Chapter 9

Ray Optics and Optical Instruments

(Assertion and Reason questions)

Directions: These questions consist of two statements, each printed as Assertion and Reason. While answering these questions, you are required to choose any one of the following four responses.

(a) If both Assertion and Reason are correct and the Reason is a correct explanation of the Assertion.

(b) If both Assertion and Reason are correct but Reason is not a correct explanation of the Assertion.

(c) If the Assertion is correct but Reason is incorrect.

(d) If both the Assertion and Reason are incorrect.

Q.1. Assertion: Plane mirror may form real image.
Reason: Plane mirror forms virtual image, if object is real.

Q.2. Assertion: The focal length of the convex mirror will increase, if the mirror is placed in water.
Reason: The focal length of a convex mirror of radius R is equal to , f = R/2.

Q.3. Assertion: The image formed by a concave mirror is certainly real if the object is virtual.
Reason: The image formed by a concave mirror is certainly virtual if the object is real.

Q.4. Assertion: The image of an extended object placed perpendicular to the principal axis of a mirror, will be erect if the object is real but the image is virtual.

Reason: The image of an extended object, placed perpendicular to the principal axis of a mirror, will be erect if the object is virtual but the image is real.

Q.5. Assertion: An object is placed at a distance off from a convex mirror of focal length f its image will form at infinity.
Reason: The distance of image in convex mirror can never be infinity

Q.6. Assertion: The image of a point object situated at the centre of hemispherical lens is also at the centre.
Reason: For hemisphere Snell's law is not valid.

Q.7. Assertion: The focal length of an equiconvex lens of radius of curvature R made of material of refractive index $\mu = 1.5$, is R.
Reason: The focal length of the lens will be R/2.

Q.8. Assertion: If the rays are diverging after emerging from a lens; the lens must be concave.
Reason: The convex lens can give diverging rays.

Q.9. Assertion: The resolving power of a telescope is more if the diameter of the objective lens is more.
Reason: Objective lens of large diameter collects more light.

Q.10. Assertion: The optical instruments are used to increase the size of the image of the object.
Reason: The optical instruments are used to increase the visual angle.

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ANSWER KEY

Q.1 : (b)

Q.2 : (d) Focal length of the spherical mirror does not depend on the medium in which it placed.

Q.3 : (c) The image of real object may be real in case of concave mirror.

Q.4 : (b) **Q.5 :** (d)

Q.6 : (c) The rays from centre of hemisphere cut at the centre after refraction – Snell's law is valid in each case of refraction.

Q.7: (c)

Q.8 : (d) If the rays cross focal point of convex lens, they become diverging.

Q.9: (a) RP α diameter of objective.

Q.10: (d)