Grade 8

Physics

Chapter 14

PROPERTIES OF WAVES

SOLUTIONS TO ASSIGNMENT 1

Q1): Given that,

Frequency, f = 10 Hz

Wave length, λ = 30 m

Wave speed = ?

Wave equation =

$$V = f \times \lambda$$

Substitute the value of f and λ in wave equation.

$$V = 10 \text{ Hz} \times 30 \text{ m}$$

$$= \underline{\underline{300}} \text{ m/s}.$$

Solution: Wave speed = 300 m/s.

Q2) : Given that,

$$\text{frequency of light wave} = 6 \times 10^{14} \text{ Hz}$$

$$\text{Wavelength of wave} = 3.75 \times 10^{-7} \text{ m}$$

Wave speed in water = ?

By wave equation,

$$v = f \times \lambda$$

$$v = 6 \times 10^{14} \text{ Hz} \times 3.75 \times 10^{-7} \text{ m}$$

$$= 225000000 \text{ m/s}$$

$$= \underline{2.25 \times 10^{8} \text{ m/s}}$$

Speed of wave in water $= 2.25 \times 10^{8}$ m/s.

Q3): Given that,

Speed of wave (Sound) = 330 m/s

frequency of wave = 220 Hz

Wavelength = ?

By Wave equation,

$$v = f \times \lambda$$

Re arrange the equation to get wave length.

$$\lambda = \frac{v}{f}$$

$$= \frac{330 \, m/s}{220 \, Hz}$$

$$= 1.5 \, m$$

Wavelength of sound wave = 1.5 m

Q4): (a) Wavelength, $\lambda = 4$ cm $= 0.04$ m

(b) Amplitude, $A = 3$ cm $= 0.03$ m

(c) Given that,

$$\text{Wave speed} = 10 \text{ cm/s}$$
$$= 0.1 \text{ m/s}$$

$$\text{Wave length} = 4 \text{ cm} = 0.04 \text{ m}$$

Frequency, $= ?$

Wave equation $= f \times \lambda$

To get frequency, f

$$v = f \times \lambda$$

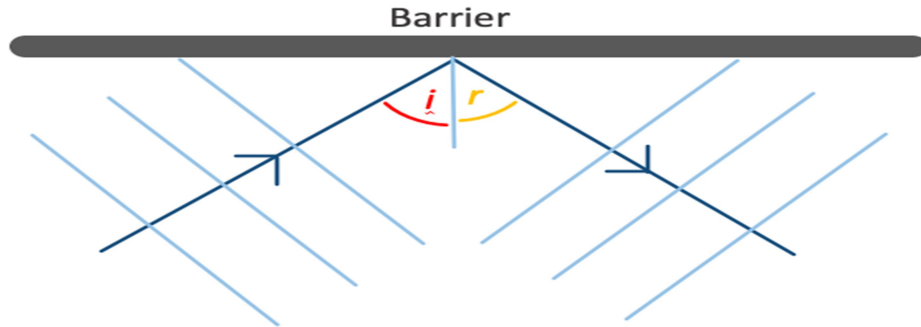$$f = \frac{v}{\lambda}$$

$$= \frac{0.1 \text{ m/s}}{0.04 \text{ m}}$$

$$= \underline{\underline{2.5 \text{ Hz}}}$$

Frequency of wave $= 2.5$ Hz

Wave Effects

Reflection

When waves hit an object, such as a barrier, they can be reflected:

When waves are reflected:

angle of incidence = angle of reflection

i = r