

Time : 1 Hour 30 Minute

STD 10 Science
Chapter Based Test

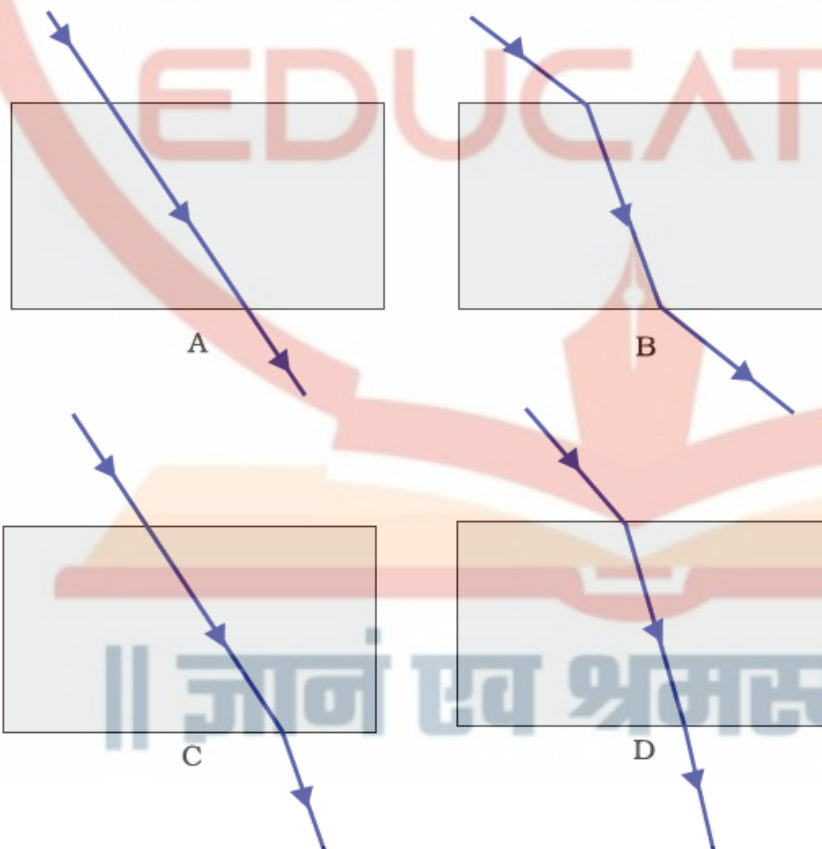
Total Marks : 50

SECTION A

* Select and write one most appropriate option out of the four options given [7]
for each of the questions

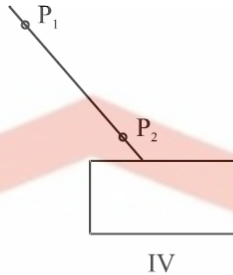
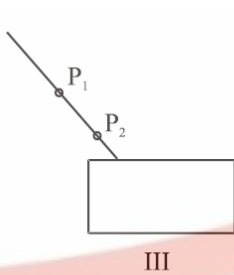
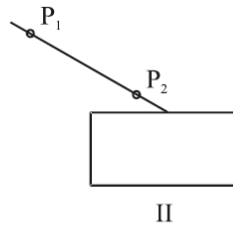
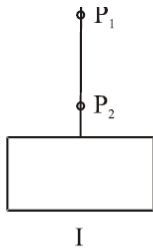
- A student has obtained a point image of a distant object using the given convex lens. To find the focal length of the lens he should measure the distance between the:

(A) Lens and the object only.	(B) Lens and the screen only.	(C) Object and the image only.	(D) Lens and the object and also between the object and the image.
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- 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.

- Study the following four experimental set-ups I, II, III and IV for the experiment, " To trace the path of a ray of light through a Rectangular glass slab."



Which of the marked set-ups is likely to give best results (P_1 and P_2 are the positions of pins fixed on the incident ray)?

- (A) I (B) II (C) III (D) IV
4. Linear magnification (m) 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) In be more less than one depending on the position of object.
5. To determine the focal length of a convex lens by obtaining a sharp image of a distant object, the following steps were suggested which are not in proper sequence:
 I. Hold the lens between the object and the screen.
 II. Adjust the position of the lens to form sharp image.
 III. Select a suitable distant object.
 IV. Measure the distance between the lens and the screen.
 The correct sequence of steps to determine the focal length of the lens is:
 (A) III, I, II, IV (B) III, I, IV, II (C) III, IV, II, I (D) I, II, III, IV
6. An object is placed at a distance of 20cm in front of concave mirror of focal length 10cm. The image produced is:
 (A) Real, inverted and diminished. (B) Real, inverted and enlarged. (C) Real, inverted and same size. (D) Virtual, erect and enlarged.
7. A student has obtained the image of a distant object with a concave mirror to determine its focal length. If he has selected a well illuminated red building as object, which of the following correctly describes the features of the image formed?
 (A) Virtual, inverted, diminished image in red shade. (B) Real, erect, diminished image in pink shade. (C) Real, inverted, diminished image in red shade. (D) Virtual, erect, enlarged image in red shade.

