

QB365 Question Bank Software Study Materials

Optics Important 2 Marks Questions With Answers (Book Back and Creative)

10th Standard

Science

Total Marks : 60

2 Marks

30 x 2 = 60

1) What is refractive index?

Answer : The ratio of speed of light in vacuum (c) to the speed of light in a medium (v) is defined as refractive index (μ) of that medium.

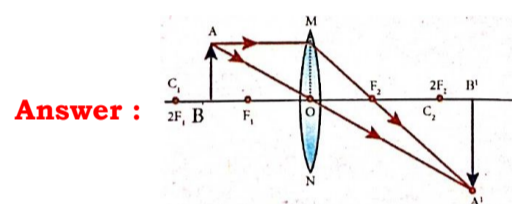
$$\mu = \frac{c}{v}$$

2) State Snell's law.

Answer : Snell's law states that, the ratio of the sine of the angle of incidence and sine of the angle of refraction is equal to the ratio of refractive indices of the two media.

$$\frac{\sin i}{\sin r} = \frac{\mu_2}{\mu_1}$$

3) Draw a ray diagram to show the image formed by a convex lens when the object is placed between F and 2F.



4) Define dispersion of light.

Answer : When a beam of white light or composite light is refracted through any transparent media such as glass or water, it is split into its component colours. This phenomenon is called as dispersion of light.

5) State Rayleigh's law of scattering.

Answer : Rayleigh's scattering law states that "The amount of scattering of light is inversely proportional to the fourth power of its wavelength.

$$\text{Amount of scattering 's'} \propto \frac{1}{\lambda^4}$$

6) Differentiate convex lens and concave lens.

Answer :

S.NO.	CONVEX LENS	CONCAVE LENS
i	A convex lens is thicker in the middle than at edges.	A concave lens is thinner in the middle than at edges.
ii	It is a converging lens.	It is diverging lens.
iii	It produces mostly real images.	It produces a virtual image.
iv	It is used to treat hypermetropia.	It is used to treat myopia.

7) What is power of accommodation of eye?

Answer : The ability of the eye lens to focus nearby as well as the distant objects is called power of accommodation of the eye.

8) What are the causes of 'Myopia'?

Answer : (i) The focal length of eye lens is reduced or the distance between eye lens and retina increases.

(ii) Hence the far point will not be infinity for such eyes and the far point has come closer, with this defect, nearby object can be

seen clearly but distant objects cannot be seen clearly.

9) Why does the sky appear in blue colour?

Answer : (i) When sunlight passes through the atmosphere the blue colour (shorter wavelength) is scattered to a greater extent than the red colour (longer wavelength).

(ii) This scattering causes the sky to appear in blue colour.

10) Why are traffic signals red in colour?

Answer : (i) The red colour has longer wavelength.

(ii) So, it can travel for longer distance and will be seen clearly. So red colour is used in traffic signals.

11) How is a rainbow formed?

Answer : (i) Tiny water droplets are formed in the atmosphere due to rainfall. The rainbow is formed when sun light falling on these tiny water droplets undergoes dispersion.

(ii) When the sun light is incident on them, it is first refracted and dispersed at the front surface. When the refracted light falls on the back surface of the water droplet, it undergoes total internal reflection.

(iii) This reflected beam of coloured lights are refracted at the front surface of the water droplet. Thus, the rainbows can always be seen opposite to the sun.

12) When does Mie scattering take place? Write the causes.

Answer : (i) Mie scattering takes place when the diameter of the scatterer is similar to or larger than the wavelength of the incident light. It is also an elastic scattering. The amount of scattering is independent of wave length.

(ii) Mie scattering is caused by pollen, dust, smoke, water droplets, and other particles in the lower portion of the atmosphere.

13) What is 'Presbyopia'?

Answer : (i) Due to ageing, ciliary muscles becoming weak and the eye-lens becoming rigid (inflexible), the eye loses its power of accommodation.

