PHYS10005/53 Vibrations, Waves, and Optics

Problem Set 2 Solutions, Semester I — 2018/2019

Due: 15 Oct 2018



Problem 1: The H.M.S. S.H.M. [comprehension, ★]

A BOAT AT ANCHOR BOBS up and down with the waves. The boat moves 5 cm above and 5 cm below its equilibrium position, and makes one complete up-and-down cycle every 4 s. What are the amplitude, period, frequency, and angular frequency of the motion?

The amplitude is A = 5 cm, and the period is T = 4 s. The frequency and angular frequency are given by

$$f = \frac{1}{T} = \frac{1}{4s} = 0.25 \,\text{Hz}$$

$$\omega = 2\pi \times f = 2\pi \times 0.25 \,\text{Hz} = 1.57 \,\text{rad/s}$$

