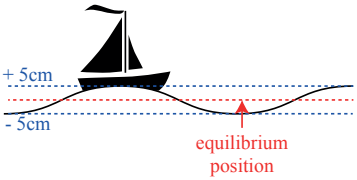
PHYS10005/53 Vibrations, Waves, and Optics

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 $\boxed{A = 5\,\text{cm}}$, and the period is $\boxed{T = 4\,\text{s}}$. The frequency and angular frequency are given by

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

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