

1 (a) Define *acceleration*. Explain any symbols in your definition.

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

(b) Fig. 1.1 shows a graph of speed against time for a train. After 100s the train stops at a station.

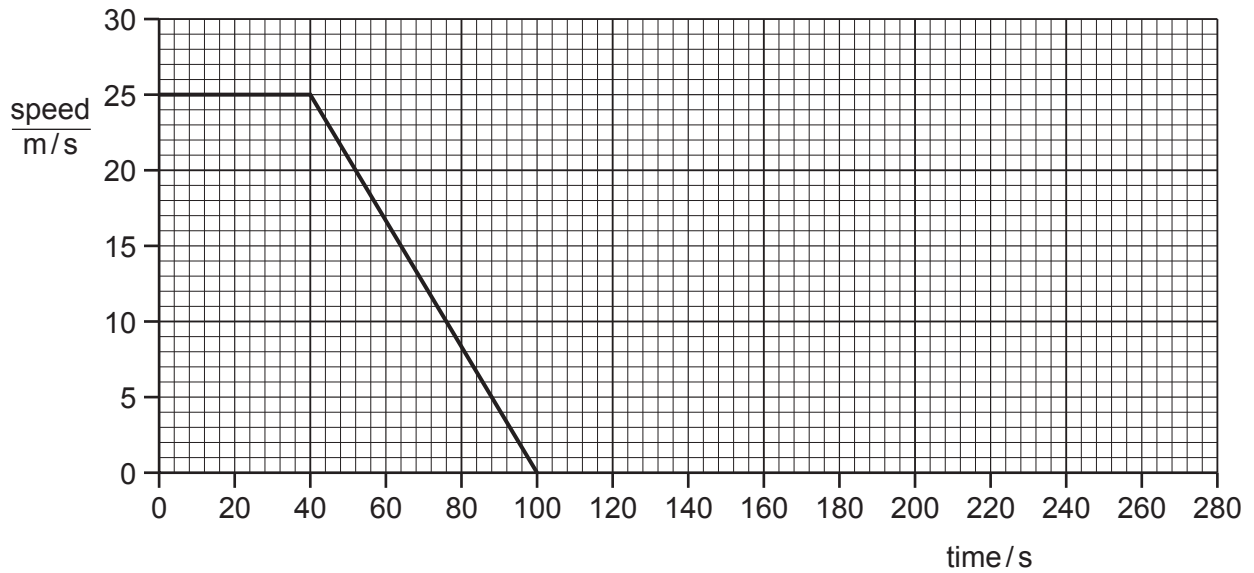


Fig. 1.1

(i) For the time interval between 40s and 100s, calculate the distance travelled by the train.

distance =[2]

- (ii) The train stops for 80 s, then accelerates to 30 m/s with an acceleration of 0.60 m/s^2 . It then travels at constant speed.

Complete the graph for the interval 100 s to 280 s, showing your calculations in the space below.

[5]

[Total: 8]

2 A hillside is covered with snow. A skier is travelling down the hill.



Fig. 1.1

The table below gives the values of the acceleration of the skier at various heights above the bottom of the hill.

height / m	350	250	150	50
<u>acceleration</u> m/s ²	7.4	3.6	1.2	0

(a) On Fig. 1.2, plot the values given in the table, using dots in circles.

Draw the best curve for these points.

[2]

