

## 6.2 - Wave Motion

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- (2000) What vibrates in the following types of wave motion?
  - Light waves
  - Sound waves
  - X-rays
  - Water waves
- (2000) A plane progressive wave on a water surface is given by the equation  $y = 2 \sin 2x(100t - x/30)$ ; where  $x$  is the distance covered in a time  $t$ .  $x$ ,  $y$  and  $t$  are in cm and seconds respectively. Find:
  - the wavelength, and frequency of the wave motion.
  - the phase difference between two points on the water surface that are 60 cm apart.
- (2007) Give two (2) differences between progressive and standing waves.
- (2007) Two progressive waves travelling along the same line in a medium are represented by  $Y_1 = 10 \sin(\omega t + \pi/2)$  and  $Y_2 = 10 \sin(\omega t + \pi/6)$ 
  - If the two progressive waves form a standing wave, determine the resultant amplitude and phase angle of the wave formed.
- (2010) Distinguish between stationary waves and progressive waves.
- (2010) A wave is represented by the equation  $y = 10 \sin(0.42\pi(60 t-x))$ , where the distance parameters are measured in metres and the time in seconds.
  - State whether the wave is stationary or progressive.
  - Determine the wavelength and frequency of the wave.
  - What will be the phase difference between two points which are 40 cm apart?
  - Calculate the period and amplitude of the wave.
- (2013) Define the term standing wave.
- (2013) State the position in a stationary wave where a man can hear a louder sound.
- (2016) State the principle of:
  - Superposition of waves

- Huygens construction of wave fronts.
- (2017) The equation  $y = a \sin(\omega t k x)$  represents a plane wave traveling in a medium along the  $x$  - direction,  $y$  being the displacement at the point  $x$  at time  $t$  . Deduce whether the wave is traveling in the positive  $x$  direction or in the negative  $x$  direction.
  - If  $z = 1.1 \times 10^{-7}$  m ,  $\omega = 6.5 \times 10^3$  s $^{-1}$  ,  $k = 19$  m $^{-1}$  ; determine the speed of the wave.
- (2018) What do you understand by the terms:
  - Progressive wave
  - Refraction of waves
  - Diffraction of waves
  - Standing wave.
- (2018) Two progressive waves traveling in the opposite direction in the medium are represented by  $Y_1 = 5 \sin(\omega t + \pi/3)$  and  $Y_2 = 5 \sin(\omega t - \pi/3)$  . If the two progressive waves form a standing wave, determine the resultant amplitude and the phase angle formed.
- (2019) Give the meaning of the terms wave function, longitudinal wave and transverse waves.
- (2019) The equation of a Progressive wave traveling in the  $+x$  direction is given by  $y = a \sin(\omega t - kx)$  . Show that the maximum velocity,  $V_{max} = 2\pi a/T$  .