Motion

Question Paper 7

Level	IGCSE
Subject	Physics
ExamBoard	CIE
Topic	General Physics
Sub-Topic	Motion
Paper Type	(Extended) Theory Paper
Booklet	Question Paper 7

Time Allowed: **58 minutes**

Score: **/48**

Percentage: **/100**

1 **(a)** A stone falls from the top of a building and hits the ground at a speed of 32 m/s.
The air resistance-force on the stone is very small and may be neglected.

(i) Calculate the time of fall.

time = ...

(ii) On Fig. 1.1, draw the speed-time graph for the falling stone.

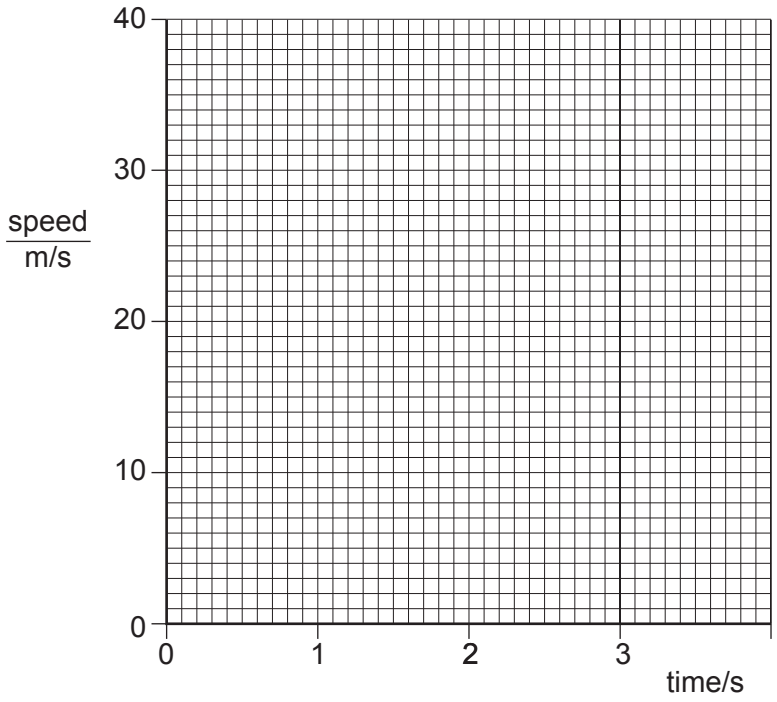

Fig. 1.1

(iii) The weight of the stone is 24 N.
Calculate the mass of the stone.

mass = ...
[5]

(b) A student used a suitable measuring cylinder and a spring balance to find the density of a sample of the stone.

(i) Describe how the measuring cylinder is used, and state the readings that are taken.

.....

.....

.....

.....

(ii) Describe how the spring balance is used, and state the reading that is taken.

.....

.....

(iii) Write down an equation from which the density of the stone is calculated.

.....

(iv) The student then wishes to find the density of cork. Suggest how the apparatus and the method would need to be changed.

.....

.....

.....

[6]

[Total : 12]

2 A solid plastic sphere falls towards the Earth.

Fig. 1.1 is the speed-time graph of the fall up to the point where the sphere hits the Earth's surface.