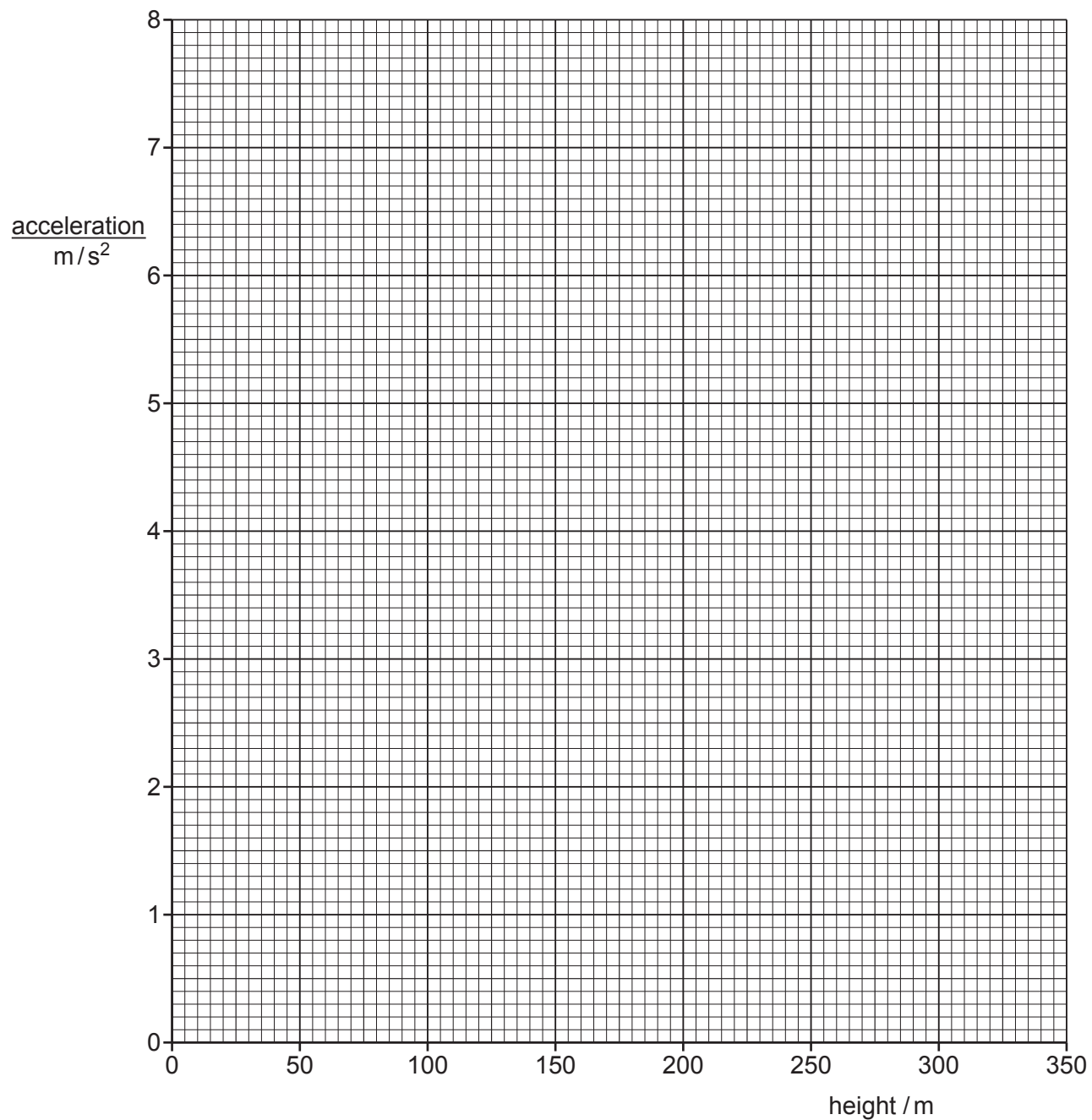


Fig. 1.2

(b) Describe what is happening, during the descent, to

(i) the acceleration of the skier,

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

(ii) the speed of the skier.

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

(c) The acceleration becomes zero before the skier reaches the bottom of the hill.

Use ideas about forces to suggest why this happens.

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

(d) Below a height of 50m, further measurements show that the acceleration of the skier has a negative value.

What does this mean is happening to the speed of the skier in the last 50m?

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

(e) The skier has a mass of 60 kg.

