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)