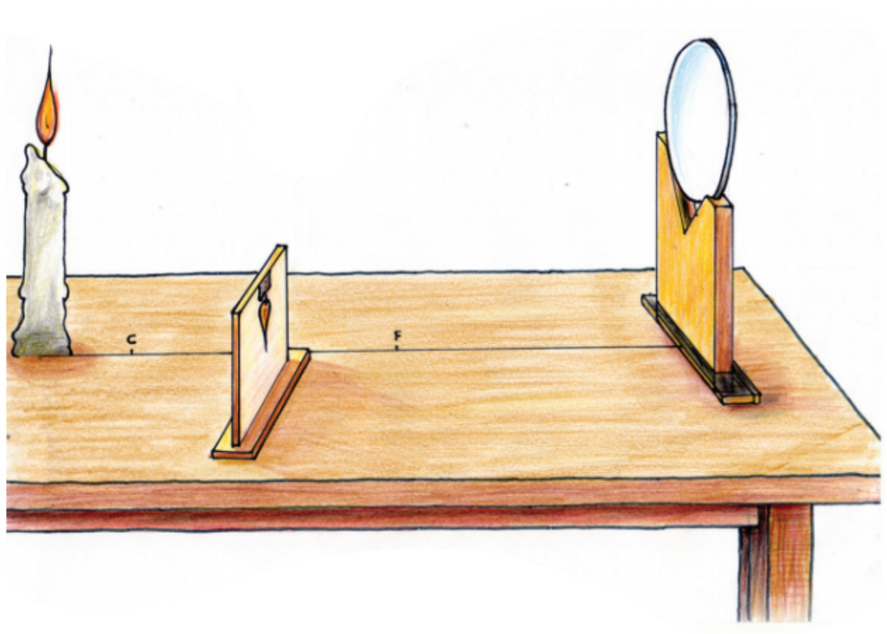
Q 4. What is the size of the image?

(1) Less than the size of object
(2) Greater than size of object
(3) Same size as object
(4) NONE OF THESE

Q 5. State true or false: Images are formed when light hitting on objects undergoes reflection at the mirrors.

(1) TRUE
(2) FALSE

Passage - 2 **5 Marks**



Worksheet 10.3

Marks - 25

Febin is doing an experiment as shown above. He draws a straight line on table. At one end of the line, he placed a concave mirror of focal length 20 cm. Marked principle focus (F) and centre of curvature (C) on the line. He fixed a burning candle on the principle focus in such a way that it is at a slight distance from the centre of curvature. Arranged a screen in such a way that a clear image is obtained on the screen.

Q 1. What is the position of the image?

(1) At F
(2) At C
(3) Between F and C
(4) At infinity

Q 2. The image formed is

(1) Real and erect
(2) Real and inverted
(3) Virtual and erect
(4) Virtual and inverted

Q 3. If plane mirror is placed instead of concave mirror, then the size of the image is

(1) Less than the size of object
(2) Greater than size of object
(3) Same size as object
(4) NONE OF THESE

