Forces – 2022 June IGCSE 0625

1. June/2022/Paper_11/No.6

Which pieces of apparatus are the most appropriate for an experiment to plot an extension–load graph of a spring?

A ruler, newton meter, clamp and stand

B balance, stop-watch, ruler

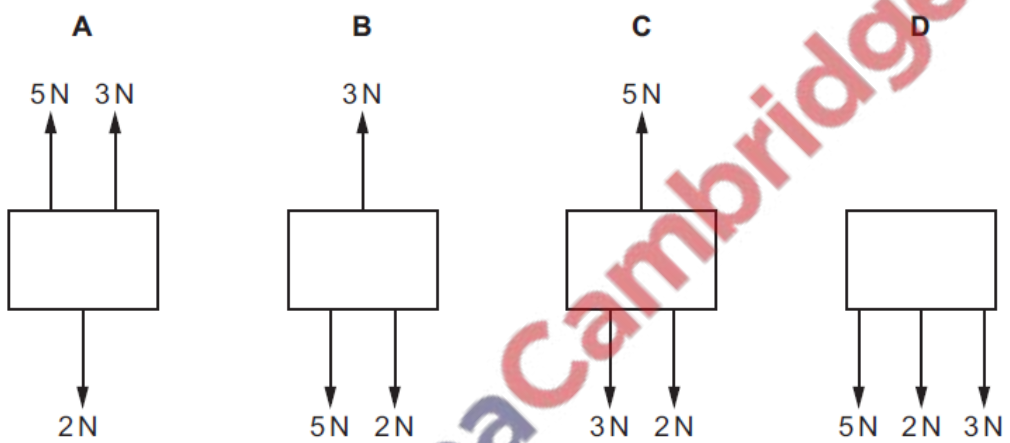
C light gate, ruler, newton meter

D stop-watch, balance, measuring cylinder

2. June/2022/Paper_11/No.8

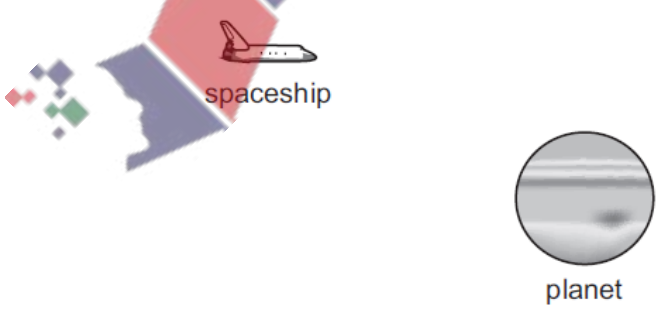
The diagrams show the forces acting on four moving objects.

Which object is moving at a constant speed?



3. June/2022/Paper_12/No.6

A spaceship approaches and passes a planet.



What can the force of gravity between the spaceship and planet achieve?

A It can change the direction of the spaceship, or slow it down, but not speed it up.

B It can change the direction of the spaceship, or speed it up, but not slow it down.

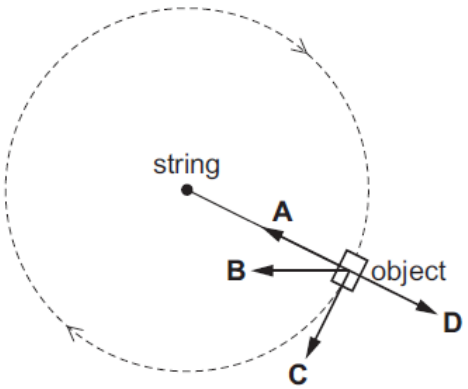
C It can slow down the spaceship, or speed it up, but not change its direction.

D It can change the direction of the spaceship, slow it down, or speed it up.

4. June/2022/Paper_21/No.6

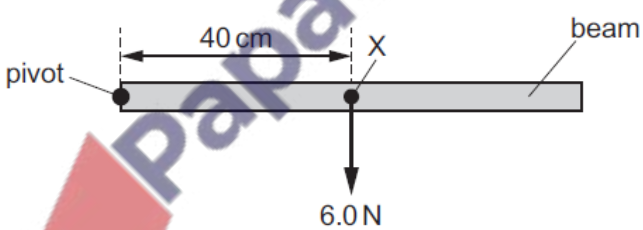
An object on the end of a string moves in a clockwise circular path at constant speed. The diagram shows the object as viewed from above.

What is the direction of the resultant force on the object when it is in the position shown?



5. June/2022/Paper_21/No.7

A beam is pivoted at one end, as shown.



The beam weighs 6.0 N and its weight acts at a point X 40 cm from the pivot.

A force of 4.0 N is applied to the beam causing it to balance horizontally.

In which direction and where is the 4.0 N force applied?

A vertically downwards at 20 cm to the left of X

B vertically downwards at 20 cm to the right of X

C vertically upwards at 20 cm to the left of X

D vertically upwards at 20 cm to the right of X

6. June/2022/Paper_22/No.6

An object moves at constant speed around a circular path.

