Name of the Student:_____
Max. Marks : 16 Marks **Time : 16 Minutes**

Q1.

A student investigates the forces between the trucks in the toy railway.
She places four trucks in a row.
She pulls truck **Z** in the direction shown by the arrow.
The whole train travels at a constant speed as shown in Figure 17.

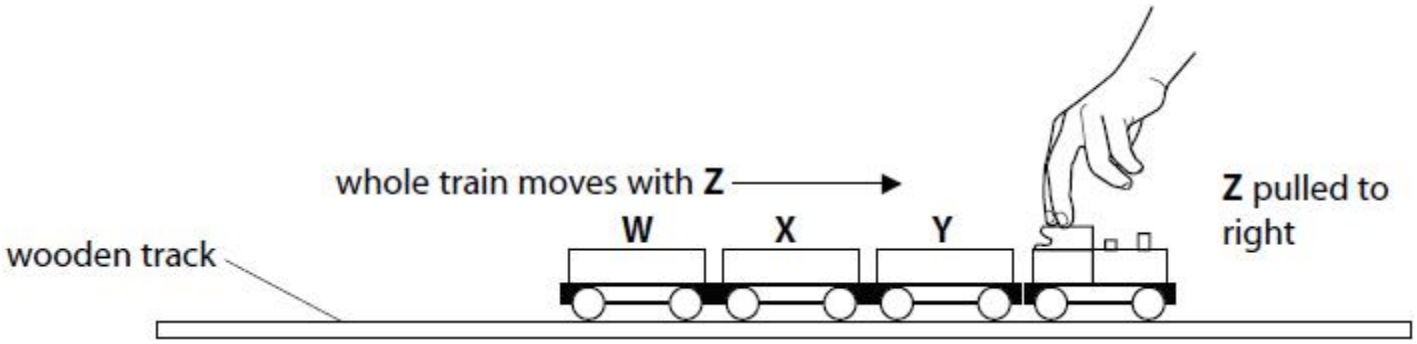


Figure 17

The student repeats this method of adding trucks and pulling the train each time.
When there are seven trucks in total, the train comes apart between **Y** and **Z** when tested as shown in Figure 18.

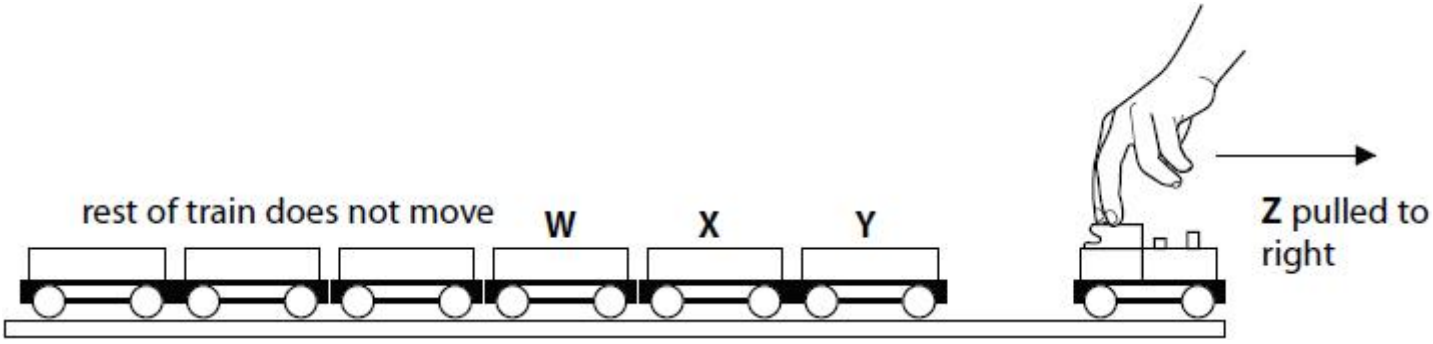


Figure 18

(i) Explain why the train acts in this way by considering the forces involved.

(2)

.....

.....

.....

.....

(ii) Devise an experiment to investigate the horizontal force needed to separate the trucks from the engine.

(3)

.....

.....

.....

.....

.....

.....

(iii) Explain why a larger force is needed to separate the trucks from the engine if the force is applied at an angle to the horizontal.

(2)

.....

.....

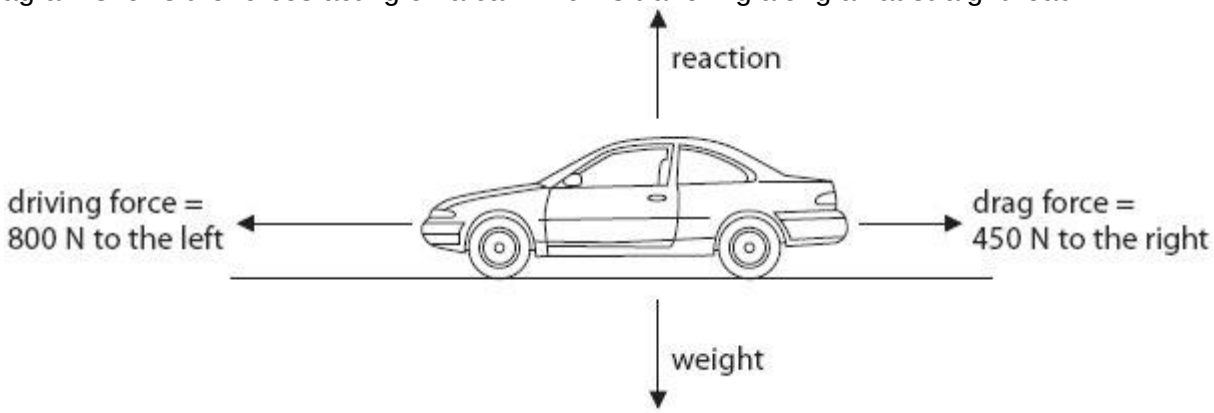
.....

.....

(Total for question = 7 marks)

Q2.

The diagram shows the forces acting on a car which is travelling along a flat straight road.



(i) The size of the resultant force on the car is 350 N.
In which direction is the resultant force acting?
Put a cross (■) in the box next to your answer.

(1)

☒ **A** down ↓

☒ **B** to the left ←

☒ **C** to the right →

☒ **D** up ↑

(ii) Complete the sentence by putting a cross (■) in the box next to your answer.

The car is

(1)

☒ **A** accelerating

☒ **B** decelerating

☒ **C** moving at a constant speed

☒ **D** not moving

(2)

(iii) The mass of the car is 625 kg.
Calculate the weight of the car.
gravitational field strength = 10N/kg

(2)

.....

Q3.

Figure 5 shows a box sliding down a slope in the direction shown.

(3)

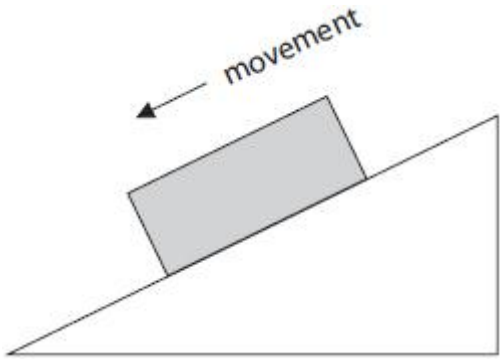


Figure 5

Draw two vector arrows on this diagram showing the 'normal contact force' and 'friction' acting on the box.
Label these two forces.

(Total for question = 3 marks)