*** Assertion - Reasoning based questions.**

[3]

8. For two statements are given-one labelled Assertion (A) and the other labelled Reason (R). Select the correct answer to these questions from the codes (a), (b), (c) and (d) as given below:

- a. Both A and R are true, and R is correct explanation of the assertion.
- b. Both A and R are true, but R is not the correct explanation of the assertion.
- c. A is true, but R is false.
- d. A is false, but R is true.

Assertion: Property of converging of a convergent lens does not remain same in all media.

Reason : Property of lens whether the ray is diverging or converging is independent of the surrounding medium.

9. For two statements are given-one labelled Assertion (A) and the other labelled Reason (R). Select the correct answer to these questions from the codes (a), (b), (c) and (d) as given below:

- a. Both A and R are true, and R is correct explanation of the assertion.
- b. Both A and R are true, but R is not the correct explanation of the assertion.
- c. A is true, but R is false.
- d. A is false, but R is true.

Assertion: If a ray of light is incident on a convex mirror along its principal axis, then the angle of incidence as well as the angle of reflection for a ray of light will be zero.

Reason: A ray of light going towards the centre of curvature of a convex mirror is reflected back along the same path.

10. For two statements are given-one labelled Assertion (A) and the other labelled Reason (R). Select the correct answer to these questions from the codes (a), (b), (c) and (d) as given below:

- a. Both A and R are true, and R is correct explanation of the assertion.
- b. Both A and R are true, but R is not the correct explanation of the assertion.
- c. A is true, but R is false.
- d. A is false, but R is true.

Assertion: A plane mirror neither converges parallel rays of light nor diverges them.

Reason: The focal length of a plane mirror can be considered to be infinite.

* **Fill in the blank with correct answer.[1 Mark each] [2]**

11. Parallel rays of light are refracted by a convex lens to a point called the _____.

12. 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.

* **Answer the questions.[1 Mark each] [2]**

13. Where should an object be placed in front of a convex lens so as to obtain its real, inverted and magnified image?

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

SECTION B

* **Answer the following question. : [10]**

- 1. List two properties of the images formed by convex mirrors. Draw ray diagram in support of your answer.
- 2.

In an experiment with a rectangular glass slab, a student observed that a ray of light incident at an angle of 55° with the normal on one face of the slab, after refraction strikes the opposite face of the slab before emerging out into air making an angle of 40° with the normal. Draw a labelled diagram to show the path of this ray.' What value would you assign to the angle of refraction and angle of emergence?

3. Draw ray diagrams showing the image formation by a concave mirror when an object is placed:

A little beyond centre of curvature of the mirror.

4. Define:

- i. Principal focus of a concave mirror.
- ii. Focal length of a concave mirror.

5. An object is placed at the following distance from a convex lens of focal length 15cm:

- a. 35cm
- b. 30cm
- c. 20cm
- d. 10cm

Which position of the object will produce:

- i. A magnified real image?
- ii. A magnified virtual image?
- iii. A diminished real image?
- iv. An image of same size as the object?

SECTION C

- * Answer short answer questions. [3 Mark each]

[12]

1. An object is placed at a distance of 4cm from a concave lens of focal length 12cm. Find the position and nature of the image.
2.
 - a. Draw a ray diagram to show the refraction of light through a glass slab and mark angle of refraction and the lateral shift suffered by the ray of light while passing through the slab.
 - b. If the refractive index of glass for light going from air to glass is $\frac{3}{2}$, find the refractive index of air for light going from glass to air.
3. An object 4cm high is placed at a distance of 10cm from a convex lens of focal length 20cm. Find the position, nature and size of the image.
4. 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.

SECTION D

- * Long answer questions [5 Mark each]

[10]

1.
 - a. Define focal length of a spherical lens.
 - b. A divergent lens has a focal length of 30 cm. At what distance should an object of height 5 cm from the optical centre of the lens be placed so that its image is formed 15 cm away from the lens? Find the size of the image also.
 - c. Draw a ray diagram to show the formation of image in the above situation.
2. Why does a light ray incident on a rectangular glass slab immersed in any medium emerges parallel to itself? Explain using a diagram.

SECTION E

* case - based/data -based questions

[4]

1. The table below shows the refractive index of different materials.

	Water	Kerosene	Flint glass	Diamond
Refractive index of the material	1.33	1.44	1.65	2.42

The formula for calculating the refractive index (n_m) of a material is,

$$n_m = \frac{\text{Speef of light in } X}{\text{Speef of light in the medium}}$$

8. What does X stand for?

JARS
EDUCATION



॥ ज्ञानं एव श्रमस्य पुंजः ॥