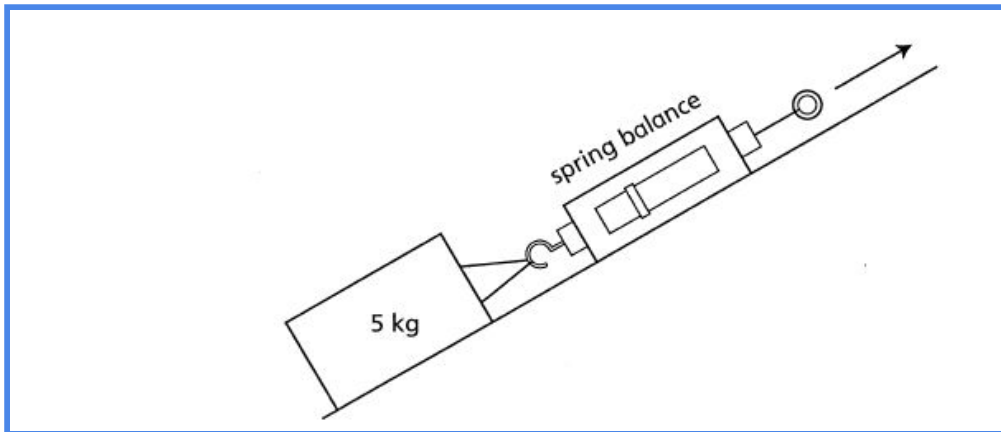


Forces and Energy

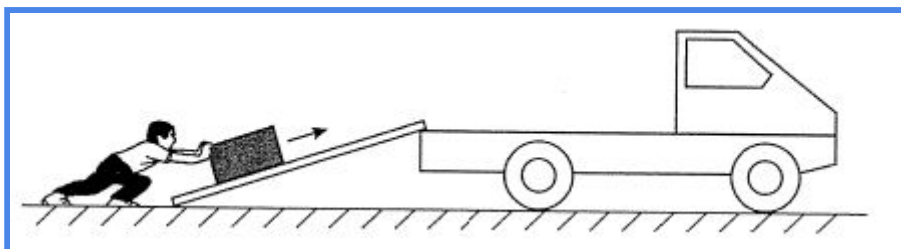
1. Study the diagram below which shows a spring balance being used to move a 5 kg load.



A force of 100 units is required to move the block up the slope.

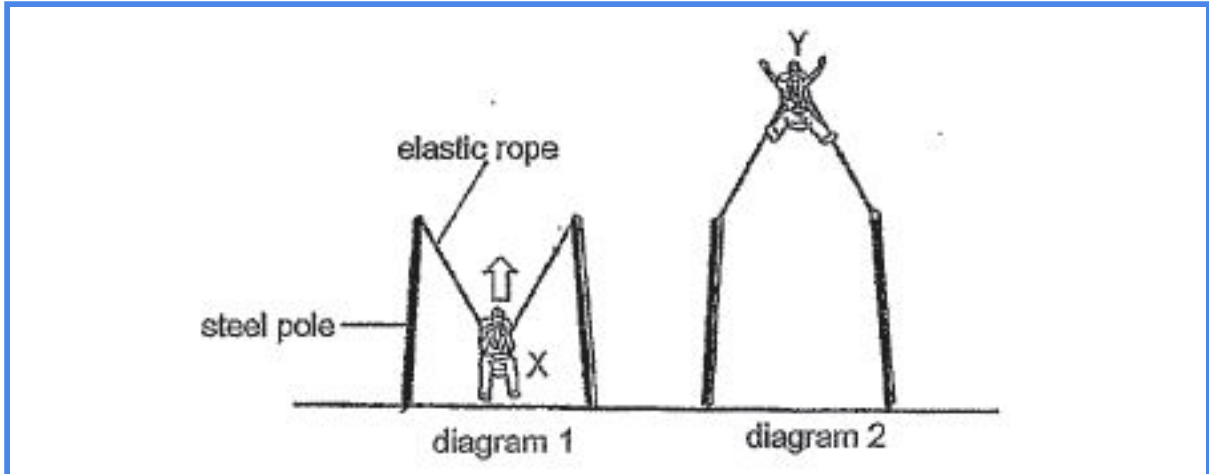
a) How much force is required to move the block up a steeper slope? Would it be more than 100 units, less than 100 units or equal to 100 units? Explain your answer. [2]

