

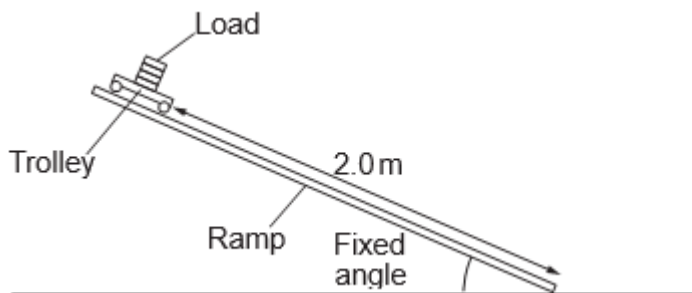
## **GCSE Physics A (Gateway)**

**J249/01 Physics A P1-P4 and P9 (Foundation Tier)**

### **Question Set 14**

- 1 A student investigates the average speed at which a trolley with different loads travels down a ramp.

Look at the diagram of her experiment.



She releases the trolley from a distance of 2.0m from the bottom of the ramp.

The student uses a stop-clock to measure the time it takes to reach the bottom of the ramp.

She calculates the average speed. Look at her results.

Load (N)	Time taken (s)	Average speed (m/s)
20	2.3	0.87
40	2.4	0.83
60	2.3	0.87
80	2.4	0.83

- (a)\* Describe the trend shown by the results, identify problems with the experiment and describe any improvements that you would make to the experiment.

The trend shown by the results is [6] that as the load increases the time taken doesn't really change and average speed also doesn't change. The results show that time taken and average speed are independent of load.

A problem with her experiment is that she only carried out her experiment once when she should've repeated it at least 3 times then calculated her average speed.

The student could use light gates to measure the final speed of the trolley at the end of the ramp.

(b) For one experiment the trolley starts from rest and reaches a final speed of 2 m/s.

The ramp length is 2.0 m.

Calculate the acceleration of the trolley.

$$\begin{aligned} s &= 2 \\ u &= 0 \\ v &= 2 \\ a &= ? \end{aligned}$$

$$\begin{aligned} v^2 &= u^2 + 2as \\ 2^2 &= 0 + 2a \cdot 2 \\ u &= 4a \\ a &= 1 \end{aligned}$$

Acceleration = .....1.....m/s<sup>2</sup>

[4]

**Total Marks for Question Set 14: 10**

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