e-Edge Education Centre

Light- Reflection and Refraction

In this topic Questions are divided in three parts:

1. **Multiple Choice Questions (Total Questions-24)**
2. **Definition & Theoretical Questions (26 Questions)**
3. **Numerical Questions (Total Questions-06)**

Multiple choices

(Q.1) Mirrors used in vehicle headlights are: (1 mark)
   (A) Concave mirrors   (B) Convex mirrors
   (C) Plane mirrors   (D) Any spherical mirror

(Q.2) Dispersion of light by a glass prism takes place because of   (1 mark)
      (A) Difference in wavelengths of the constituents of light
      (B) Difference in speeds of various constituents of white light.
      (C) Scattering of light by the surface of the glass prism.
      (D) Only 1 and 2 are correct.

(Q.3) Negative value of focal length of a spherical mirror indicates that it is   (1 mark)
   (A) Concave mirror   (B) Convex mirror
   (C) Plane mirror   (D) None of these

(Q.4) Refraction of light can take place at the boundary of   (1 mark)
   (A) Transparent media   (B) Opaque media
   (C) Any medium   (D) None of these

(Q.5) According to the laws of reflection   (1 mark)
   (A) Angle i = Angle r   (B) Sine i = sine r
   (C) Sine i / Sine r = constant   (D) All of these

(Q.6) An object placed at F of a concave mirror will produce an image   (1 mark)
   (A) At infinity   (B) Highly enlarged
   (C) Real and Inverted   (D) All of these

(Q7) An object placed at infinity of a concave mirror will produce an   (1 mark)
image
    (A) Behind the mirror   (B) Diminished
    (C) Virtual and erect   (D) All of these

(Q.8) An object placed at F of a concave lens will produce an image   (1 mark)
    (A) On same side as the object   (B) Diminished
    (C) Virtual and erect   (D) All of these

(Q.9) An object placed at 2F of a convex lens will produce an image   (1 mark)
    (A) At 2F   (B) Same size
    (C) Real and Inverted   (D) All of these

(Q.10) An object placed between F and 2F of a convex lens will
produce an image   (1 mark)
    (A) Beyond 2F   (B) Enlarged
    (C) Real and Inverted   (D) All of these

(Q.11) According to the laws of refraction (Snell's law)   (1 mark)
    (A) Angle i = Angle r   (B) Sine i = sine r
    (C) Sine i / Sine r = constant   (D) All of these

(Q.12) Refractive index of a substance is   (1 mark)
    (A) Speed of light in vacuum / Speed of light in the medium
    (B) Speed of light in water / Speed of light in the medium
    (C) Speed of light in the medium / Speed of light in air
    (D) All of these

(Q.13) According to Cartesian Sign Convention   (1 mark)
  (A) Object distance is always negative   (B) Object distance is always positive
  (C) Image distance is always negative   (D) Image distance is always positive

(Q.14) Magnification produced by a concave mirror is   (1 mark)
    (A) Negative for a real image   (B) Positive for a virtual image
    (C) Both are correct   (D) None of these

(Q.15) A ray of light propagates from an optically denser medium
to an optically rarer medium.   (1 mark)
    (A) It will bend towards the normal after refraction.
    (B) It will bend away from the normal after refraction.
    (C) It will continue to go on the same path after refraction.
    (D) It will refract making an angle of refraction equal to the angle of incidence.

(Q.16) Radius of curvature of a spherical mirror (or lens) is   (1 mark)
    (A) Half of its focal length   (B) Double of its focal length
    (C) Equal to its focal length   (D) There is no relation

(Q.17) The distance between a spherical lens and the image is – 15 cm. The lens is   (1 mark)
  (A) Concave lens   (B) Convex lens
  (C) Either of the two irrespective of the object distance
  (D) Either Concave lens or Convex lens with object between O and F.