Q 4. If convex mirror is placed instead of concave, then the image formed is

(1) Real and erect

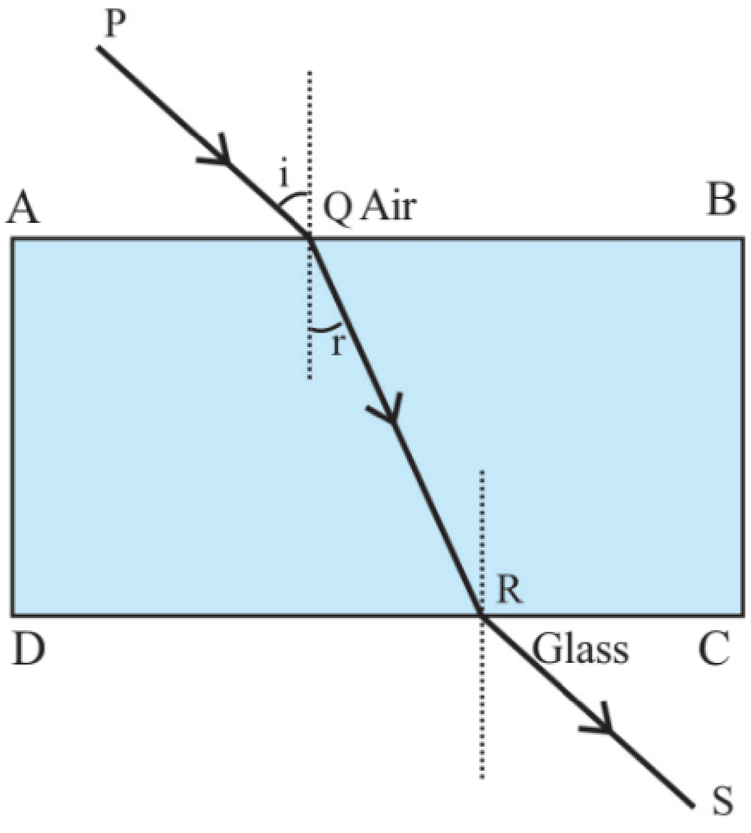
---

(2) Real and inverted
(3) Virtual and erect
(4) Virtual and inverted

Q 5. Position of the object is at infinity and the position of the image formed by a convex mirror is at the focus F, behind the mirror. What will be the nature of the image?

(1) Real and erect
(2) Real and inverted
(3) Virtual and erect
(4) Virtual and inverted

Passage - 3 **5 Marks**



Aravind placed a glass slab on a drawing sheet and marked its boundary as ABCD. Then he removed the glass slab and drew a line PQ on the side AB. He placed the glass slab in position, passed light from a laser torch through it along PQ. He observed the path of light through the glass slab and marked the points Q, R and S. AB is the surface of seperation of air and glass and that CD is the surface of seperation of glass and air.

Q 1. Which is the incident ray on the surface of separation CD?

(1) PQ
(2) QR
(3) RS
(4) NONE OF THESE

Q 2. Is the angle of refraction greater or lower than the angle of incidence when it goes from air to glass?

(1) Greater
(2) Lower

Q 3. Is the angle of refraction greater or lower than the angle of incidence when it goes from glass to air?

(1) Greater
(2) Lower

Q 4. Which is of greater optical density - air or glass?

(1) Air
(2) Glass

Q 5. While going from air to glass, the refracted ray deviates

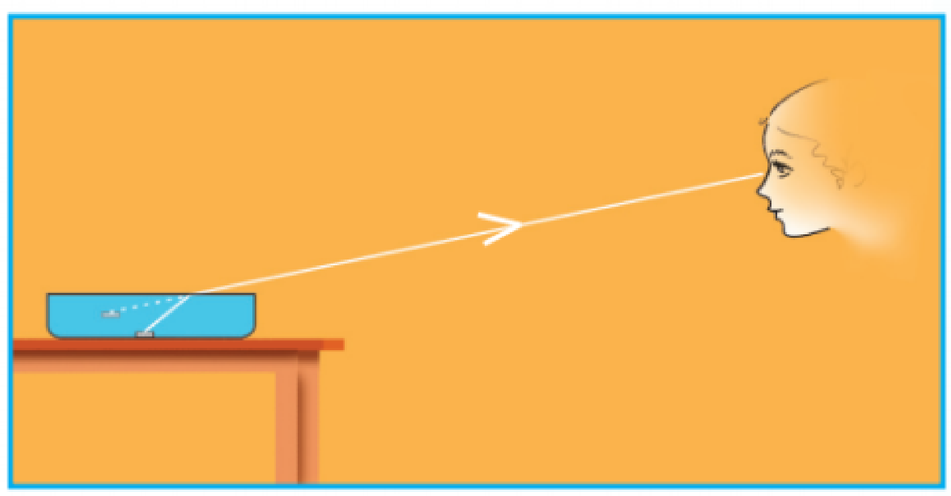
(1) Away from normal
(2) Towards the normal

Passage - 4

5 Marks

Worksheet 10.3

Marks - 25



Saritha took an opaque vessel. Placed a coin at its bottom. She asked Neenu to walk backwards looking at the coin. Saritha asked Neenu to stop at the place where the coin disappers. Now saritha added water into the vessel without moving the coin.

