

STANDARD – X
SUBJECT - PHYSICS

TIME: 2 HRS.

M.M:80

Note: Section A is compulsory. Attempt any four questions from Section B.

SECTION A (40 MARKS)

Q1. Choose the correct option.

a) Lateral displacement depends on:

- i) thickness of medium ii) refractive index of medium
iii) angle of incidence iv) all of these.

b) In optics, an object with higher refractive index is called:

- i) optically rarer ii) optically denser
iii) density iv) refractive index.

c) The optical phenomena, twinkling of stars is due to:

- i) atmospheric reflection ii) total reflection
iii) atmospheric refraction iv) total refraction.

d) Critical angle for a pair of media depends on:

- i) refractive index. ii) temperature.
iii) colour. iv) all of these.

e) Which phenomenon is used in cables to transfer signals?

- i) Refraction ii) Reflection.
iii) Total internal reflection iv) None of these.

f) At angle of incidence equal to the critical angle, the angle of refraction is :

- i) 0° ii) 30°
iii) 90° iv) 180°

g) A beam of light parallel to the principal axis falls on a equi-convex lens and after refraction through lens, the beam focus at:

- i) optical centre. ii) first focus.
iii) second focus. iv) none of these

- h) A ray of light passes through a lens undeviated through:
- | | |
|-----------------|--------------------|
| i) focus | ii) optical centre |
| iii) main focus | iv) all of these. |
- i) In the spectrum the colour towards the base of the prism is:
- | | |
|-----------|------------|
| i) Violet | ii) yellow |
| iii) blue | iv) red. |
- j) Electromagnetic radiation that produces fluorescence on striking the zinc sulphide screen is :
- | | |
|-----------------------|-------------------|
| i) radiowaves | ii) infrared rays |
| iii) ultraviolet rays | iv) microwaves |
- k) Radiation hazard happens on human body due to excess exposure of ultraviolet rays :
- | | |
|-------------------|--------------------|
| i) skin cancer | ii) kidney problem |
| iii) brain tumour | iv) mental illness |
- i) The minimum distance between the source of sound and the reflecting surface in air to hear an echo is equal to:
- | | |
|------------|-----------|
| i) 10 m | ii) 330 m |
| iii) 340 m | iv) 17 m |
- m) Sound waves emitted from a listener and received back in the form of an echo then time interval is equal to:
- | | |
|--------------|-------------------|
| i) 0.33 sec | ii) 0.34 sec |
| iii) 0.1 sec | iv) none of these |
- n) The resistance of a bulb (100 W-120 V) is:
- | | |
|--------------|-------------|
| i) 1.2ohm | ii) 144 ohm |
| iii) 120 ohm | iv) 100 ohm |
- o) The commercial unit of electrical energy is:
- | | |
|-----------|--------------|
| i) kWh | ii) kilowatt |
| iii) watt | iv) joule |

(15)

Q2 Complete the following:-

- I. a. Angle of incidence is the angle between incident ray and.....(normal/ reflected ray)
- b. Light ray of single wavelength is called..... (monochromatic/ polychromatic)
- c.Light is used for danger signal.(Red /Green)

- d) White colour of clouds is due to (Scattering of light / Refraction of light)
- e) Sound cannot travel through (water / vacuum)
- f) Frequency of infrasound is..... (less than 20 Hertz/ greater than 20 Hertz). **(6)**
- ii. What is meant by the statement that Critical angle for Flint glass is 39° ? **(2)**
- iii. Why does a welder wear a mask? **(2)**

Q3.

- i) A candle of size 2 cm is placed at 0.25m from the eye lens. Its image is formed on the retina which is 25 mm behind the eye lens. Find the size of the image. **(2)**
- ii) A combined lens is formed by combining two lenses of 9.5 D and -1.5 D powers .What is the nature and power of this combined lens? **(2)**
- iii) The ratio of the amplitudes of two waves is 4:9. What is the ratio of their intensities? **(2)**
- iv) What do you mean by noise pollution? **(2)**
- v) Can a glass slab disperse light? **(2)**
- vi) Draw a labelled diagram of an optical fibre **(2)**
- vii) Show through a properly labelled diagram that the apparent depth of water in a tank is less than its real depth. **(3)**

SECTION B (40 MARKS)

Attempt any four questions:

Q4.

- i. A swimming pool appears to be 2.7m deep. Find its real depth if refractive index of water is $4/3$.
- ii. A ray of light incident at an angle of 40° on an equilateral prism suffers minimum angle of deviation. Calculate value of this deviation.
- iii. Draw a graph showing the variation of angle of deviation with angle of incidence in case of refraction of light through a Prism. **(3+3+4)**

Q5.

- i. A ray of light is incident normally on a plane glass slab. What will be the angle of refraction and angle of deviation for the ray?

- ii. A harpoon used to kill a fish is aimed at a point below the apparent position of the fish. Why?
- iii. What are the factors affecting the critical angle?
(3+3+4)

Q6.

- i. An object is placed perpendicular to the principal axis of a convex lens of focal length 6cm. The distance of the object from the lens is 8 cm. Find the distance of image from the lens.
- ii. A lens has a power of + 2D. What is the focal length and nature of the lens?
- iii. A convex lens can act as a burning glass. Draw a diagram showing how it can be achieved. (3+3+4)

Q7.

- i. Define Scattering of light.
- ii. Name the colour produced by prism itself, during dispersion of white light through the prism.
- iii. Give uses of infrared radiations. (3+3+4)

Q8.

- i. Draw displacement time graph for free vibrations.
- ii. What are the factors affecting the loudness of sound?
- iii. A person is standing between two parallel cliffs that are separated by a distance of 1000 m. He claps his hands and hears the first echo after 2s. If the speed of sound is 330 m/s, after how much time will he hear the second echo? (3+3+4)

Q9.

- i. Two bulbs are rated as 40 W, 220 V and 40 W, 110V respectively. Compare the resistance of two bulbs.
- ii. An electric heater draws 5A of current for 10 min when connected to 230 V power supply. Find the heat energy developed.
- iii. Derive the relation between commercial and S.I. unit of energy. (3+3+4)