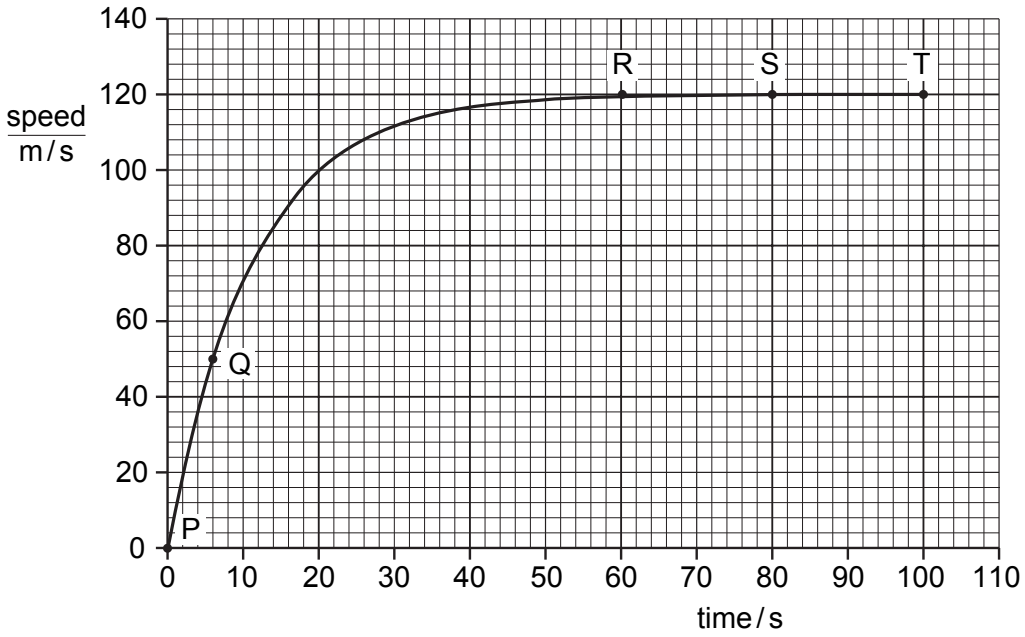

Fig. 1.1

(a) Describe in detail the motion of the sphere shown by the graph.

.....

.....

.....

.....

..... [3]

(b) On Fig. 1.2, draw arrows to show the directions of the forces acting on the sphere when it is at the position shown by point S on the graph. Label your arrows with the names of the forces. [2]

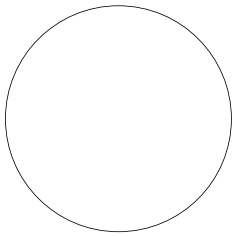

Fig. 1.2

(c) Explain why the sphere is moving with constant speed at S.

.....

.....

..... [2]

(d) Use the graph to calculate the approximate distance that the sphere falls

(i) between R and T,

distance = ... [2]

(ii) between P and Q.

distance = ... [2]

[Total : 11]

3 Fig. 1.1 shows a cycle track.

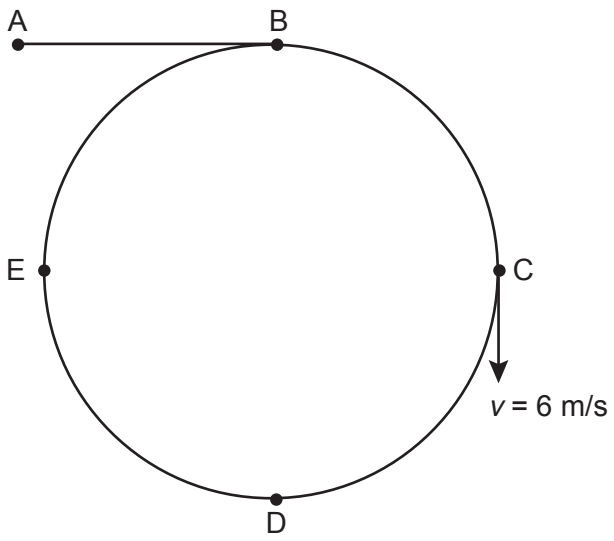

Fig. 1.1

A cyclist starts at A and follows the path ABCDEB.

The speed-time graph is shown in Fig. 1.2.

