# Chapter - 10

# Light-Reflection and Refraction

## ( Assertion and Reasoning Questions )

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**Following questions consist of two statements – Assertion (A) and Reason (R). Answer these questions selecting the appropriate option given below:**

**(a)** Both A and R are true and R is the correct explanation of A.

**(b)** Both A and R are true but R is not the correct explanation of A.

**(c)** A is true but R is false.

**(d)** A is false but R is true.

**Q.1. Assertion (A) :** The centre of curvature is not a part of the mirror. It lies outside its reflecting surface.

**Reason (R) :** The reflecting surface of a spherical mirror forms a part of a sphere. This sphere has a centre.

**Q.2. Assertion (A) :** A ray passing through the centre of curvature of a concave mirror after reflection, is reflected back along the same path.

**Reason (R) :** The incident rays fall on the mirror along the normal to the reflecting surface.

**Q.3. Assertion (A) :** Light does not travel in the same direction in all the media.

**Reason (R) :** The speed of light does not change as it enters from one transparent medium to another.

**Q.4. Assertion (A) :** The emergent ray is parallel to the direction of the incident ray.

**Reason (R) :** The extent of bending of the ray of light at the opposite parallel faces (air- glass interface and glass-air interface) of the rectangular glass slab is equal and opposite.

**Q.5. Assertion (A) :** A ray of light travelling from a rarer medium to a denser medium slows down and bends away from the normal. When it travels from a denser medium to a rarer medium, it speeds up and bends towards the normal.

**Reason (R) :** The speed of light is higher in a rarer medium than a denser medium.

**Q.6. Assertion (A) :** The mirrors used in search lights are concave spherical.

**Reason (R) :** In concave spherical mirror the image formed is always virtual.

**Q.7. Assertion (A) :** Light travels faster in glass than in air.

**Reason (R) :** Glass is denser than air.

**Q.8. Assertion (A) :** For observing traffic at back, the driver mirror is convex mirror.

**Reason (R) :** A convex mirror has much larger field of view than a plane mirror.

**Q.9. Assertion (A) :** Mirror formula can be applied to a plane mirror.

**Reason (R) :** A plane mirror is a spherical mirror of infinite focal length.

**Q.10. Assertion (A) :** It is not possible to see a virtual image by eye.

**Reason (R) :** The rays that seem to emanate from a virtual image do not in fact emanates from the image.

**Q.11. Assertion (A) :** When the object moves with a velocity 2 m/s, its image in the plane mirror moves with a velocity of 4 m/s.

**Reason (R) :** The image formed by a plane mirror is as far behind the mirror as the object is in front of it.

**Q.12. Assertion (A) :** The height of an object is always considered positive.

**Reason (R) :** An object is always placed above the principal axis in this upward direction.

**Q.13. Assertion (A) :** Concave mirrors are used as make-up mirrors.

**Reason (R) :** When the face is held within the focus of a concave mirror, then a diminished image of the face is seen in the concave mirror.

**Q.14. Assertion (A) :** Refractive index has no units.

**Reason (R) :** The refractive index is a ratio of two similar quantities.

**Q.15. Assertion (A) :** The formula connecting u, v and f for a spherical mirror is valid in all situations for all spherical mirrors for all positions of the object.

**Reason (R) :** Laws of reflection are strictly valid for plane surfaces.

**Q.16. Assertion (A) :** A person cannot see his image in a concave mirror, unless, he is standing beyond the center of curvature of the mirror.

**Reason (R) :** In a concave mirror, image formed is real provided the object is situated beyond its focus.

**Q.17. Assertion (A) :** Virtual images are always erect.

**Reason (R) :** Virtual images are formed by diverging lenses only.

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## ANSWER KEY

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|---|---|---|---|
| **Q.1** : (a) | **Q.2** : (a) | **Q.3** : (c) | **Q.4** : (a) |
| **Q.5** : (d) | **Q.6** : (c) | **Q.7** : (d) | **Q.8** : (a) |
| **Q.9** : (a) | **Q.10** : (d) | **Q.11** : (a) | **Q.12** : (a) |
| **Q.13** : (c) | **Q.14** : (a) | **Q.15** : (c) | **Q.16** : (b) |
| **Q.17** : (c) | | | |