ASSERTION REASONING ASSIGNMENT FOR STUDENTS

Each question has two statements – one labeled *Assertion* (A) and the other labeled *Reason* (R). Select the correct answer to these questions from the codes (i), (ii), (iii) and (iv) as given below:

(i) Both A and R are true and R is the correct explanation of the assertion.
(ii) Both A and R are true but R is not the correct explanation of the assertion.
(iii) A is true but R is false.
(iv) A is false but R is true.

1. **Assertion:** A ray of light incident, perpendicular to the reflecting surface retraces its path.
   Reason: Angle of incidence = Angle of reflection
2. **Assertion:** The image formed by a concave mirror can be real and inverted.
   Reason: When the object lies infront of a concave mirror beyond principal focus it forms a real and inverted image.
3. **Assertion:** Virtual image cannot be obtained on a screen.
   Reason: Virtual image is always formed behind the mirror.
4. **Assertion:** The height of the object is 2.10m and the height of plane mirror required to see its full image is 4.20m.
   Reason: The height of plane mirror for full image = $\frac{Height\ of\ object}{2}$
5. **Assertion:** The size of the image of an object decreases as it moves away from the concave mirror.
   Reason: Magnification = $\frac{size\ of\ image}{size\ of\ object}$
6. **Assertion:** Convex mirror is used as a rear view mirror in a vehicle.
   Reason: Convex mirror forms a magnified virtual image.
7. **Assertion:** Concave mirror is used as a shaving mirror.
   Reason: Concave mirror forms real as well as virtual image.
8. **Assertion:** Linear magnification produced by a concave mirror may be less than 1, more than 1 or equal to 1.
   Reason: A concave mirror can form both real and virtual images of an object.
9. **Assertion:** Magnification of a plane mirror is -1.
   Reason: In a plane mirror, size of image = size of object.
10. **Assertion:** Out of the three lenses of focal lengths +5cm, -5cm and +50cm respectively a student prefers the lens of +5cm focal length to read small letters.
    Reason: The power of a lens increases with increase in focal length.
11. **Assertion:** Refractive index of a medium can be less than 1.
    Reason: Speed of light is less in a denser medium and more in a rarer medium.
12. **Assertion:** Refractive index of a medium is a pure number.
    Reason: Refractive index = $\frac{speed\ of\ light\ in\ vacuum}{speed\ of\ light\ in\ medium}$
13. **Assertion:** No refraction of light takes place when light goes from optically rarer medium to optically denser medium perpendicular to the surface separating the two media.
    Reason: $\frac{\sin i}{\sin r} = \mu$
14. **Assertion:** The frequency of light remains unaltered, when light goes from one medium to another medium.
    Reason: The speed and wavelength of light changes, when it goes from one medium to another medium.
15. **Assertion:** A lens forms a full-length image of an object even if its half portion is covered with a black paint.
    Reason: Black paint absorbs light.
16. **Assertion:** The magnification produced by a convex lens can be positive and greater than 1.
    Reason: When a convex lens produces real image its magnification is positive.

