2(a) Figure 2.1 shows a light spring of a spring constant k = 160 N m^{-1} rests vertically on the bottom of a large beaker of water. A 5.0 kg block of wood, with a density of 650 kg m^{-3}, is connected to the spring, and the block-spring system is allowed to come to a static equilibrium. The block of wood has two-thirds of its volume partially submerged in the water. Density of water is 1000 kg m^{-3}.
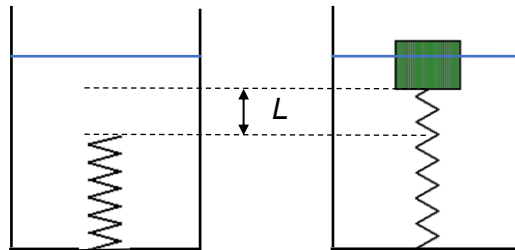

Figure 2.1

(i) Using the figure below, draw and label clearly all the forces exerting on the block of wood. [2]

(ii) Determine L. [3]

(b)   A 1200 N uniform boom AC is supported by a cable perpendicular to the boom as shown in Figure 2.2. The cable joins the boom at point B where BC = $\frac{AC}{4}$. The boom is hinged at the bottom, and a 2000 N weight hangs from its top.
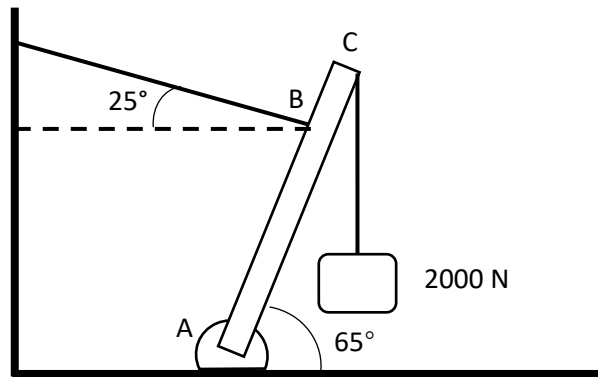

Figure 2.2

(i)   Determine the tension in the supporting cable.   [3]

(ii)   Explain why the force acting on the boom at the hinge is not vertical.   [2]