

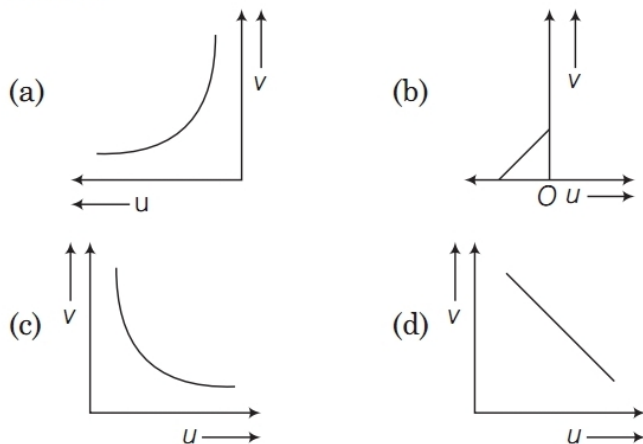
Objective Questions

(For Complete Chapter)

Multiple Choice Questions (MCQs)

1. A biconcave lens of power P vertically splits into two identical plano-concave parts. The power of each part will be Delhi 2020
(a) $2P$ (b) $\frac{P}{2}$ (c) P (d) $\frac{P}{\sqrt{2}}$
2. A person standing in front of a mirror finds his image larger than himself. This implies that the mirror is
(a) convex (b) parabolic
(c) plane (d) concave
3. A plane mirror produces a magnification of
(a) zero (b) -1
(c) $+1$ (d) between 0 and $+1$
4. When light passes from one medium to other, then which will not change?
(a) Frequency (b) Wavelength
(c) Amplitude (d) Velocity
5. Maximum lateral displacement of a ray of light incident on a slab of thickness t is
(a) $\frac{t}{2}$ (b) $\frac{t}{3}$ (c) $\frac{t}{4}$ (d) t
6. A plane glass slab is kept over various colour letters, the letter which appears least raised is
(a) red (b) violet (c) green (d) blue

7. In optical fibres, the refractive index of the core is
- greater than that of the cladding
 - equal to that of the cladding
 - smaller than that of the cladding
 - independent of that of the cladding
8. The graph between the image distance (v) and object distance (u) from the convex lens is



9. When a biconvex lens of glass having refractive index 1.47 is dipped in a liquid, it acts as a plane sheet of glass. This implies that the liquid must have refractive index
- equal to that of glass
 - less than one
 - greater than that of glass
 - less than that of glass
10. The intermediate image formed by the objective of a compound microscope is
- real, inverted and magnified
 - real, erect and magnified
 - virtual, erect and magnified
 - virtual, inverted and magnified
11. If the focal length of the eyepiece of a telescope is doubled, its magnifying power m will be
- $2m$
 - $3m$
 - $\frac{m}{2}$
 - $4m$

Assertion - Reason Questions

Directions (Q. Nos. 12-16) *In the following questions, two statements are given- one labelled Assertion (A) and the other labelled Reason (R). Select the correct answer to these questions from the codes (a), (b), (c) and (d) as given below*

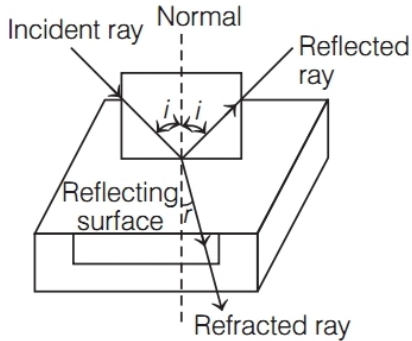
- If both Assertion and Reason are correct and Reason is the correct explanation of Assertion.
 - If both Assertion and Reason are correct but Reason is not the correct explanation of Assertion.
 - If Assertion is correct but Reason is incorrect.
 - If both Assertion and Reason are incorrect.
12. **Assertion** A ray of light incident along the normal to the plane mirror retraces its path after reflection from the mirror.
Reason A ray of light along the normal has angle of incidence as $\pi/2$.
13. **Assertion** A convex mirror always make a virtual image.
Reason The rays always diverge after reflection from the convex mirror.
14. **Assertion** The images formed by total internal reflection are much brighter than those formed by mirrors or lenses.
Reason There is no loss of intensity in total internal reflection.
15. **Assertion** A diverging lens (in air) cannot be made more diverging whatever be the medium we choose to completely immerse the lens.
Reason The minimum refractive index of any medium is 1.
16. **Assertion** A hollow lens behaves like a thin glass plate.
Reason Power of this lens becomes zero.