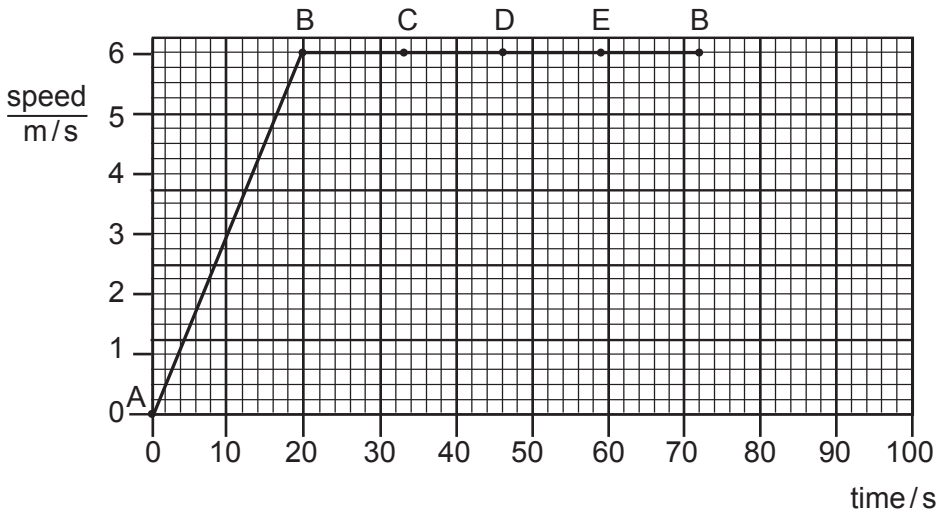

Fig. 1.2

(a) Use information from Fig. 1.1 and Fig. 1.2 to describe the motion of the cyclist

(i) along AB,

.....

(ii) along BCDEB.

.....

.....

[4]

(b) The velocity *v* of the cyclist at C is shown in Fig. 1.1.

State one similarity and one difference between the velocity at C and the velocity at E.

similarity .....

difference .....[2]

(c) Calculate

(i) the distance along the cycle track from A to B,

distance = ……

(ii) the circumference of the circular part of the track.

circumference = ……

[4]

[Total : 10]

4 Fig. 1.1 shows the path of one drop of water in the jet from a powerful hose.

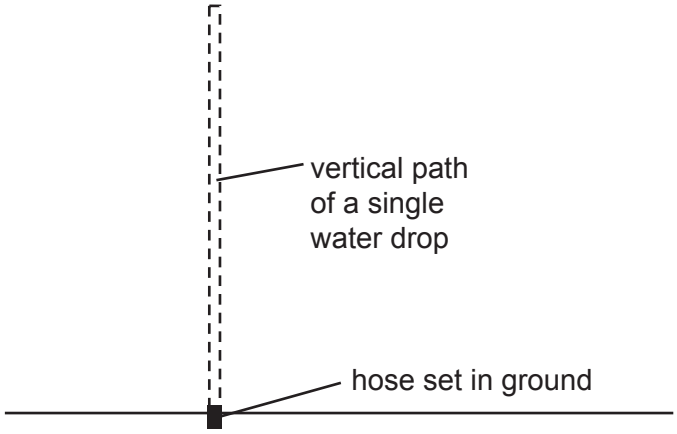

Fig. 1.1

Fig. 1.2 is a graph of speed against time for the water drop shown in Fig. 1.1.

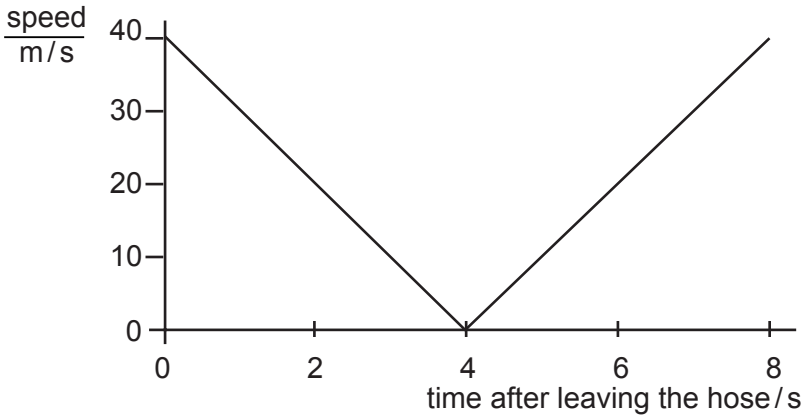

Fig. 1.2

(a) Describe the movement of the water drop in the first 4 s after leaving the hose.

.....

.....

.....[2]

(b) Use Fig. 1.2 to find

(i) the speed of the water leaving the hose,

speed = ……..

(ii) the time when the speed of the water is least.

time = ……..
[2]

(c) Use values from Fig. 1.2 to calculate the acceleration of the drop as it falls back towards the ground. Show your working.

acceleration = ……...[3]

(d) Calculate the greatest distance above the ground reached by the drop.

distance = ……...[3]

[Total :10]

5 The speed of a cyclist reduces uniformly from 2.5 m/s to 1.0 m/s in 12 s.

(a) Calculate the deceleration of the cyclist.

deceleration = ...[3]

(b) Calculate the distance travelled by the cyclist in this time.

distance = ...[2]

[Total : 5]