

Name of the Student: _____

Max. Marks : 23 Marks

Time : 23 Minutes

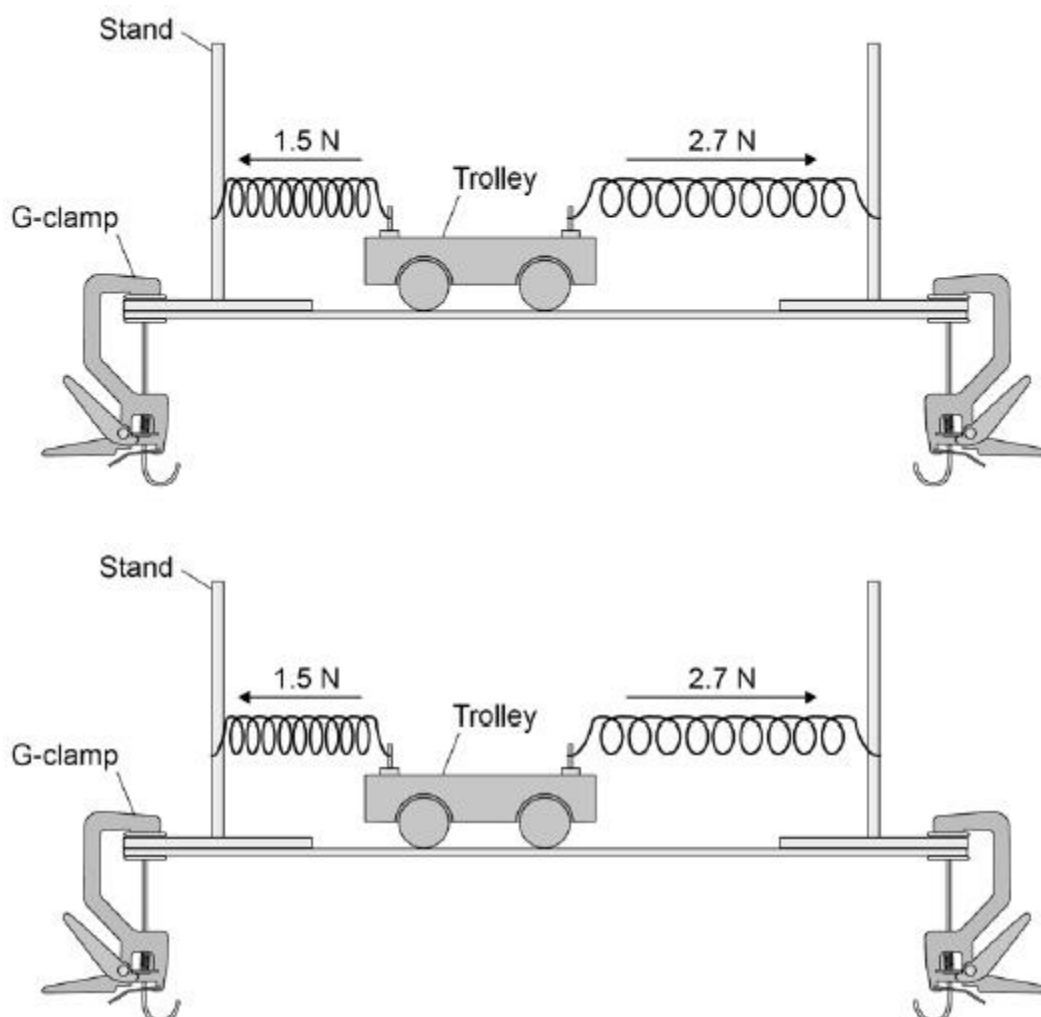
Q1.

A trolley is attached to two identical springs.

The trolley is pushed to the left and then released.

Figure 1 shows the horizontal forces acting on the trolley just after it is released.

Figure 1



(a) Write the equation which links acceleration, mass and resultant force.

(1)

(b) The trolley has a mass of 0.75 kg

Calculate the acceleration of the trolley just after it is released.

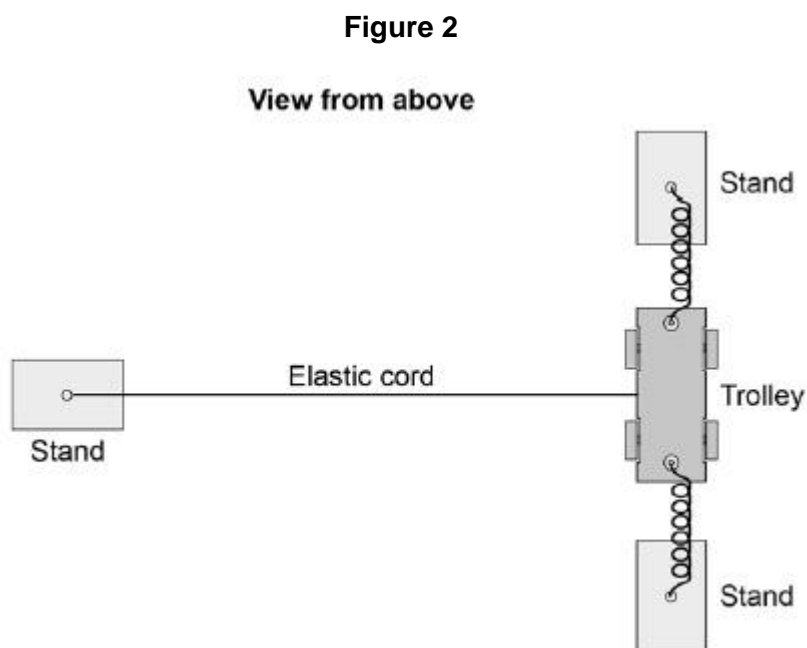
Give the unit.

