

Motion

Question Paper

Level	IGCSE
Subject	Physics
Exam Board	CIE
Topic	General Physics
Sub-Topic	Motion
Paper Type	Alternative to Practical
Booklet	Question Paper

Time Allowed: 24 minutes

Score: /20

Percentage: /100

1 An IGCSE student is investigating the average speed of a toy car travelling down a slope.

She releases the toy car on the slope. She uses a stopwatch to measure the time taken for the car to travel down part of the slope. Fig. 5.1 shows the slope.

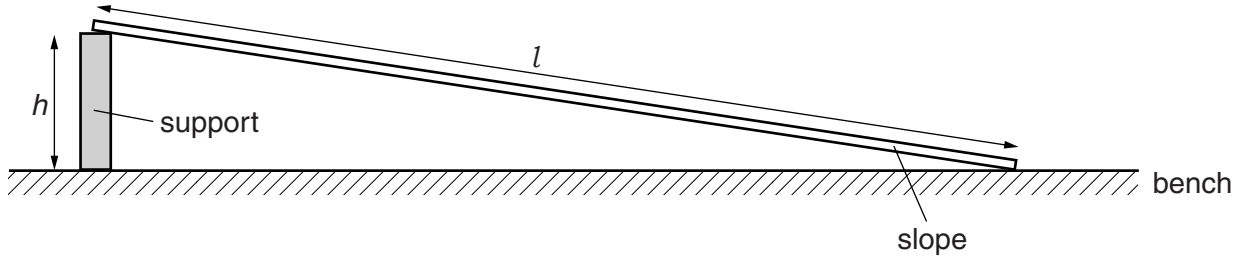


Fig. 5.1

(a) (i) Suggest a suitable length l for the slope used in this school laboratory experiment.

$l = \dots\dots\dots$

(ii) Suggest a suitable height h , above the laboratory bench, for one end of the slope.

$h = \dots\dots\dots$

[2]

(b) The student tries to determine the time that the toy car takes to travel a distance down the slope.

Make three suggestions about what she could do to ensure that the distance travelled and the time taken by the toy car are measured as reliably as possible.

1.

.....

2.

.....

3.

.....

[3]

[Total: 5]

2 An IGCSE student is investigating the motion of a ball down a slope.

She is using the apparatus shown in Fig. 4.1.

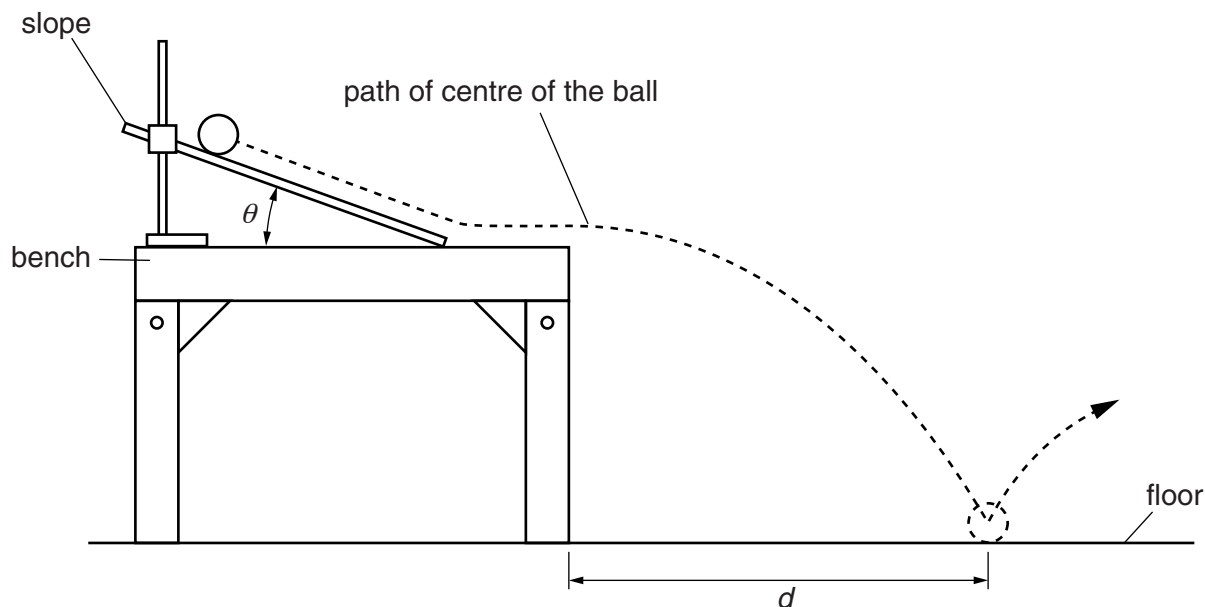


Fig. 4.1

She measures the angle θ of the slope, releases the ball from a marked point on the slope and watches where it hits the floor.

