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 $y = 10\sin(0.42\pi(60 \text{ t-x}))$, 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 $y = a\sin(\omega tkx)$ 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, $V_{max} = 2\pi a/T$.