Which statement is correct?

A A resultant force acts on the object outwards from the centre of the circle.

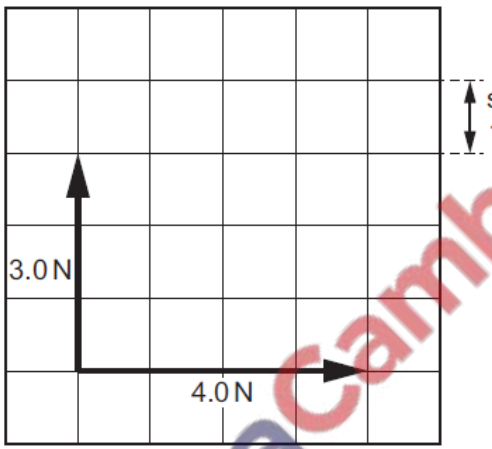
B A resultant force acts on the object in the direction it is travelling.

C A resultant force acts on the object towards the centre of the circle.

D There is no resultant force acting on the object because it is moving at constant speed.

7. June/2022/Paper_22/No.8

The diagram shows two forces acting at right angles to each other.



What is the resultant of the two forces?

A 1.0 N **B** 5.0 N **C** 7.0 N **D** 12.0 N

8. June/2022/Paper_23/No.6

A box of mass 4.0 kg is pulled along a horizontal floor in a straight line by a constant force *F*.

The constant frictional force acting on the box is 2.0 N.

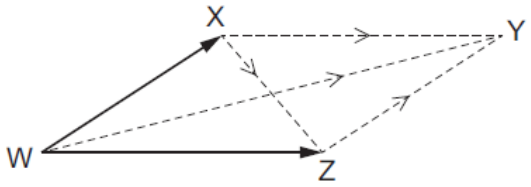
The speed of the box increases from 0.50 m / s to 2.5 m / s in 2.0 s.

What is the value of *F*?

A 2.0 N **B** 4.0 N **C** 6.0 N **D** 7.0 N

9. June/2022/Paper_23/No.8

Two vectors, WX and WZ, are as shown.



What is the resultant of the vectors?

A WY **B** XY **C** XZ **D** ZY

10. June/2022/Paper_32/No.3(a)

(a) Fig. 3.1 shows an aeroplane flying. There are horizontal forces acting on the aeroplane, as shown in Fig. 3.1.

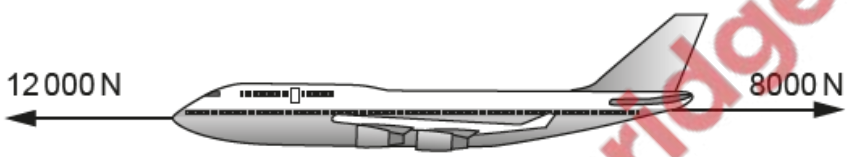


Fig. 3.1 (not to scale)

(i) Calculate the resultant horizontal force on the aeroplane.

resultant force = ... N

direction of resultant force .....

[3]

(ii) State the name of the effect producing the 8000 N force on the aeroplane.

..... [1]

(iii) At a later time in the flight, the resultant horizontal force on the aeroplane is zero.

Describe the horizontal motion of the aeroplane.

..... [1]

11. June/2022/Paper_42/No.2

Fig. 2.1 shows an object of mass 2.0 kg on a bench. This object is connected by a cord, passing over a pulley, to an object of mass 3.0 kg.

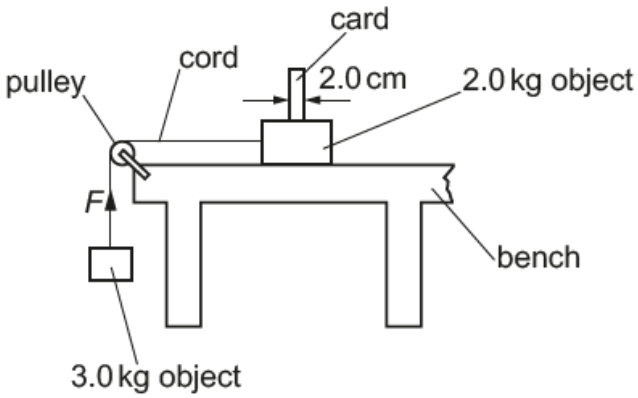


Fig. 2.1

The 2.0 kg object is released from rest and accelerates at 4.0 m/s^2.

(a) Calculate the resultant force acting on the 2.0 kg object.

force = ... [2]

(b) Calculate the upward force *F* exerted by the cord on the 3.0 kg object.

force *F* = ... [3]

(c) The objects have a constant acceleration.

(i) Show that the speed of the objects 0.80 s after release is 3.2 m/s.