A worker wanted to push a heavy box along a ramp from the ground up to the back of the truck as shown below. He uses 500 units of energy to push the box up the truck.



b) Explain how much energy does he needs to use to push the box up a longer ramp? Would it be more than 500 units, less than 500 units or equal to 500 units? [2]

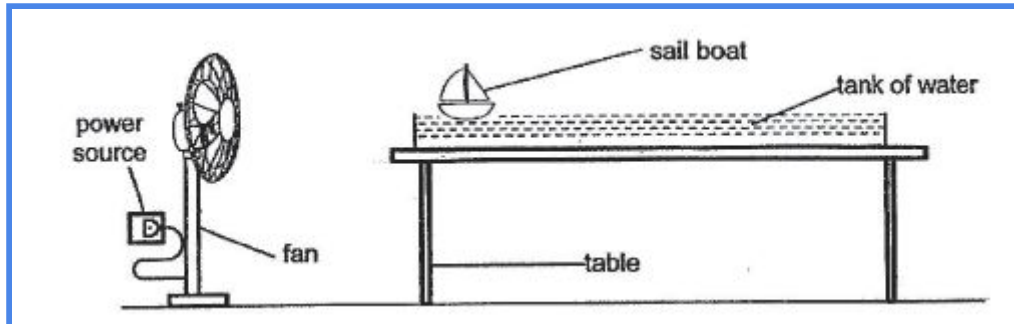
2. James sat on a ride at an amusement park. The elastic ropes were pulled down to point X as shown in diagram 1.



When released, the stretched elastic ropes pulled James upwards as shown in diagram 2. The elastic ropes stretched to a maximum length when he was at point Y.

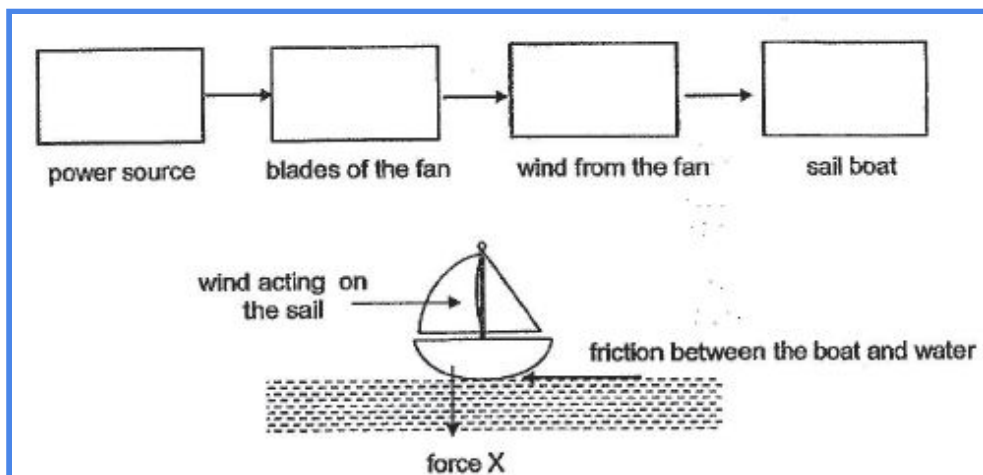
a) If James is replaced with a boy who has a smaller mass and released from point X, will his final position be higher or lower than point Y? Explain your answer. [2]

3. Study the set-up below.



Peter switched on the fan which was connected to the power source and observed that the sail boat moved across the tank of water.

a) Write down the energy conversion for the above observation in the boxes below. [1]



b) Name the force X. [1]

c) If Peter increases the size of the sail, explain how this will be an advantage. [2]

d) If Peter increases the mass of the sail, explain why would the boat move slower? [2]
