

Light-Reflection and Refraction

Assertion & Reason Type Questions

Directions: Each of the following questions consists of two statements, one is Assertion (A) and the other is Reason (R). Give answer:

- a. Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).
- b. Both Assertion (A) and Reason (R) are true but Reason (R) is not the correct explanation of Assertion (A).
- c. Assertion (A) is true but Reason (R) is false.
- d. Assertion (A) is false but Reason (R) is true.

Q1. Assertion (A): A ray incident along normal to the mirror retraces its path.

Reason (R): In reflection, angle of incidence is always equal to angle of reflection.

Answer : (a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).

Q2. Assertion (A): Large concave mirrors are used to concentrate sunlight to produce heat in solar cookers.

Reason (R): Concave mirror converges the light rays falling on it to a point.

Answer : (a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).

Q3. Assertion (A): A pencil partly immersed in water appears to be bent at the water surface.

Reason (R): Light from different points on the pencil immersed in water refracts and appears to come from a point above the original position.

Answer : (a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).

Q4. Assertion (A): Higher is the refractive index of a medium or denser the medium, lesser is the velocity of light in that medium.

Reason (R): Refractive index is inversely proportional to velocity.

Answer : (a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).

Q5. Assertion (A): A convex lens can form a magnified erect as well as magnified inverted image of an object placed in front of it.

Reason (R): A magnified and inverted image can be obtained by a convex lens when an object is kept between F and C.

Answer : (c) Assertion (A) is true but Reason (R) is false.

Q6. 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.

Answer : (a)

Q7. 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.

Answer : (a)

Q8. 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.

Answer : (c)

Q9. 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.

Answer : (a)

Q10. 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.

Answer : (d)

Q11. Assertion (A) : The mirrors used in search lights are concave spherical.

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

Answer : (c)

Q12. Assertion (A) : Light travels faster in glass than in air.

Reason (R) : Glass is denser than air.

Answer : (d)

Q13. 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.

Answer : (a)

Q14. Assertion (A) : Mirror formula can be applied to a plane mirror.

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

Answer : (a)

Q15. 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.

Answer : (d)

Q.16. 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.

Answer : (a)

Q17. 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.

Answer : (a)

Q18. 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.

Answer : (c)

Q19. Assertion (A) : Refractive index has no units.

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

Answer : (a)

Q20. 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.

Answer : (c)

Q21. 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.

Answer : (b)

Q22. Assertion (A) : Virtual images are always erect.

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

Answer : (c)