Q 1. What is observed here?

(1) The coin seems to be lifted up.
(2) Still the coin can't be seen.

Q 2. What is the reason for this observation?

(1) Due to reflection
(2) Due to refraction

Q 3. As light from the coin comes from dense to rarer medium it bends

(1) Away from the normal
(2) Towards the normal

Q 4. Which is the denser medium?

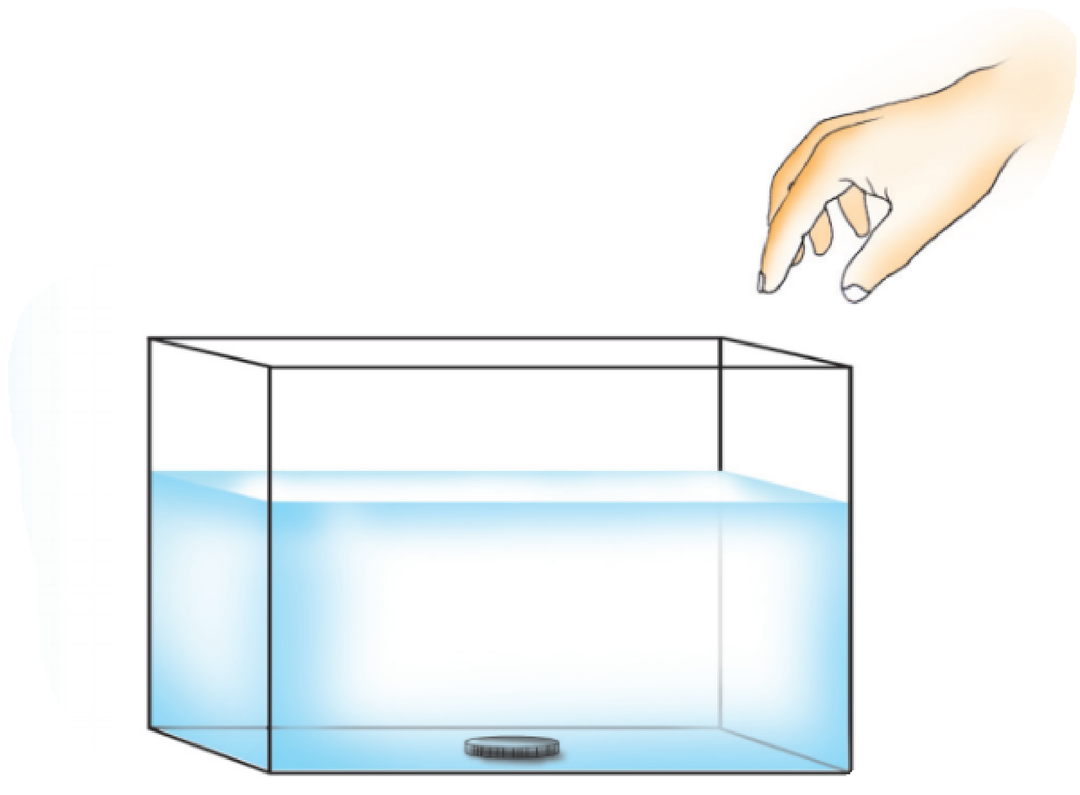
(1) Air
(2) Water

Q 5. The refractive index from air to glass is 1.5 and the refractive index of water is 1.33. What is the refractive index from glass into water?

(1) 1.13
(2) 0.89
(3)
(4)

Passage - 5

5 Marks



John is trying to take out a coin from the bottom of a trough filled with water by viewing it from one side.

Q 1. Can you easily pick up the coin?

