CLASS 8 · SCIENCE

Light: Mirrors and Lenses

Sample paper · 15 questions · 22 marks

10 objective questions × 1 mark. Five written-response questions: 12 marks. Write your working where needed. Suggested time: 45 minutes. Answers and marking guidance follow the questions.

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Section A · Objective questions (10 marks)

1. A ray of light bounces off a polished steel plate. What is this change called?

A. Magnetisation

B. Evaporation

C. Conduction

D. Reflection

2. An image can be caught clearly on a white card. Which description fits it?

A. Virtual

B. Always upright

C. Always larger

D. Real

3. For an ordinary object in front of a convex mirror, the image is:

A. Upright and always larger

B. Upright and smaller

C. Always on a screen

D. Inverted and larger

4. Which mirror can show a larger upright view of a tooth when held sufficiently close?

A. Plane

B. Convex

C. Concave

D. All mirrors always do

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5. A parallel beam passes through a concave lens in air. The emerging rays generally:

A. All stop

B. Remain parallel in every case

C. Spread apart

D. Become sound

6. A simple hand magnifier normally uses which lens?

A. An opaque disc

B. Convex

C. Concave

D. A plane mirror

7. Why can a page be seen from many positions under a lamp?

A. The page produces sunlight

B. Its rough surface scatters reflected light

C. All rays return along one line

D. Reflection never occurs

8. A ray makes an angle of 30° with the normal to a plane mirror. Its angle of reflection is:

A. 15°

B. 90°

C. 30°

D. 60°

9. Light changes direction as it crosses obliquely from air into water. This is:

A. Condensation

B. Electric current

C. Rusting

D. Refraction

10. A pencil is 20 cm in front of a plane mirror. How far behind the mirror is its image?

A. 20 cm

B. 40 cm

C. 10 cm

D. 0 cm

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Section B · Written responses (12 marks)

Attempt all five. Use a separate sheet if you need more space. The marks for each question are shown.

11. A road-corner mirror lets a driver see a wide area, but vehicles look smaller. Name a suitable mirror and explain why apparent size can mislead distance judgement. [2 marks]

12. A student looks through a hand magnifier at small print held closer than the focal length. Name the lens and describe the image orientation and size. [2 marks]

13. Give one useful application each of a concave mirror and a convex mirror, and connect each application to its image or reflection property. [2 marks]

14. A narrow ray strikes a plane mirror at 40° to the normal. Find the reflection angle, explain what the normal is, and state the law used. [3 marks]

15. A pencil behind a partly filled curved glass looks different through the water. Describe one possible change and explain why the exact appearance depends on the setup. [3 marks]

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Answers & marking guidance

Use these after attempting the paper. Accept equivalent correct reasoning and sensible units. These are Evater model answers, not an official marking scheme.

Section A · 1 mark each

1. D — Light returning from a surface is reflection.
2. D — An image formed where rays actually meet can be projected on a screen.
3. B — A convex mirror gives an upright, diminished virtual image of a real object.
4. C — A concave mirror magnifies an object placed within its focal length.
5. C — A concave lens is a diverging lens in air.
6. B — A convex lens gives an enlarged upright view when the object is inside its focal length.
7. B — Diffuse reflection sends light in many directions.
8. C — The angle of reflection equals the angle of incidence, measured from the normal.
9. D — Refraction is the change in light direction associated with passing between media.
10. A — The virtual image in a plane mirror is as far behind it as the object is in front.

Section B · Model answers

11. A convex mirror gives a wider field of view and an upright diminished image. The smaller image can make a vehicle seem farther away than it really is.

Marking: 1 mark for convex mirror with diminished image; 1 for relating small apparent size to misleading distance judgement.

12. The magnifier uses a convex lens. With print inside the focal length, the image is virtual, upright and enlarged.

Marking: 1 mark for convex lens; 1 for upright enlarged image at the stated position.

13. A concave mirror close to a tooth can give an enlarged view for inspection. A convex vehicle mirror gives a wide field of view with smaller upright images. Other correct examples are acceptable.

Marking: 1 mark per valid use with a correct property, one for each mirror type.

14. The angle of reflection is 40°. The normal is a line perpendicular to the mirror at the point where the ray strikes. The angle of incidence equals the angle of reflection.

Marking: 1 mark for 40°; 1 for the perpendicular normal; 1 for the correct reflection law.

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15. It may look displaced, distorted or differently sized. Refraction at the air, glass and water boundaries changes ray direction; curved surfaces have a lens effect. The result depends on the pencil position, glass shape and viewing direction, so one universal bend pattern is not required.

Marking: 1 mark for a plausible observation; 1 for refraction/lens effect; 1 for dependence on viewing geometry.

Topic references

Concept references: OpenStax Physics, Reflection and Lenses.

https://openstax.org/books/physics/pages/16-1-reflection

https://openstax.org/books/physics/pages/16-3-lenses

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