Q1.

Answer the question with a cross in the box you think is correct ☒. If you change your mind about an answer, put a line through the box ☒ and then mark your new answer with a cross ☒.

The magnitude and direction of a force can be represented by a vector.
Figure 22 shows the forces acting on four identical trolleys. The arrows show the magnitude and direction of the forces.

Which diagram shows a pair of forces that will produce zero acceleration?

(1)

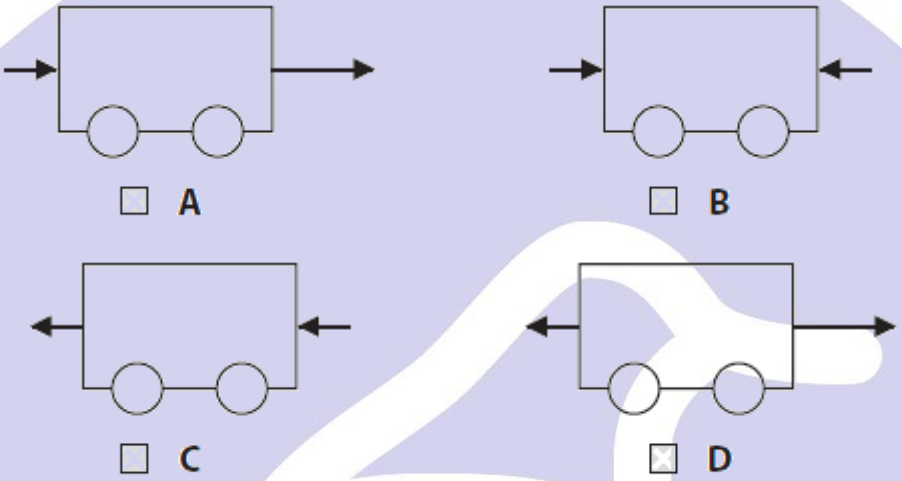


Figure 22

(Total for question = 1 mark)

Q2.

A firework rocket contains a solid fuel inside a cardboard tube.

The burning of the fuel creates a thrust to propel the rocket upwards.

(iii) There is a resultant force on the rocket of 0.5 N upwards when it takes off.

The arrow on the diagram shows the size and direction of the force of gravity acting on the rocket when it takes off.

Add another arrow to the diagram to show the thrust produced by the burning fuel at the time the rocket takes off.
You should label the arrow with the size of the thrust.

(2)

Q3.

(i) Figure 14 shows the vertical forces on an aeroplane.

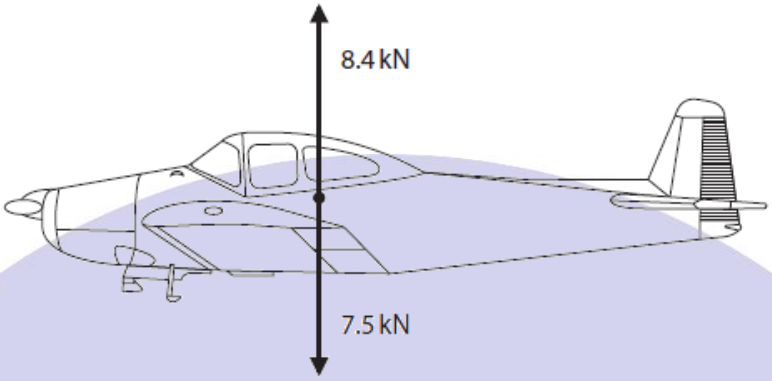


Figure 14

Use information from the diagram to determine the size and direction of the resultant vertical force on the aeroplane.

(2)

size = ... kN, direction is .....

(ii) The aeroplane is descending.

Figure 15 shows a diagram of the resultant vertical and horizontal forces on the aeroplane as it is descending.

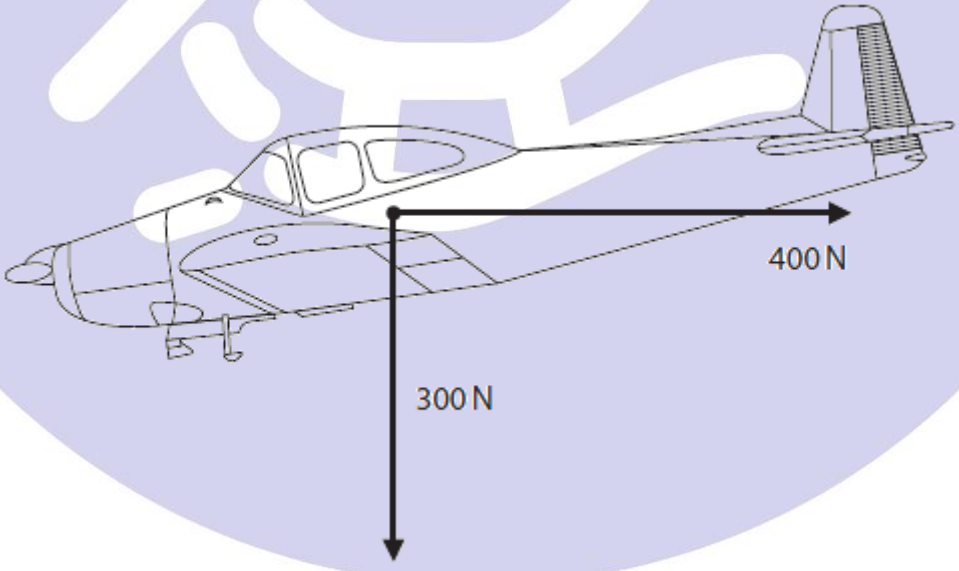


Figure 15

Complete the diagram to show the resultant of these two forces.