(Q.18) Power of a lens is   (1 mark)
  (A) Equal to its focal length   (B) Reciprocal of the focal length (in meters)
  (C) Square of its focal length   (D) Reciprocal of its radius of curvature

(Q.19) Lens formula is expressed as   (1 mark)
  (A) $1/v - 1/u = 1/f$ (B) $1/v + 1/u = 1/f$
  (C) $1/u - 1/v = 1/f$ (D) $u + v = f$

(Q.20) The color of an object is determined by   (1 mark)
  (A) The colour of light reflected by it.   (B) The colour of light absorbed by it.
  (C) The colour of light incident on it only. (D) None of the above.

(Q.21) The three primary colours are   (1 mark)
  (A) Red, Blue and Green   (B) Red, Yellow and Blue
  (C) Red, White and Blue   (D) Violet, Green and Red

(Q.22) Laws of reflection are applicable to: (1 mark)
  (A) Spherical reflecting surfaces   (B) Plane reflecting surfaces
  (C) All types of reflecting surfaces   (D) Spherical and plane reflecting surfaces

(Q.23) Magnitude of magnification less than 1 indicates: (1 mark)
  (A) Size of image > Size of object   (B) Size of image = Size of object
  (C) Size of image < Size of object   (D) None of the above

(Q.24) A lens with power – 4 D is a: (1 mark)
  (A) Convex lens of focal length -4 m   (B) Convex lens of focal length -0.25 m
  (C) Concave lens of focal length -4 m   (D) Concave lens of focal length -0.25 m

Definition & Theoretical Questions

Write Answer in appropriate words.

Short & long answer type questions.

1. What is refraction of light? Write a law of refraction.
2. What do you understand by the principal focus of a concave mirror?
3. Why do we prefer a convex mirror as a rear-view mirror in vehicles?
4. Where will the image be formed when an object is placed between the pole and focus point of the mirror?
5. Can an enlarged image be formed by a convex mirror?
6. What is the property of image formed by a concave lens?
7. Name the three primary colours?
8. For which colour the refractive index of material is maximum?
9. What colour we obtain when we mix red and green?
10. What is refraction of light? Write a law of refraction.
11. What do you understand by the principal focus of a concave mirror?
12. Why do we prefer a convex mirror as a rear-view mirror in vehicles?
13. Where will the image be formed when an object is placed between the pole and focus point of the mirror?
14. Can an enlarged image be formed by a convex mirror?
15. What is the property of image formed by a concave lens?
16. Name the three primary colours?
17. For which colour the refractive index of material is maximum?
18. What colour we obtain when we mix red and green?
18. What happens to the light when it travels from denser to rarer medium?
19. Can total internal reflection take place when light travels from rarer to denser medium?
20. Will the focal length of an image change, when it is placed in water?
21. A convex lens has a focal length of 50cm.What is its power?
22. The refractive index of diamond is 2.42. What is the meaning of this statement?
24. What is the difference between real and virtual images?
25. What are the uses of a concave mirror?
26. What happens to the light when it travels from denser to rarer medium? Can total internal reflection take place when light travels from rarer to denser medium?

Numerical Questions

1. An object 5 cm in length is held 25 cm away from a converging lens of focal length 10cm. Draw the ray diagram and find the position, size and nature of the image formed.
2. Light enters from air to glass having refraction index 1.50. What is the speed of light in the glass? The speed of light in vacuum is 3×10^8 ms^{-1}.
3. A doctor has prescribed a corrective lens of power + 1.5 D. Find the focal length of the lens. Is the prescribed lens diverging or converging?
4. An object is placed at 10cm in front of a concave mirror of focal length 15cm. Find the position, nature and size of the image.

Human Eye and Colourful World

Multiple choices:

(Q.1) Least distance of vision for a normal eye is   (1 mark)
    (A) 25 cm   (B) 1 m   (C) 30m   (D) Infinity

(Q.2) Cataract is a condition   (1 mark)
    (A) When the crystalline lens becomes milky and cloudy.
    (B) There is complete loss of vision.
    (C) It cannot be cured.   (D) All of these

(Q.3) Which of the following does not describe working of the human eye?   (1 mark)
    (A) The lens system forms an image on a light sensitive screen called the retina.
    (B) Light enters the eye through a thin membrane called the cornea.
    (C) Rainbow is formed due to splitting of white light.
    (D) Iris is a dark muscular diaphragm that controls the size of the pupil for regulating the amount of light entering into the eye.