(1) YES
(2) NO

Q 2. The light rays from the coin comes from

(1) Denser to rarer medium
(2) Rarer to denser medium

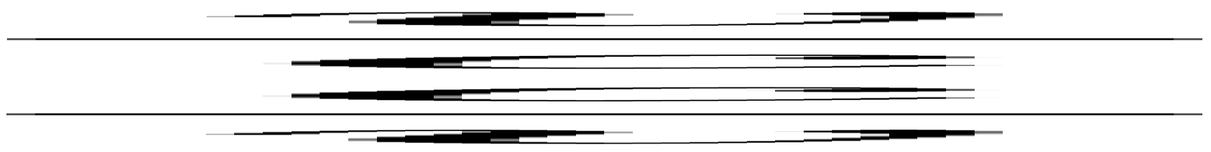
Q 3. The light rays bends

(1) Away from the normal
(2) Towards the normal

Q 4. Refractive index of a liquid is $\frac{4}{3}$. The critical angle for this liquid is

(1) 
(2)
(3)
(4)

Q 5. The formula to calculate the refractive index is

(1) n = cv
(2) n = 
(3) n =
(4) v = nc

Worksheet 10.4

Marks - 25

Case study based questions

10th Science

Light - Reflection and Refraction

Passage - 1 **5 Marks**

Arjun is a student of class VIII. During summer vacation, his parents planned a visit to Pondicherry by their car. During the journey from Chennai to Pondicherry, Arjun sat on the front seat and his father was driving the car. Arjun observed that the road ahead on the highway appears to be wet as in figure. But when the car reached the spot, road is found to be dry. He was perplexed by this observation. He asked his father. His father advised Arjun not to disturb him during driving and said that he will discuss the problem on reaching Pondicherry. In the evening, when they were settled in a hotel at Pondicherry, Arjun's father told him that the illusion observed by Arjun was on account of atmospheric refraction. Now, Arjun was happy as he knew the real explanation of his observation.

Q 1. Absolute refractive index of any medium is always _____ .

(1) Less than 1
(2) Greater than 1
(3) 1
(4) 0

Worksheet 10.4

Marks - 25

Q 2. The refracting surfaces obeys the _____.

(1) Law of reflection
(2) Law of refraction

Q 3. State true or false: Light travels faster in air than in glass or water.

(1) TRUE
(2) FALSE

Q 4. The cold air layers of the atmosphere behave as optically

(1) Either inactive or rarer medium
(2) Denser medium
(3) Rarer medium
(4) Inactive medium

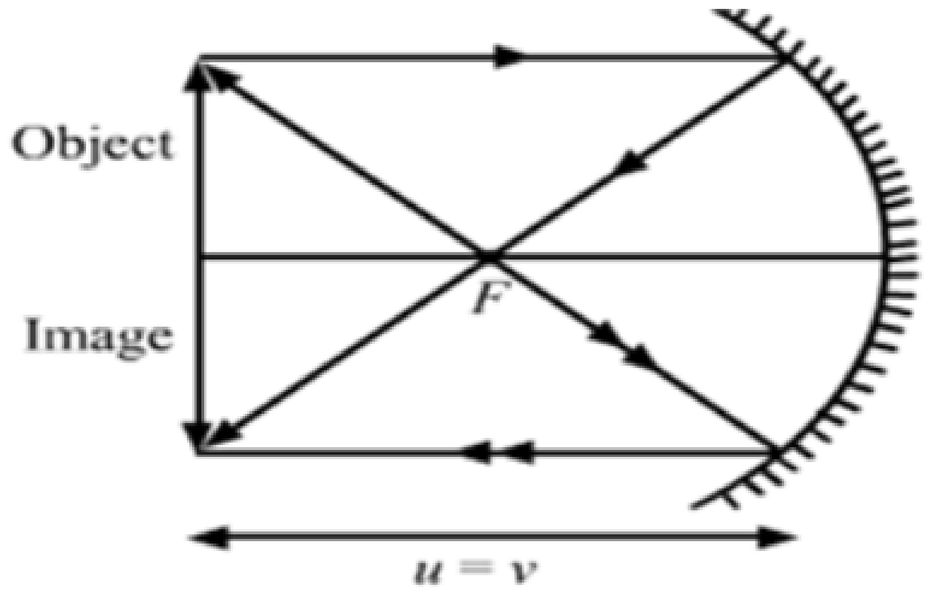
Q 5. Deviation of light as it passes through the atmosphere due to variation in air density is called

