RG CLASSES

EDUCATING FOR BETTER FUTURE...

GRADE X

LIGHT(REFLECTION)

MOST IMPORTANT

<table>
<tr><td>1.</td><td>At what distance from a convex lens should an object be placed to get an image of the same size as that of the object on a screen? (2024)
(a) Beyond twice the focal length of the lens.
(b) At the principal focus of the lens.
(c) At twice the focal length of the lens.
(d) Between the optical centre of the lens and its principal focus.</td></tr>
<tr><td>2.</td><td>An object is placed at a distance of 10 cm from a convex mirror of focal length 15 cm. Find the position of the image formed by the mirror. (2024)</td></tr>
<tr><td>3.</td><td>Source-based/case-based questions with 2 to 3 short subparts. Internal choice is provided in one of these sub-parts: (2024)
Study the data given below showing the focal length of three concave mirrors A, B and C and the respective distances of objects placed in front of the mirrors :
<table>
<tr><th>Case</th><th>Mirror</th><th>Focal Length (cm)</th><th>Object Distance (cm)</th></tr>
<tr><td>1</td><td>A</td><td>20</td><td>45</td></tr>
<tr><td>2</td><td>B</td><td>15</td><td>30</td></tr>
<tr><td>3</td><td>C</td><td>30</td><td>20</td></tr>
</table>
(i) In which one of the above cases the mirror will form a diminished image of the object ? Justify your answer.
(ii) List two properties of the image formed in case 2.
(iii) (A) What is the nature and size of the image formed by mirror C?
Draw ray diagram to justify your answer.
OR
(iii) (B) An object is placed at a distance of 18 cm from the pole of a concave mirror of focal length 12 cm. Find the position of the image formed in this case.</td></tr>
<tr><td>4.</td><td>Case-based/data-based questions with 3 short sub-parts. Internal choice is provided in one of these sub-parts. (2024)
A highly polished surface such as a mirror reflects most of the light falling on it. In our daily life we use two types of mirrors plane and spherical. The reflecting surface of a spherical mirrors may be curved inwards or outwards. In concave mirrors, reflection takes place from the inner surface, while in convex mirrors reflection takes place from the outer surface.
(a) Define the principal axis of a concave mirror.
(b) A ray of light is incident on a concave mirror, parallel to its principal axis. If this ray after reflection from the mirror passes through the principal axis from a point at a distance of 10 cm from the pole of the mirror, find the radius of curvature of the mirror.
(c) (i) An object is placed at a distance of 10 cm from the pole of a convex mirror of focal length 15 cm. Find the position of the image.</td></tr>
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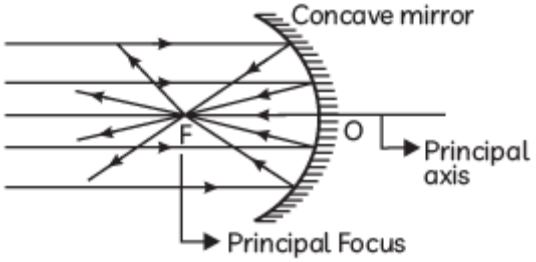
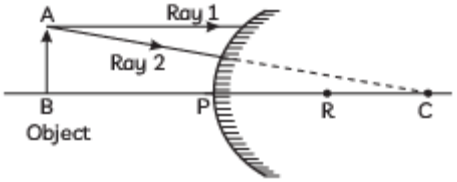
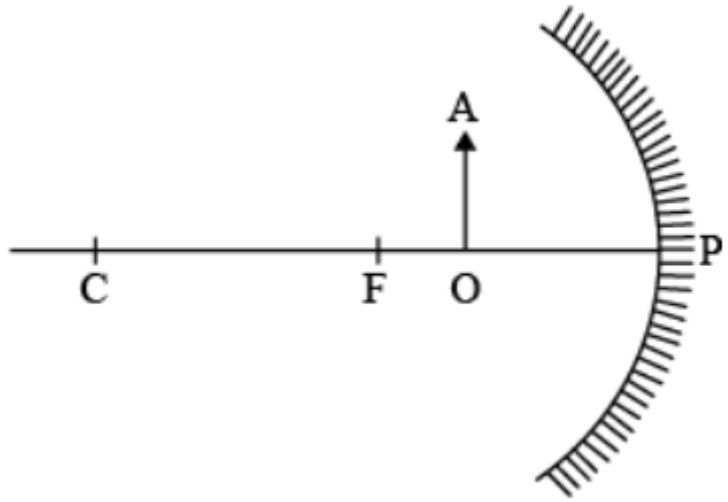
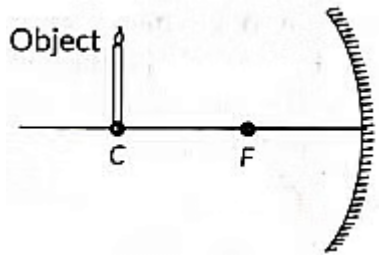
	OR (c) (ii) A mirror forms a virtual, erect and diminished image of an object. Identify the type of this mirror. Draw a ray diagram to show the image formation in this case.
5.	The magnification produced when an object is placed at a distance of 20 cm from a spherical mirror is +1/2. Where should the object be placed to reduce the magnification to +1/3? (2023)
6.	Define the following terms in the context of a diverging mirror: (2023) (i) Principal focus (ii) Focal length Draw a labelled ray diagram to illustrate your answer.
7.	Hold a concave mirror in your hand and direct its reflecting surface towards the sun. Direct the light reflected by the mirror on to a white card-board held close to the mirror. Move the card-board back and forth gradually until you find a bright, sharp spot of light on the board. This spot of light is the image of the sun on the sheet of paper; which is also termed as "Principal Focus" of the concave mirror. (CBSE 2023)  (A) List two applications of concave mirror. (B) If the distance between the mirror and the principal focus is 15 cm, find the radius of curvature of the mirror. (C) Draw a ray diagram to show the type of image formed when an object is placed between pole and focus of a concave mirror. (D) An object 10 cm in size is placed at 100 cm in front of a concave mirror. If its image is formed at the same point where the object is located, find: (i) focal length of the mirror, and (ii) magnification of the image formed with sign as per Cartesian sign convention.
8	(A) Complete the following ray diagram to show the formation of image: (CBSE 2023)  (B) Mention the nature, position and size of the image formed in this case. (C) State the sign of the image distance in this case using the Cartesian sign convention.
9	An optical device forms an erect image of an object placed in front of it. If the size of the image is one half that of the object, the optical device is a (2022) (a) concave mirror (b) convex mirror (c) plane mirror (d) convex lens.
10	The relation R = 2f is valid (2022) (a) for concave mirrors but not for convex mirrors (b) for convex mirrors but not for concave mirrors (c) neither for concave mirrors nor for convex mirrors (d) for both concave and convex mirrors.