Case Based Questions

Directions (Q.Nos. 17-18) *These questions are case study based questions. Attempt any 4 sub-parts from each question. Each question carries 1 mark.*

17. Refraction of Light

Refraction involves change in the path of light due to change in the medium.



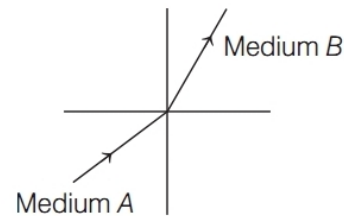
When a beam of light encounters another transparent medium, a part of light gets reflected back into the first medium while the rest enters the other. The direction of propagation of an obliquely incident ray of light, that enters the other medium, changes at the interface of two media. This phenomenon is called refraction of light.

- (i) Which of the following quantity does not change during refraction of light?
 - (a) Speed of light
 - (b) Intensity of light
 - (c) Wavelength of light
 - (d) Frequency of light
- (ii) A ray of light strikes an air-glass interface at an angle of incidence ($i = 60^\circ$) and gets refracted at an angle of refraction r . On decreasing the angle of incidence ($i < 60^\circ$), the angle of refraction r
 - (a) decreases
 - (b) remains same
 - (c) is equal to 60°
 - (d) increases
- (iii) When an object lying in a denser medium is observed from rarer medium, then real depth of object is
 - (a) more than that observed
 - (b) less than that observed

(c) equals to observed depth

(d) None of the above

- (iv) For the same angle of incidence, the angles of refraction in media P , Q and R are 45° , 35° and 20° , respectively. Which of the following relation hold true for the velocity of light in medium P , Q and R ?
 - (a) $v_P < v_Q < v_R$
 - (b) $v_P < v_R < v_Q$
 - (c) $v_P > v_Q > v_R$
 - (d) $v_P > v_R > v_Q$
- (v) A light ray enters from medium A to medium B as shown in figure. The refractive index of medium A and B are μ_A and μ_B , then



(a) $\mu_B > \mu_A$

(b) $\mu_B < \mu_A$

(c) $\mu_A = \mu_B$

(d) $\mu_A = \frac{1}{\mu_B}$

18. Compound Microscope

A compound microscope consists of two converging lenses. One of them of smaller aperture and smaller focal length is called objective and the other slightly larger aperture and slightly larger focal length is called eyepiece.

Both the lenses are fitted in a tube with an arrangement to vary the distance between them. A tiny object is placed in front of the objective at a distance slightly greater than its focal length. The objective produces the image of the object which acts as an object for the eyepiece. The eyepiece, in turn produces the final magnified image. $1 \times 5 = 5$

- (i) In a compound microscope, the image formed by the objective and the eyepiece are respectively
 - (a) virtual, real
 - (b) real, virtual
 - (c) virtual, virtual
 - (d) real, real
- (ii) The magnification due to a compound microscope does not depend upon
 - (a) the aperture of the objective and the eyepiece

- (b) the focal length of the objective and the eyepiece
 - (c) the length of the tube
 - (d) the colour of the light used
- (iii) Which of the following is not correct in the context of a compound microscope ?
- (a) Both the lenses are of short focal lengths.
 - (b) The magnifying power increases by decreasing the focal lengths of the two lenses.
 - (c) The distance between the two lenses is more than $(f_o + f_e)$.
 - (d) The microscope can be used as a telescope by interchanging the two lenses.
- (iv) A compound microscope consists of an objective of 10X and an eyepiece of 20X. The magnification due to the microscope would be
- (a) 2
 - (b) 10
 - (c) 30
 - (d) 200
- (v) The focal lengths of objective and eye piece of a compound microscope are 1.2 cm and 3.0 cm respectively. The object is placed at a distance of 1.25 cm from the objective. If the final image is formed at infinity, the magnifying power of the microscope would be
- (a) 100
 - (b) 150
 - (c) 200
 - (d) 250