[2]

(ii) A card, of width 2.0 cm, is fixed to the 2.0 kg object. As the 2.0 kg object moves to the left, the card passes through a beam of light that is perpendicular to the card.

Using the speed given in **(c)(i)**, calculate the time taken for the card to pass through the beam of light.

time = ... [2]

[Total: 9]

12. June/2022/Paper_42/No.3(a)

(a) Fig. 3.1 shows water in a river moving parallel to the river bank at 4.0 m/s and a can travelling in the river.

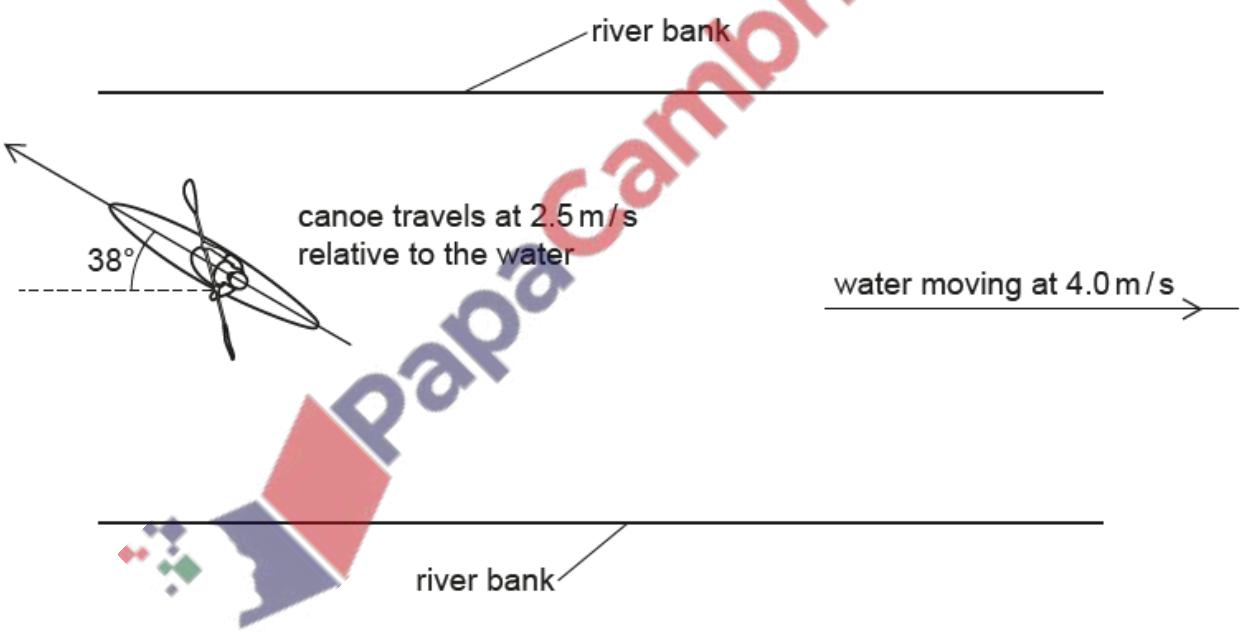


Fig. 3.1

The canoe travels at 2.5 m/s relative to the water and heads at an angle of 38° to the river bank.

Draw a scale diagram to determine the canoe's resultant velocity and state the scale you used.

scale .....

magnitude of resultant velocity .....

direction of resultant velocity (angle from the river bank) .....

[4]

13. June/2022/Paper_43/No.3

(a) Fig. 3.1 shows a boat stored in a shed. The boat is suspended from the ceiling of the shed by two ropes.

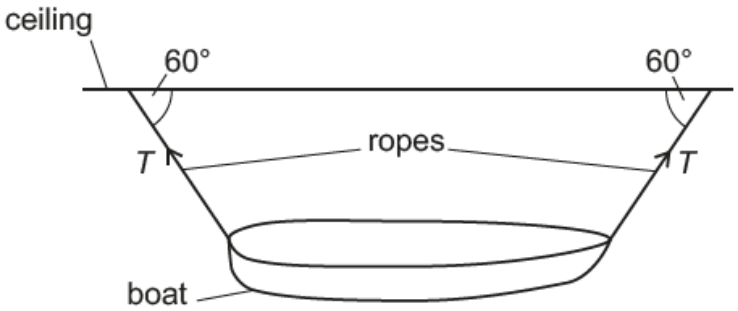


Fig. 3.1

The tension T in each of the ropes is 75 N.

(i) Draw a vector diagram to determine the resultant of the forces exerted by the two ropes on the boat. State the scale you used.

scale = ...

magnitude of resultant force = ...

direction of resultant force = ... [4]

(ii) Determine the mass of the boat.

mass = ... [1]

(b) Force is a vector.

Draw a circle around **two** other quantities in the list which are vectors.

acceleration	**density**	**energy**	**mass**
momentum	**power**	**refractive index**	

[2]

[Total: 7]