(1) Atmospheric dispersion
(2) Atmospheric reflection
(3) Atmospheric refraction
(4) Atmospheric scattering

Passage - 2 **5 Marks**

Worksheet 10.4

Marks - 25



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

Q 1. What type of image is formed?

(1) Real
(2) Virtual

Q 2. What type of mirror is used?

(1) Convex mirror
(2) Concave mirror
(3) Plane mirror
(4) NONE OF THESE

Q 3. Find the distance of the image from the object?

(1) 50 cm
(2) 0 cm
(3) 150 cm
(4) NONE OF THESE

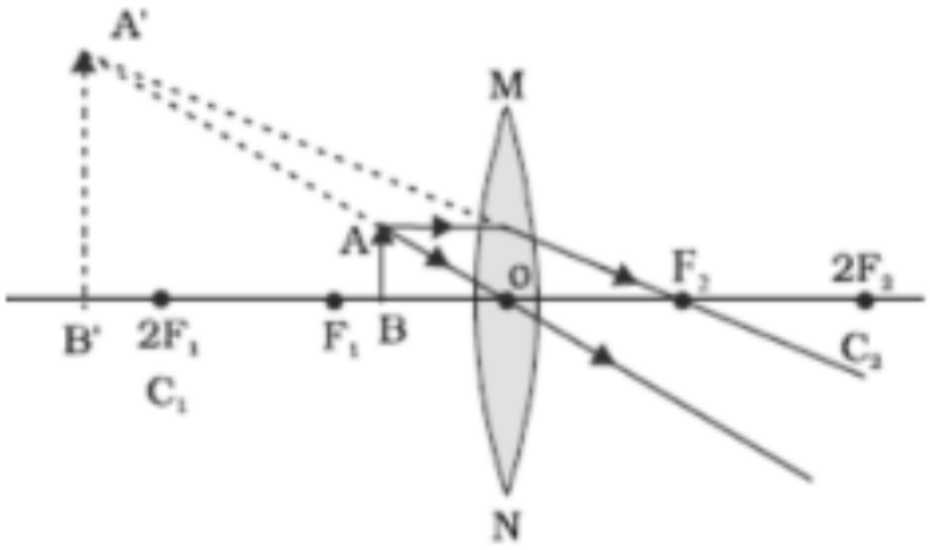
Q 4. What is the focal length of the mirror?

(1) -25
(2) 25
(3) 35
(4) -35

Q 5. The mirror having reflecting surface curved inwards.

(1) Plane mirror
(2) Convex mirror
(3) Cylinderical mirror
(4) Concave mirror

Passage - 3 **5 Marks**



A student has focused the image of a candle flame on a white screen using a concave mirror. The situation is as given below:
Length of the flame= 1.5cm, Focal length of the mirror = 12cm, Distance of flame from the mirror= 18cm.

Q 1. Calculate the distance of the image from the mirror.

(1) - 30 cm
(2) - 32 cm
(3) - 34 cm
(4) - 36 cm

Worksheet 10.4

Marks - 25

Q 2. Find the length of the image?

(1) 1 cm
(2) 2 cm
(3) 3 cm
(4) 4 cm

Q 3. If the distance between the mirror and the flame is reduced to 10cm, then what would be observed on the screen?

(1) Nothing will be observed on the screen.
(2) Candle flame will be observed on the screen .