She then measures the distance d from the table to where the ball lands.

This is repeated for a number of angles, releasing the ball from the same point on the slope. Her results are shown in Table 4.1.

Table 4.1

$\theta/^\circ$	d/cm
20	42
30	55
40	64
50	51
60	40

(a) (i) Describe the pattern in the values of d as θ is increased.

.....
.....
..... [1]

(ii) From the pattern of results, predict what the d values may be for slope angles of 10° and 70° .

10°
 70°
[1]

(b) The student is being assessed and must carry out the experiment on her own. She says that it is difficult to release the ball carefully and then be able to see exactly where it lands.

Suggest an improvement she might make to the experiment, so that she could obtain a more accurate measurement of d .

.....
.....
..... [1]

(c) Suggest how she might make sure that the results of the experiment are reliable.

.....
.....
..... [2]

[Total: 5]

- 3 The IGCSE class is studying the acceleration of a toy car that is pulled along a track by a force F .

The arrangement is shown in Fig. 1.1.

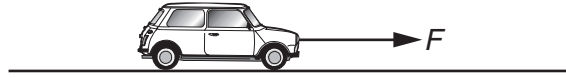


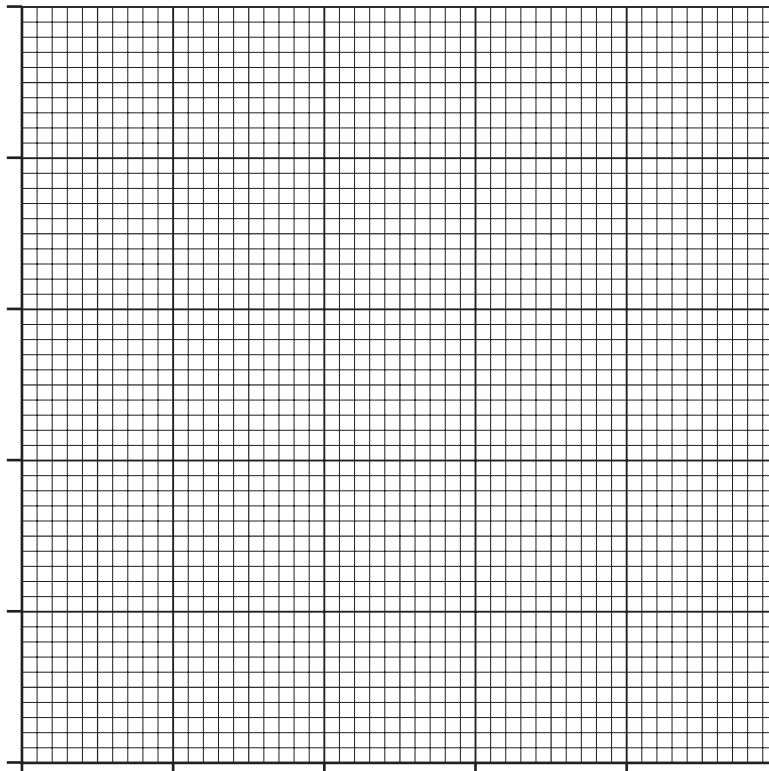
Fig. 1.1

A student uses a force F of 0.5 N to pull a toy car along a track and electronically measures the acceleration a . He records the results in a table. He repeats the procedure using a range of different forces up to 2.5 N. The readings are shown in Table 1.1.

Table 1.1

$\frac{F}{\text{N}}$	$\frac{a}{\text{m/s}^2}$
0.5	0.35
1.0	0.72
1.5	1.02
2.0	1.44
2.5	1.74

- (a) Plot a graph of $\frac{F}{\text{N}}$ (y-axis) against $\frac{a}{\text{m/s}^2}$ (x-axis).



- (b) Theory suggests that the acceleration is directly proportional to the force applied to the toy car. State whether the results support this suggestion and justify your statement by reference to the graph.

statement

justification

..... [2]

- (c) The gradient of the graph is equal to the mass of the toy car. From the graph, determine the mass m of the toy car. Show clearly how you obtained the necessary information.

$m =$ [3]

[Total: 10]