(ii) Because of this, an aged person cannot see the nearby objects clearly. So, it is also called as 'old age hypermetropia'.

14) What is Lens? What are types of lenses?

Answer : (i) A lens is an optically transparent medium bounded by two spherical refracting surfaces or one plane and one spherical surface.

(ii) Lens is basically classified into two types. They are: (i) Convex Lens (ii) Concave Lens.

15) What is the function of Cornea?

Answer : (i) This is the thin and transparent layer on the front surface of the eyeball. It is the main refracting surface.

(ii) When light enters through the cornea, it refracts or bends the light on to the lens.

16) Explain the function of Iris.

Answer : It is the coloured part of the eye. It may be blue, brown or green in colour. Every person has a unique colour, pattern and texture. Iris controls amount of light entering into the pupil like camera aperture.

17) Write the uses of simple microscope.

Answer : Simple microscopes are used.

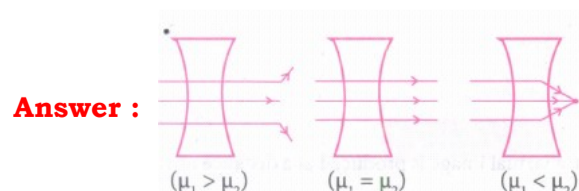
(i) by watch repairers and jewellers.

(ii) to read small letters clearly.

(iii) to observe parts of flower, insects etc.

(iv) to observe finger prints in the field of forensic science.

18) A concave lens of refractive in μ_1 is kept in a medium of refractive index (μ_2). A parallel beam of light is incident on the lens. Draw the path of the rays of light emerging from a lens.



19) Give the examples for luminous objects.

Answer : (i) Stars.
(ii) Sun.

20) What is called Monochromatic source?

Answer : If a source of light produces a light of single colour, with single wavelength is known as a Monochromatic source.

21) Define Tyndall scattering.

Answer : The scattering of light rays by the colloidal particles in the colloidal solution is called Tyndall scattering (or) Tyndall effect.

22) How many types of lenses?

Answer : They are 2 types.
(i) Plano — convex lens.
(ii) Plano — concave lens.

23) Define Magnification of a lens.

Answer : It is defined as the ratio of the height of the image to the height of an object. Magnification is denoted by the letter 'm'. If the height of the object is 'h' and height of the image is 'h¹', the magnification produced by lens is $m = \frac{\text{height of the image}}{\text{height of the object}} = \frac{h^1}{h}$.

24) Write the types of Microscope.

Answer : (i) Simple microscope.
(ii) Compound microscope.

25) Write the disadvantages of Telescope.

Answer : (i) Frequent maintenance needed.
(ii) It is not easily portable one.

26) Define Tyndall effect.

Answer : The scattering of light rays by the colloidal particles in the colloidal solution is called the Tyndall scattering or Tyndall effect.

27) Differentiate Rayleigh lines and Raman lines.

Answer :

Rayleigh lines	Raman lines
(i) The spectral lines having frequency equal to the incident ray frequency is called Rayleigh line.	(i) The spectral lines which are having frequencies other than the incident ray frequency are called Raman lines.

28) Define Plano-convex lens and Plano-concave lens.

Answer : a) Plano-convex lens:

One of the faces of a bi-convex lens is plane, it is known as plano-convex lens.

b) Plane-concave lens:

If one of the faces of a bi-concave lens is plane, it is known as plano-concave lens.

29) What is Astigmatism?

Answer : i) In this defect, the eye cannot see parallel and horizontal lines clearly.
ii) It may be inherited or acquired.
iii) It is due to the imperfect structure of the eye lens due to the development of cataracts on the lens, ulceration of the cornea, injury to the refracting surfaces, etc.
iv) It can be corrected by using cylindrical lenses (Toric lenses).

30) In common what is the value of least distance of distinct vision of a human.

Answer : Least distance of distinct vision of a human eye is 25 cm.