11	In which of the following is a concave mirror used? (2022) (a) A solar cooker (b) A rear view mirror in vehicles (c) A safety mirror in shopping malls (d) In viewing full size image of distant tall buildings
12	For the diagram shown, according to the new Cartesian sign convention the magnification of the image formed will have the following specifications : (2022)  (a) Sign - Positive, Value - Less than 1 (b) Sign - Positive, Value - More than 1 (c) Sign - Negative, Value - Less than 1 (d) Sign - Negative, Value - More than 1
13	The radius of curvature of a converging mirror is 30 cm. At what distance from the mirror should an object be placed so as to obtain a virtual image? (2022) (a) Infinity (b) 30 cm (c) Between 15 cm and 30 cm (d) Between 0 cm and 15 cm
14	Which of the following statements is not true in reference to the diagram shown above? (2022)  (a) Image formed is real. (b) Image formed is enlarged. (c) Image is formed at a distance equal to double the focal length. (d) Image formed is inverted.
15	An object of height 4 cm is kept at a distance of 30 cm from the pole of a diverging mirror. If the focal length of the mirror is 10 cm, the height of the image formed is (2022) (a) +3.0 cm (b) +2.5 cm (c) +1.0 cm (d) +0.75 cm
16	An object of height 4 cm is kept at a distance of 30 cm from the pole of a diverging mirror. If the focal length of the mirror is 10 cm, the height of the image formed is: (a) +3.0 cm (b) +2.5 cm (c) +1.0 cm (d) +0.75 cm
17	Rishi went to a palmist to show his palm. The palmist used a special lens for this purpose. (2020) (i) State the nature of the lens and reason for its use. (ii) Where should the palmist place/hold the lens so as to have a real and magnified image of an object? (iii) If the focal length of this lens is 10 cm, the lens is held at a distance of 5 cm from the palm, use lens formula to find the position and size of the image. (2020)

18	Draw ray diagram in each of the following cases to show what happens after reflection to the incident ray when: (A) it is parallel to the principal axis and falling on a convex mirror. (B) it is falling on a concave mirror while passing through its principal focus. (C) it is coming oblique to the principal axis and falling on the pole of a convex mirror. (CBSE 2020)
19	State laws of reflection of light. List four characteristics of the image formed by a plane mirror. (2019)
20	The image of a candle flame placed at a distance of 30 cm from a mirror is formed on a screen placed in front of the mirror at a distance of 60 cm from its pole. What is the nature of the mirror? Find its focal length. If the height of the flame is 2.4 cm, find the height of its image. State whether the image formed is erect or inverted.
21	An object 4 cm in height, is placed at 15 cm in front of a concave mirror of focal length 10 cm. At what distance from the mirror should a screen be placed to obtain a sharp image of the object. Calculate the height of the image.
22	The image of an object formed by a mirror is real, inverted and is of magnification -1. If the image is at a distance of 40 cm from the mirror, where is the object placed? Where would the image be if the object is moved 20 cm towards the mirror? State reason and also draw ray diagram for the new position of the object to justify your answer.
23	The image formed by a spherical mirror is real, inverted and its magnification is -2. If the image is at a distance of 30 cm from the mirror, where is the object placed? Find the focal length of the mirror. List two characteristics of the image formed if the object is moved 10 cm towards the mirror.
24	A student wants to project the image of a candle flame on a screen 48 cm in front of a mirror by keeping the flame at a distance of 12 cm from its pole. (a) Suggest the type of mirror he should use. (b) Find the linear magnification of the image produced. (c) How far is the image from its object? (d) Draw ray diagram to show the image formation in this case.
25	Calculate the magnification of the image of an object placed perpendicular to the principal axis of a concave mirror of focal length 15 cm. The object is at a distance of 20 cm from the mirror.
26	Suppose you have three concave mirrors A, B and C of focal lengths 10 cm, 15 cm and 20 cm. For each concave mirror you perform the experiment of image formation for three values of object distances of 10 cm, 20 cm and 30 cm. By giving reason, answer the following: (a) For the three object distances, identify the mirror/mirrors which will form an image of magnification -1. (b) Out of the three mirrors, identify the mirror which would be preferred to be used for shaving purposes/make up. (c) For the mirror B draw ray diagram for image formation for object distances 10 cm and 20 cm.