(Q.4) Human eye is one of the most valuable and sensitive organ that   (1 mark)
    (A) Enables us to see the wonderful world and colours around us
    (B) Can identify the objects
    (C) Is like a camera   (D) All of these

(Q.5) Iris contracts the pupil   (1 mark)
    (A) In bright light   (B) To allow less light to enter
    (C) In darkness   (D) Only (1) and (2)

(Q.6) Electrical signals generated by light sensitive cells of retina   (1 mark)
   are sent to the brain via
   (A) Motor nerves   (B) Optic nerves
   (C) auditory nerves   (D) Spinal cord

(Q.7) Accommodation of a human eye is the property of   (1 mark)
   (A) The eye lens to adjust its focal length   (B) The eye to see different colours
   (C) Filling the eyes with tears   (D) All of the above

(Q.8) The eye lens forms a _____ and _____ image of
   the object on the retina.   (1 mark)
   (A) Virtual and erect   (B) Real and inverted
   (C) Real and erect   (D) Virtual and erect

(Q.9) Light sensitive cells get activated on   (1 mark)
   (A) Illumination   (B) Seeing the different colours
   (C) Facing opaque objects   (D) Receiving message from the brain

(Q.10) Colour blindness is the name given to   (1 mark)
   (A) Inability to distinguish between colours (B) Inability to see anything
   (C) Inability to see in dark   (D) Inability to see in bright light

(Q.11) Ciliary muscles help in seeing nearby and far off objects
    clearly by   (1 mark)
   (A) Modifying the curvature of eye lens
   (B) Relaxing to make the lens thin, thus increasing its focal length
   (C) Contraction to make the lens thick, thus reducing its focal length
   (D) All of these

(Q.12) A person is not able to see distant objects clearly, because   (1 mark)
   (A) He is suffering from myopia
   (B) The defect can be rectified by using a concave lens
   (C) Focal length of the eye lens is too less
   (D) All of the above

(Q.13) Hypermetropia is also known as far sightedness because   (1 mark)
   (A) The person is not able to see clearly the distant objects, but can see near
   objects Clearly
   (B) The person is able to see clearly the distant objects, but not near objects
   (C) The person is not able to see clearly the distant or near objects
   (D) The person is able to see clearly the distant or near objects

(Q.14) Presbyopia can be corrected by   (1 mark)
   (A) Using bifocal lenses   (B) Using concave lenses only.
   (C) Using binoculars   (D) Using sunglasses

(1 mark)

(Q.15) The shape of the triangular prism
    (A) Makes the emergent ray bend at angle to the direction of the incident ray
    (B) Causes dispersion of the light.
    (C) Both (1) and (2)   (D) Neither (1) nor (2)

(Q.16) Splitting of white light on passage through a triangular
    prism   (1 mark)
    (A) Takes place due to the inclined surfaces (B) Is known as dispersion of light
    (C) Is a band of seven colours known as spectrum   (D) All of these

(Q.17) Dispersion of white light takes place because _____.
    Choose the most appropriate option.   (1 mark)
    (A) Different colors of light bend through different angles with the incident ray.
    (B) The red light bends the least and the violet light bends the most.
    (C) Prism is made up of glass.
    (D) Refractive index of glass is not uniform in the prism

(Q.18) Placement of another identical prism in an inverted position
    with respect to the first and allowing the colours of spectrum to pass   (1 mark)
    through it will
    (A) Change the spectrum into white light
    (B) Change the spectrum into a black band
    (C) Keep the spectrum as before
    (D) Split into more colors

