CLASS 8 SCIENCE EXTRA QUESTIONS

Extra Questions for Class 8 Science Chapter 10: Light: Mirrors and Lenses

Original extra practice questions for Class 8 Science Chapter 10 (Light: Mirrors and Lenses), going beyond the textbook exercise with fresh scenarios and applied reasoning. Full explanations included.

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Q1 (Angle calculation). A ray of light strikes a plane mirror such that the reflected ray is perpendicular to the incident ray. Find the angle of incidence.
Solution: Let angle of incidence = angle of reflection = θ. Since incident and reflected rays are perpendicular to each other, $\theta + \theta = 90° \Rightarrow \theta =$ **45°**.

Q2 (Concave vs convex mirror uses). Explain why a dentist's mirror is concave, while a shop's security mirror is convex.
Solution: A dentist's mirror is held close to the tooth (within the mirror's focal length), where a concave mirror produces a magnified, upright, virtual image — useful for close examination. A shop's security mirror needs to show a wide field of view of the store from a fixed spot; a convex mirror's diverging reflection gives a wider field of view (though diminished), letting staff monitor more of the store from one mirror.

Q3 (Assertion–Reason). Assertion (A): A concave lens can never form a real image. Reason (R): A concave lens always diverges light rays, so they never actually meet to form a real image.
Solution: Both A and R are true, and R correctly explains A — since a concave lens spreads out (diverges) parallel rays instead of bringing them together, the rays only ever appear to diverge from a point behind the lens, forming a virtual image, never a real one.

Q4 (Applied reasoning, car headlights). Why are car headlight reflectors typically concave (parabolic) rather than convex or flat?
Solution: A concave (parabolic) reflector placed with the bulb at its focus reflects light rays so they travel forward as a strong, roughly parallel beam — maximising how far the light reaches down the road. A flat or convex reflector would scatter light more widely and less intensely, giving poorer visibility at distance.

Q5 (Spot the error). A student claims: "Since a plane mirror shows a same-size image, the image distance from the mirror must be less than the object distance." Is this correct?
Solution: Incorrect. For a plane mirror, the image forms exactly as far *behind* the mirror as the object is in front of it — image distance always equals object distance, not less.

Q6 (Refraction, applied). A swimming pool looks shallower than it actually is when viewed from above the water. Explain why, using the same principle as the bent-pencil observation.
Solution: Light from the pool floor bends (refracts) away from the normal as it passes from water (denser) into air (rarer) on its way to your eye. Your brain assumes light has travelled in a straight line, so it interprets the floor as being higher up (shallower) than its true depth — the same refraction effect that makes a partly-submerged pencil look bent at the water's surface.

Q7 (Multiple reflection, angle chain). Two plane mirrors are placed facing each other at 90° to one another. A ray strikes the first mirror at 30° to its normal, reflects, and then strikes the second mirror. Find the angle this ray makes with the normal of the second mirror.
Solution: The ray reflects off the first mirror at 30° (equal to the angle of incidence). Because the two mirrors are perpendicular to each other, the geometry works out so the ray strikes the second mirror at an angle of **60°** to its normal (the two angles of incidence at perpendicular mirrors are complementary, summing to 90°).

Q8 (Everyday instrument reasoning). A camera lens forms a real, inverted, diminished image of a distant scene onto the film/sensor. What type of lens must it use, and why?
Solution: It must use a **convex (converging) lens**. Only a convex lens can bring diverging light rays from

a distant object to a real focus, forming an inverted image on a screen (film/sensor) — a concave lens can never form a real image.

Q9 (Classification). Classify each instrument's main optical element as concave mirror, convex mirror, convex lens, or concave lens: (i) shaving/makeup mirror (magnified, close-up) (ii) vehicle rear-view/side mirror (iii) simple magnifying glass (iv) corrective lens for short-sightedness (myopia).
Solution: (i) **Concave mirror** (magnifies when object is close, within focal length). (ii) **Convex mirror** (wide field of view, diminished image). (iii) **Convex lens** (converges light, magnifies close objects). (iv) **Concave lens** (diverges light to correct the eye focusing light in front of, rather than on, the retina in myopia).

Q10 (Ray-path reasoning). If the angle between an incident ray and the mirror surface (not the normal) is 35°, find the angle between the incident and reflected rays.
Solution: Angle of incidence (from normal) = 90° − 35° = 55°. Angle of reflection = 55° too. Angle between incident and reflected rays = 55° + 55° = **110°**.