Q 4. If the distance between the mirror and the flame is reduced to 10cm, then the image formed behind the mirror is

(1) Real and erect
(2) Real and inverted
(3) Virtual and erect
(4) Virtual and inverted

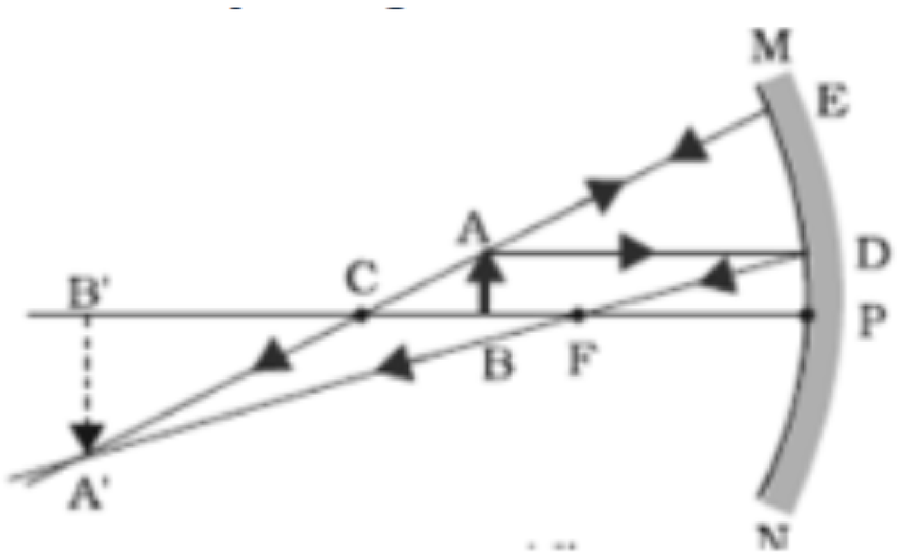
Q 5. A concave mirror gives virtual and erect image if the object is placed

(1) At F
(2) At C
(3) Between P and F
(4) At infinity

Passage - 4 **5 Marks**

Worksheet 10.4

Marks - 25



A student wants to project the image of a candle flame on a screen 90 cm in front of a mirror by keeping the flame at a distance of 15 cm from its pole.

Q 1. Suggest the type of mirror he should use.

(1) Plane mirror
(2) Convex mirror
(3) Cylindrical mirror
(4) Concave mirror

Q 2. Determine the linear magnification in this case.

(1) m = -1
(2) m = -3
(3) m = -6
(4) NONE OF THESE

Q 3. Find the distance between the object and its image.

(1) 15 cm
(2) 75 cm
(3) 90 cm
(4) NONE OF THESE

Worksheet 10.4

Marks - 25

Q 4. The mirror having reflecting surface curved inwards.

(1) Plane mirror
(2) Convex mirror
(3) Cylindrical mirror
(4) Concave mirror

Q 5. Focal length of a concave mirror is

(1) Negative
(2) Positive
(3) Depends on the position of the object.
(4) Depends on the position of image.

Passage - 5 **5 Marks**

The wing and rear-view mirrors of a car are made of a convex and a plane mirror respectively. The two wing mirrors enable the driver to see objects on both sides of the car. The rear-view mirror enables the driver to see things behind the car.

Q 1. Magnification produced by a rear view mirror filled in vehicles is

(1) Less than one
(2) More than one
(3) Both A and B
(4) Equal to one

Q 2. The mirror having reflection surface curved outward is

(1) Plane mirror
(2) Concave mirror
(3) Convex mirror
(4) Cylinderical mirror

Q 3. Acoording to laws of reflection, The angle of incidence is equal to angle of _____.

(1) Refraction
(2) Reflection

Q 4. Why convex mirrors are used as rear view mirror?

(1) It enables the driver to view much larger area than plane mirror.
(2) It enables the driver to view much smaller area than plane mirror
(3) Both A and B
(4) NONE OF THESE

Q 5. What is the size of the image?

(1) Less than the size of object
(2) Greater than size of object
(3) Same size as object
(4) NONE OF THESE