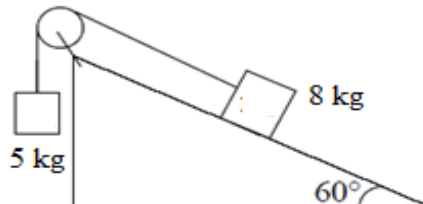


Year 12 Physics 2021 Worksheet 3- Mechanics

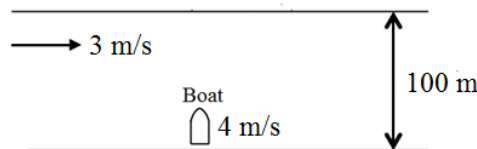
Write the answers in your Exercise Book.

1. A 5 kg hanging mass is connected by a string over a pulley to a 8 kg mass on a frictionless surface as shown below. The system is then released.

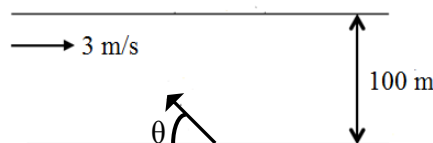


Calculate

- (a) the **acceleration** of the masses. (3 marks)
- (b) the **tension** in the string. (2 marks)
2. Water in a river 100 m wide flows with a speed of 3 m/s. A boat, which points directly towards the opposite bank, crosses the river at a constant speed of 4 m/s relative to the surface of the water.



- (a) Find the velocity of the boat relative to the river bank. (2 marks)
- (b) How long does the boat take to cross the river? (1 mark)
- (c) How far downstream does the boat move by the time it reaches the other bank? (2 marks)
3. The captain of a different boat wishes to take his boat **directly opposite** its starting point on the other bank across the same river (as in question 2) at a steady speed of 4 m/s relative to the water. He finds that he must point his boat upstream at an angle θ from the river bank.



- (a) Find the value of θ . (2 marks)
- (b) How long will this boat take to cross the river? (1 mark)