Acceleration = _____ Unit _____

(4)

An elastic cord is fixed to the trolley.

Figure 2 shows the arrangement viewed from above.



When the trolley is pushed and released a wave travels along the cord.

(c) What type of wave travels along the cord?

Give the reason for your answer.

(2)

(d) Suggest one change that could be made to the apparatus shown in **Figure 2** to produce a wave with a lower frequency.

Q2.

Two students investigated how the acceleration of a trolley depends on the force applied to the trolley.

Before starting the investigation, each student wrote a hypothesis.

Hypothesis of student **A**:

'The acceleration of the trolley is directly proportional to the force applied to the trolley.'

Hypothesis of student **B**:

'Changing the force applied to the trolley will change the acceleration of the trolley.'

(a) Consider the hypothesis of student **A**.

Predict what would happen to the acceleration of the trolley if the force applied to the trolley is doubled.

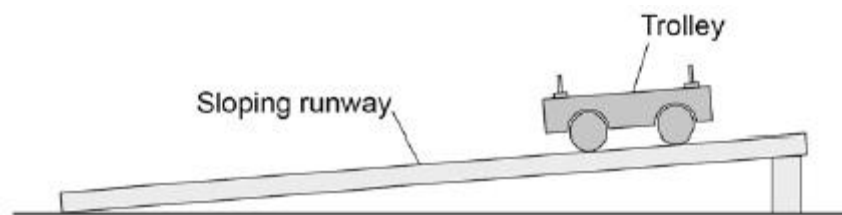
(1)

(b) Why is it difficult to make a valid prediction using the hypothesis of student **B**?

(1)

Figure 1 shows some of the equipment used by the students.

Figure 1



(c) Write a list of any other equipment the students will need to complete the investigation.

(2)

(d) Why should the students use a sloping runway?

Tick **one** box.

To reduce the effect of friction on the trolley.

To decrease the acceleration of the trolley.

To stop the trolley rolling back up the runway.

(1)

(e) Describe a method the students could have used for their investigation.

(6)

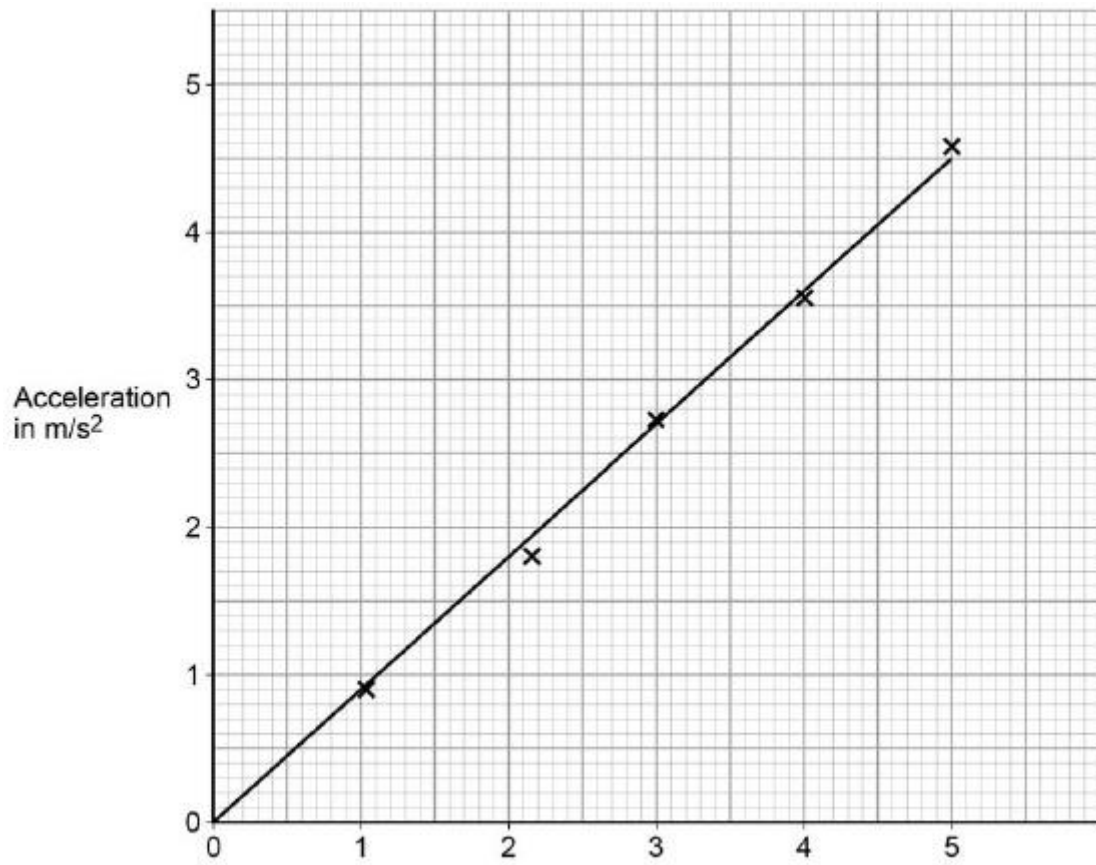
(f) The students used the same trolley throughout the investigation.

Suggest why.

(2)

The students' results are shown as a graph in **Figure 2**.

Figure 2



(g) Explain why hypothesis **A** gives a better explanation of the results.

(2)
(Total 15 marks)