(Q.19) Atmospheric refraction occurs because   (1 mark)
    (A) Light is traveling through vacuum and air
    (B) Refractive index of atmosphere keeps changing because its physical
    conditions do not remain same
    (C) Neither (1) nor (2)   (D) Both (1) and (2)

(Q.20) Twinkling of a star is due to   (1 mark)
    (A) Atmospheric refraction of sunlight   (B) Atmospheric refraction of starlight
    (C) Lightening in the sky   (D) None of these

(Q.21) The path of light passing through a clear solution is not
    visible, but becomes visible through a colloid   (1 mark)
    (A) Because light is scattered by relatively larger particles
    (B) Because light is getting refracted
    (C) Because light is getting refracted as well reflected
    (D) All of these

(Q.22) Which one of the following is the correct option?   (1 mark)
       (A) Size of scattering particles – Dispersion of light
       (B) Very fine scattering particles – Blue light gets scattered
       (C) Large scattering particles – No dispersion or scattering of light
       (D) Opaque particles – Tyndall effect

(Q.23) The sky appears blue because   (1 mark)
       (A) Molecules of air and other particles in the atmosphere are smaller than wavelength of visible light.
       (B) Light of shorter wavelengths at the blue end are scattered more than the red light whose wavelength is 1.8 times.
       (C) The scattered blue light enters our eyes.
       (D) All of these

(Q.24) 'Danger' signal lights are usually red in colour because   (1 mark)
       (A) It is a bright colour
       (B) It is least scattered by fog or smoke
       (C) It has smaller wavelength and can be seen from a distance
       (D) All of these

(Q.25) Far point of a normal human eye is: (1 mark)
       (A) 100 m   (B) 500 m   (C) 100 Km   (D) Infinity

(Q.26) During transplantation of eye, ___ is transplanted**.**   (1 mark)

       (A) Lens   (B) Retina   (C) Cornea   (D) Iris

(Q.27) The diameter of eyeball is approximately: (1 mark)
       (A) 2.0 cm   (B) 2.3 cm   (C) 2.5 cm   (D) 2.7 cm

(Q.28) I in VIBGYOR signifies: (1 mark)
    (A) Indigo   (B) Incident ray   (C) Image   (D) Inverted

Definition & Theoretical Questions

Write Answer in appropriate words.

Short & long answer type questions:

(Q.1) In an eye, where is image formed?   (1 mark)
(Q.2) What is iris?   (1 mark)
(Q.3) Where is far point located for a normal eye?   (1 mark)

(1 mark)

(Q.4) Cylindrical lenses are used to correct which type of defects of vision?

(Q.5) Hypermetropia is corrected by which type of lens?   (1 mark)

(Q.6) What is the cause of cataract?   (1 mark)

(Q.7) What is least distance of distinct vision?   (1 mark)

(Q.8) What is a simple microscope?   (1 mark)

(Q.9) In spectrum which colour bends least?   (1 mark)

Q.10) Cinematography is based on which principle?   (1 mark)

(Q.11) What happens to the image distance in the eye when we increase the distance of an object from the eye?   (1 Marks)

(Q.12) Why does the sky appear dark instead of blue to an astronaut?   (2 Marks)

(Q.13) Define dispersion and spectrum?   (2 Marks)

(Q.14) What do you understand by power of accommodation of the eye?   (2 Marks)

(Q.15) Define least distance of distinct vision.   (2 Marks)

(Q.16) Why does it take some time to see objects in a dim room when you enter the room from bright sunlight outside?   (3 Marks)

(Q.17) What is presbyopia? How is it corrected?   (3 Marks)

(Q.18) Why do stars twinkle?   (3 Marks)

(Q.19) How will you say that white light of the sun is made of seven colors?   (3 Marks)

(Q.20) The far point of a myopic person is 80cm in front of the eye. What is the nature and power of the lens required to correct the problem?   (5 Marks)

(Q.21) What is short sightedness or myopia? What causes myopia? How is myopia corrected?   (5 Marks)