

**CBSE CLASS X**  
**Science (086)**QUESTION PAPER  
*AI-generated question paper*

Code: 18MQ5L

Questions: 29

Maximum Marks: 50

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**SELECTIONS USED**

Subject	Science
Lessons	9 Light – Reflection and Refraction
Level of understanding	Initial understanding
Question selection	Curated chapter coverage (~3 questions per section)
Model	claude-sonnet-4-6

Composition – Difficulty: 17 straightforward · 12 medium | Types: 14 Short · 12 Very short · 3 MCQ

**Q1.** straightforward initial-understanding § Introduction [1]

A small source of light casts a sharp shadow of an opaque object. What does this observation tell us about how light travels?

◆ Light – Reflection and Refraction

**Q2.** straightforward initial-understanding § 9.1 REFLECTION OF LIGHT [1]

A plane mirror forms an image of an object placed 10 cm in front of it. State any two properties of the image formed.

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**Q3.** straightforward initial-understanding § 9.2 SPHERICAL MIRRORS [2]

What is the relationship between the focal length ( $f$ ) and the radius of curvature ( $R$ ) of a spherical mirror? Using this relationship, find the focal length of a concave mirror whose radius of curvature is 24 cm.

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**Q4.** medium initial-understanding § 9.2 SPHERICAL MIRRORS [3]

A small object is placed between the pole and the principal focus of a concave mirror. What will be the nature, position and relative size of the image formed?

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**Q5.** medium initial-understanding § 9.2 SPHERICAL MIRRORS [3]

A driver wants to watch traffic approaching from behind. Which type of spherical mirror – concave or convex – is more suitable as a rear-view mirror, and why?

◆ Light – Reflection and Refraction

**Q6.** straightforward initial-understanding § 9.2.1 Image Formation by Spherical Mirrors [1]

A burning candle is placed between the pole and the principal focus of a concave mirror. What is the nature of the image formed – is it real or virtual, erect or inverted, and larger or smaller than the object?

◆ Light – Reflection and Refraction

**Q7.** medium initial-understanding § 9.2.1 Image Formation by Spherical Mirrors [3]

A candle is moved from a point far beyond the centre of curvature of a concave mirror steadily toward its focus. How does the size of the image change during this movement? What is the nature of the image when the candle is placed exactly at the focus?

◆ Light – Reflection and Refraction

**Q8.** medium initial-understanding § 9.2.2 Representation of Images Formed by Spherical Mirrors Using Ray Diagrams [2]

A ray of light is directed towards the centre of curvature of a concave mirror. Describe the path of this ray after reflection, and explain why it behaves this way.

◆ Light – Reflection and Refraction

**Q9.** straightforward initial-understanding § 9.2.2 Representation of Images Formed by Spherical Mirrors Using Ray Diagrams [1]

Which of the following correctly describes what happens to a ray of light that strikes a concave mirror after travelling parallel to its principal axis?

- (A) It passes through the centre of curvature C.
- (B) It reflects back along the same path.
- (C) It passes through the principal focus F after reflection.
- (D) It emerges parallel to the principal axis after reflection.

A It passes through the centre of curvature C.

B It reflects back along the same path.

C It passes through the principal focus F after reflection.

D It emerges parallel to the principal axis after reflection.

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**Q10.** straightforward initial-understanding § 9.2.2 Representation of Images Formed by Spherical Mirrors Using Ray Diagrams [1]

State what happens to a ray of light that is incident on a convex mirror and is directed towards its principal focus. How does the reflected ray emerge?

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**Q11.** medium initial-understanding § 9.2.2 Representation of Images Formed by Spherical Mirrors Using Ray Diagrams [3]

An object is placed between the pole and the principal focus of a concave mirror. Using standard ray diagram rules, describe how the image is formed and state the nature, position, and size of the image obtained.

◆ Light – Reflection and Refraction

**Q12.** straightforward initial-understanding § 9.2.3 Sign Convention for Reflection by Spherical Mirrors [1]

According to the New Cartesian Sign Convention used for mirrors, what does a negative sign for object distance and a negative sign for image distance each indicate about the positions of the object and image relative to the mirror?

◆ Light – Reflection and Refraction

**Q13.** straightforward initial-understanding § 9.2.4 Mirror Formula and Magnification [1]

In the mirror formula  $1/v + 1/u = 1/f$ , what do the symbols u, v, and f represent? Which of these quantities is fixed for a given mirror?

◆ Light – Reflection and Refraction

**Q14.** medium initial-understanding § 9.2.4 Mirror Formula and Magnification [2]

A concave mirror produces a real image of an object. What does a negative value of magnification tell you about the image?