(1)

(Total for question = 5 marks)

Q4.

Figure 19 shows two forces, P and Q, acting at point X.

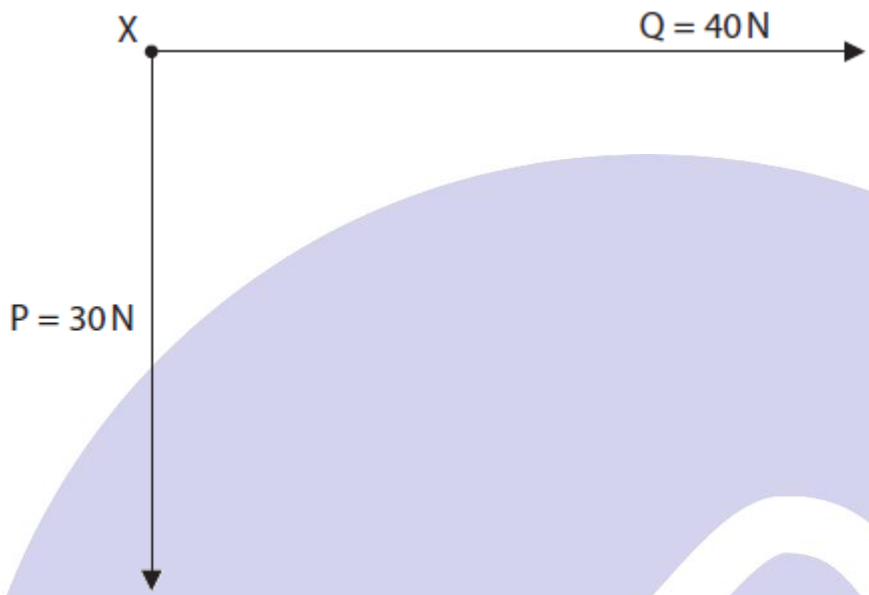


Figure 19

Complete the diagram in Figure 19 to show the size and direction of the resultant force, R, on point X.

(Total for question = 2 marks)

Q5.

Figure 23 shows two small boats pulling a much larger ship.

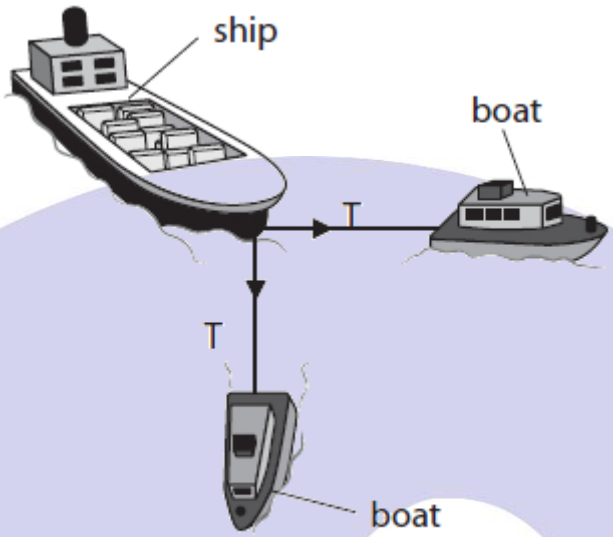


Figure 23

The ship is connected to the boats with ropes.

The tension, T, in each of the ropes has a magnitude of 20 kN.

The ropes are at right angles to each other.

Draw a vector diagram and use it to determine the resultant force that the boats exert on the ship.

(4)

magnitude of resultant force on the ship = ... kN

(Total for question = 4 marks)

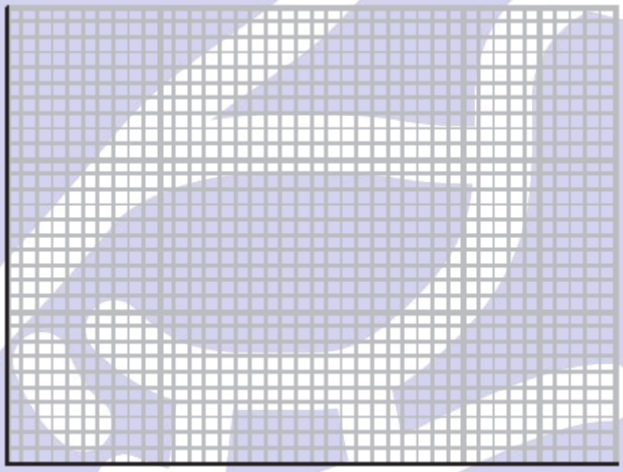
Q6.

Figure 4 shows two astronauts in space pushing at a satellite.

Figure 4

(i) The force F_1 is 3.0 N and the force F_2 is 2.0 N, acting at right angles to each other.
Draw a vector diagram to scale showing these forces.

(2)



(ii) Use the diagram in (i) to estimate the magnitude of the resultant force acting on the satellite.

(2)

resultant force = ... N

(Total for question = 4 marks)