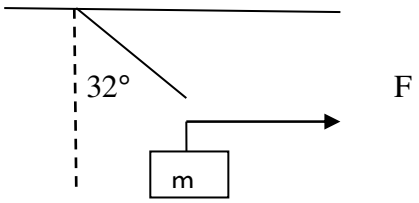
BA SANGAM COLLEGE
YEAR 12
PHYSICS
WORKSHEET 4

1. The number of millimeters in **650nm** is:
   A. 650×10^{-9}
   B. 6.5×10^{-3}
   C. 650×10^{-4}
   D. 6.5×10^{-4}

2. Coulomb's Constant 'k' used to calculate electrostatic force between charges has the unit:
   A. N m C^{-2}
   B. N m^{-2} C^{-2}
   C. N m^2 C^{-2}
   D. N m^2 C^2

3. A ball travelling south east at 10m/s strikes a wall running north south and bounces south west at 10m/s. The change in velocity of the ball is:
   A. Zero
   B. 14 ms^{-1} south
   C. 14 ms^{-1} east
   D. 14 ms^{-1} west

4. A mass, m hangs by a light string and is pulled to one side with a force of 50N. The string is at an angle of 32° to the vertical as shown below.

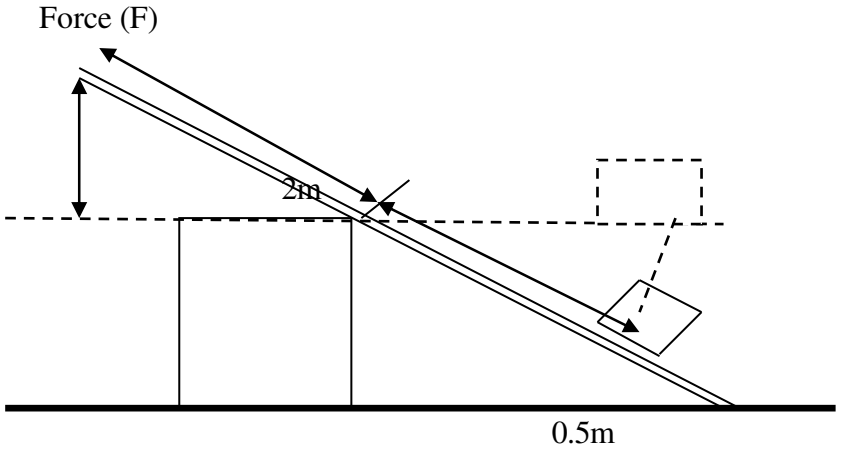


   Calculate the mass m:

   A. 5kg
   B. 8kg
   C. 3kg
   D. 4kg

5. If the velocity of A relative to C is 8m/s east, and the velocity of B relative to C is 6m/s west. What is the velocity of A relative to B?
   A. 2 ms^{-1} east
   B. 14 ms^{-1} east
   C. 2 ms^{-1} west
   D. 14 ms^{-1} west

6. A storeman uses a wooden plank (negligible mass) to lift a mass of 100kg placed on the lower end of the plank by applying a force, F, vertically downwards at the other end. The plank is initially at 30° to the horizontal and is moved at a constant velocity until it becomes horizontal.



i. What is the initial moment of the 100kg mass about the fulcrum?

ii. What is the value of force F?

iii. If it takes 5 seconds to move the plank from its initial position to the final position, what power is developed by the force, F?

7. An 700g rubber hot water bottle which has been stored at room temperature of 15°C is filled with 1.2kg of water at a temperature of 85°C. Before being placed in a cold bed, thermal equilibrium between the rubber and the water is reached. (Assume no energy loses to the surroundings). The specific heat capacity of rubber is 1700Jkg^{-1}K^{-1}. The specific heat capacity of water is 4200 Jkg^{-1}K^{-1}.
What is the common temperature of the rubber and the water at this time?

8. A soccer ball is on level ground 10m from a fence. It is kicked directly at the fence and barely goes over the fence at the highest point in its flight. The fence is 2m high.

i. What is the time of the flight of the ball?

ii. What is the horizontal velocity of the ball?

At what angle to the horizontal did the ball leave the ground?