Calculate the resultant force on the skier at a height of 250 m.

resultant force = [3]

[Total: 9]

4 Fig 1.1 shows part of a measuring instrument.

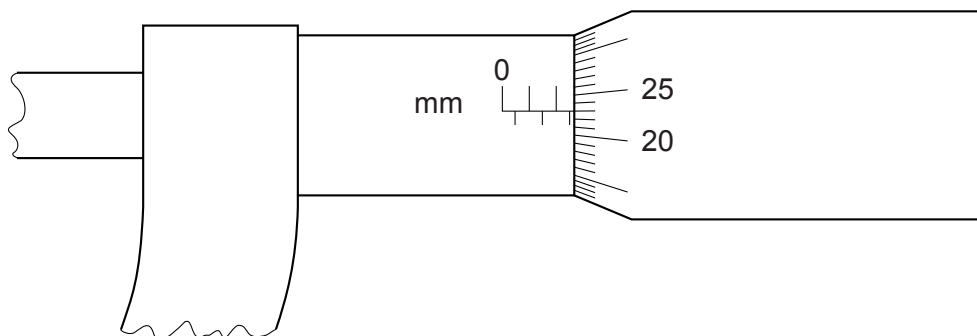


Fig. 1.1

(a) State the name of this instrument.

..... [1]

(b) Record the reading shown in Fig. 1.1.

..... [1]

(c) Describe how you would find the thickness of a sheet of paper used in a magazine.

.....
.....
.....
.....
.....
..... [3]

[Total: 5]

- 5 A weight attached to one end of a short length of string is swinging from side to side. The highest points in the swing are A and B, as shown in Fig. 1.1.

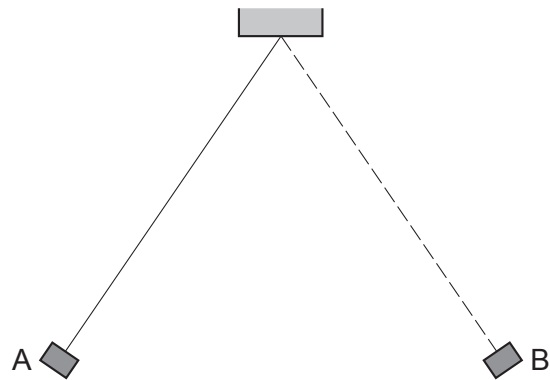


Fig. 1.1

- (a) With reference to Fig. 1.1, state what is meant by the amplitude of the oscillations.

..... [2]

- (b) Describe how the amplitude of the oscillations could be measured.

.....
.....
.....
.....
..... [3]

[Total: 5]

6 Fig. 2.1 shows a simple pendulum that swings backwards and forwards between P and Q.

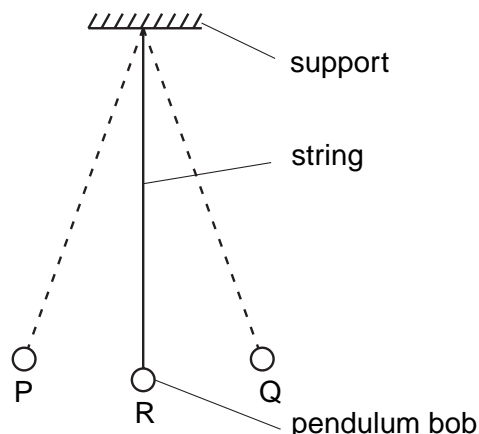


Fig. 2.1

(a) The time taken for the pendulum to swing from P to Q is approximately 0.5 s.

Describe how you would determine this time as accurately as possible.

.....

 [2]

(b) (i) State the two vertical forces acting on the pendulum bob when it is at position R.

1.
2. [1]

(ii) The pendulum bob moves along the arc of a circle. State the direction of the resultant of the two forces in (i).

..... [1]

(c) The mass of the bob is 0.2 kg. During the swing it moves so that P is 0.05 m higher than R.

Calculate the increase in potential energy of the pendulum bob between R and P.

potential energy = [2]

[Total : 6]