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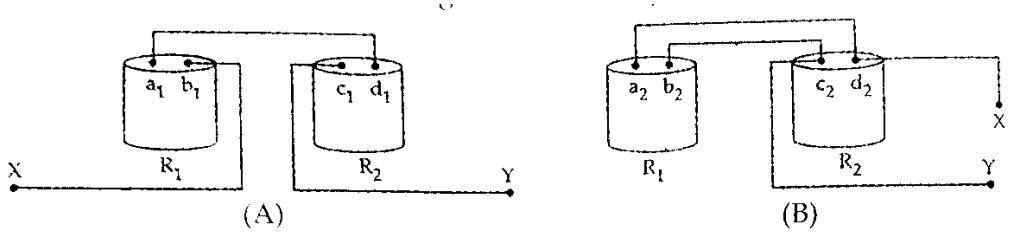
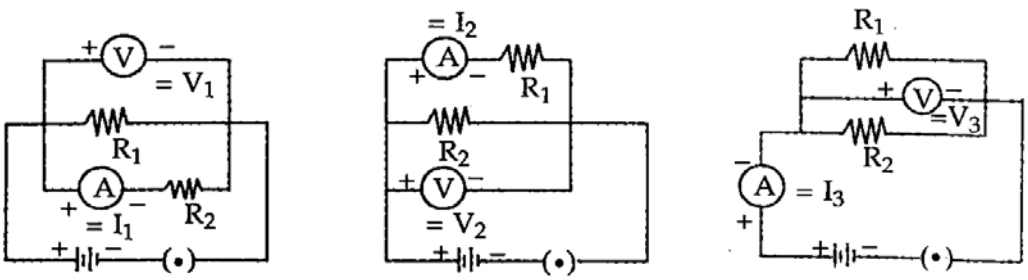
17. **Assertion:** Two thin lenses with powers +4D and -10D are kept in contact with each other, and their resultant power is +6D.
    Reason: The resultant power of two lenses in contact is the algebraic sum of their respective powers.
18. **Assertion:** Human eye is just like a camera.
    Reason: Retina acts as a screen to obtain image of an object.
19. **Assertion:** Human eye has the ability to form sharp images of objects at different position from the eye on the retina of the eye.
    Reason: Eye lens is a convex lens of fixed focal length.
20. **Assertion:** A person suffering from hypermetropia can see only distant objects clearly.
    Reason: A convex lens of suitable focal length can correct Hypermetropia.
21. **Assertion:** The splitting of white light into its constituent colours while passing through a glass prism is called dispersion of light.
    Reason: Different colours of light travel with different speeds in a glass prism.
22. **Assertion:** Rainbow is the example of dispersion of sunlight in nature.
    Reason: Rainbow is visible in the wet atmosphere, when the back of the observer is towards the sun.
23. **Assertion:** Scattering of red colour is the least as compared to the scattering of other colours.
    Reason: Intensity of scattering light is inversely proportional to the fourth power of wavelength.
24. **Assertion:** Electrons move from lower potential to higher potential in a conductor.
    Reason: Electric potential difference across the ends of a conductor is maintained by a dry cell.
25. **Assertion:** The flow of electrons in a conductor constitutes an electric current.
    Reason: A conductor carrying current is neutral.
26. **Assertion:** Ohm's law is valid only if temperature of the conductor remains the same.
    Reason: $\frac{V}{I} = R\ (Constant\ at\ a\ temperature)$
27. **Assertion:** Resistance of a conductor increases with increase in the length of the conductor.
    Reason: Resistance (R) $\propto$ length (l)
28. **Assertion:** Two students A and B connect two resistors R_1 and R_2 as shown and get the same reading of equivalent resistance.



    Reason: When same current passes through two resistors connected end to end they are said to be connected in series.
29. **Assertion:** For the given three circuits, the relation between voltmeter and ammeter reading is: $V_1=V_2=V_3$ and $I_1 \neq I_2 \neq I_3$.



    Reason: $\frac{V}{R} = I$

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30. **Assertion:** Resistivity of a wire increases with increase in the temperature of the wire.
    Reason: Resistivity of the material of a wire depends on the dimensions of the wire.
31. **Assertion:** Alloys are used in electric heater and electric iron.
    Reason: Alloys do not oxidize easily even at higher temperature.
32. **Assertion:** Electric fuse is a safety device connected in parallel with electric circuit.
    Reason: Electric fuse melts at higher temperature.
33. **Assertion:** An electric short circuit takes place when one live wire touches another live wire of electricity supply line.
    Reason: Earthing of electrical appliances prevents from fatal electric shocks.
34. **Assertion:** Magnetic compass placed near a current carrying conductor deflects.
    Reason: Current carrying conductor produces magnetic field around it.
35. **Assertion:** When a bar magnet is cut into two equal halves, two bar magnets are formed.
    Reason: Magnetic poles exist in pairs.
36. **Assertion:** No force acts on a stationary charge placed in a uniform magnetic field.
    Reason: Force acting on a charge q moving with a speed v in uniform magnetic field is qvB.
37. **Assertion:** Electric motor converts mechanical energy to electrical energy.
    Reason: A current carrying conductor placed perpendicular to uniform magnetic field experiences a force.
38. **Assertion:** Two circular coils A and B are placed close to each other. If the current in the coil A is changed, some current will be induced in the coil B.
    Reason: A force acts on a current carrying conductor placed in a magnetic field.
39. **Assertion:** The velocity of a proton can change while it moves freely in a magnetic field.
    Reason: A charged particle experiences a force while moving in a magnetic field.
40. **Assertion:** The force experienced by a current carrying conductor placed in a magnetic field is largest when the conductor is parallel to the direction of magnetic field.
    Reason: Force experienced by a current carrying conductor is directly proportional to the length of the conductor.

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Answers to Assertion Reasoning Questions

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