◆ Light – Reflection and Refraction

**Q15.** straightforward initial-understanding § 9.3 REFRACTION OF LIGHT [2]

When a ray of light travels obliquely from air into water, does it bend towards or away from the normal? Give a reason for your answer.

◆ Light – Reflection and Refraction

**Q16.** straightforward initial-understanding § 9.3.1 Refraction through a Rectangular Glass Slab [2]

A ray of light enters a rectangular glass slab obliquely and exits from the opposite face. What can you say about the direction of the emergent ray compared to the incident ray? Why does this happen?

◆ Light – Reflection and Refraction

**Q17.** medium initial-understanding § 9.3.1 Refraction through a Rectangular Glass Slab [1]

A ray of light travels from air into glass (a denser medium) obliquely. Which direction does it bend at the air-glass boundary, and what happens to its direction when it exits back into air at the opposite face?

- (A) Bends towards the normal entering glass; bends towards the normal exiting into air
- (B) Bends towards the normal entering glass; bends away from the normal exiting into air
- (C) Bends away from the normal entering glass; bends towards the normal exiting into air
- (D) Bends away from the normal entering glass; bends away from the normal exiting into air

- A Bends towards the normal entering glass; bends towards the normal exiting into air
- B Bends towards the normal entering glass; bends away from the normal exiting into air
- C Bends away from the normal entering glass; bends towards the normal exiting into air
- D Bends away from the normal entering glass; bends away from the normal exiting into air

◆ Light – Reflection and Refraction

**Q18.** straightforward initial-understanding § 9.3.2 The Refractive Index [1]

[very\_short\_answer] Light travels at  $3 \times 10^8$  m/s in air and at  $2 \times 10^8$  m/s in a certain liquid. Calculate the refractive index of the liquid with respect to air.

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**Q19.** medium initial-understanding § 9.3.2 The Refractive Index [2]

The refractive index of kerosene is 1.44 and that of water is 1.33, yet kerosene is less dense than water in terms of mass. What does this tell us about the relationship between optical density and mass density?

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**Q20.** medium initial-understanding § 9.3.2 The Refractive Index [3]

[short\_answer] A light ray travels obliquely from glass (refractive index 1.52) into water (refractive index 1.33). In which direction does the ray bend at the interface – towards the normal or away from it? Justify your answer.

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**Q21.** medium initial-understanding § 9.3.3 Refraction by Spherical Lenses [3]

A double convex lens converges a parallel beam of light, while a double concave lens diverges it. How does the shape of each lens explain this difference in behaviour?

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**Q22.** straightforward initial-understanding § 9.3.3 Refraction by Spherical Lenses [1]

Where is the principal focus of a concave lens located relative to the lens, when parallel rays of light fall on it?

- A On the opposite side of the lens from the incoming light, where the rays actually meet
- B On the same side as the incoming light, where the diverging rays appear to come from
- C At the optical centre of the lens
- D At the centre of curvature on the opposite side of the lens

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**Q23.** medium initial-understanding § 9.3.3 Refraction by Spherical Lenses [2]

A ray of light passes through the optical centre of a lens. What happens to its direction after passing through the lens?

◆ Light – Reflection and Refraction

**Q24.** straightforward initial-understanding § 9.3.4 Image Formation by Lenses [1]

A concave lens always forms the same type of image for any position of the object. State the nature of this image in terms of: (i) real or virtual, (ii) erect or inverted, and (iii) enlarged or diminished.

◆ Light – Reflection and Refraction

**Q25.** straightforward initial-understanding § 9.3.5 Image Formation in Lenses Using Ray Diagrams [1]

When drawing a ray diagram for a lens, what happens to a ray of light that passes through the optical centre of the lens?

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**Q26.** straightforward initial-understanding § 9.3.6 Sign Convention for Spherical Lenses [1]

A spherical lens has a focal length of  $-12$  cm. What type of lens is it?

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**Q27.** medium initial-understanding § 9.3.7 Lens Formula and Magnification [3]

A convex lens has a focal length of 10 cm. An object is placed 30 cm in front of the lens. Find the image distance and state whether the image formed is real or virtual.

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**Q28.** straightforward initial-understanding § 9.3.7 Lens Formula and Magnification [1]

For a lens, magnification  $m = +0.5$  is obtained. What does the positive sign tell you about the image, and is the image larger or smaller than the object?

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**Q29.** straightforward initial-understanding § 9.3.8 Power of a Lens [1]

A convex lens has a focal length of 25 cm. Calculate its power and state its SI unit.

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