Topic: Physics   Title: Motion Graphs Worksheet

Name: _____   Section: 9 (G) IB

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1 **(a)** A bus travels at a constant speed. It stops for a short time and then travels at a higher constant speed.

Using the axes in Fig. 1.1, draw a distance-time graph for this bus journey.
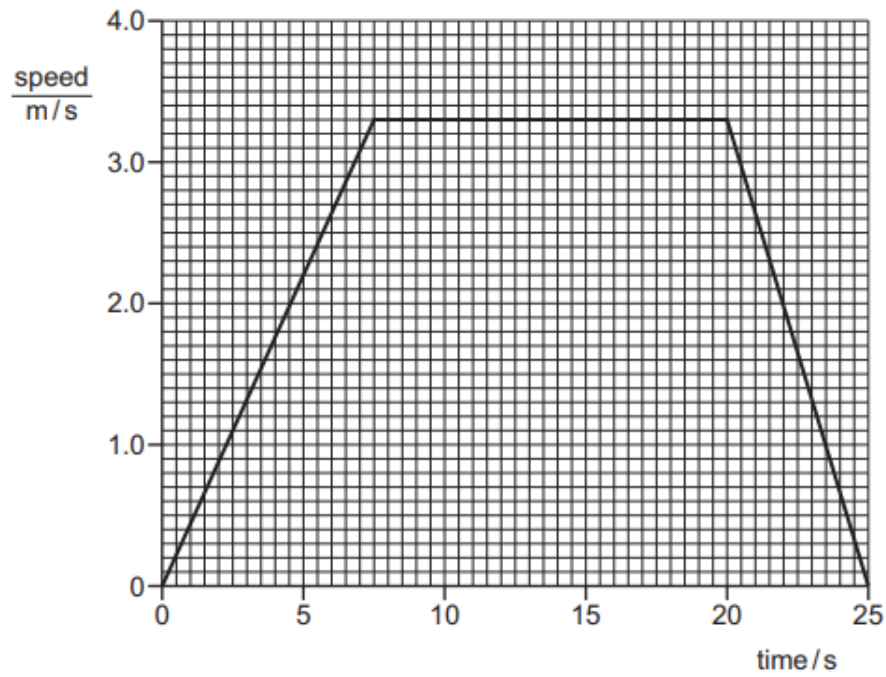
distance

0
0   time

Fig. 1.1

[3]

(b) A lift (elevator) starts from rest at the ground floor of a building.

Fig. 1.2 is the speed-time graph for the motion of the lift to the top floor of the building.

Fig. 1.2

to determine the distance from the ground floor to the top floor of the building.

distance = ... [4]

[Total: 7]

2   Fig. 1.1 shows the speed-time graph for a car travelling along a straight road.

The graph shows how the speed of the car changes as the car passes through a small town.
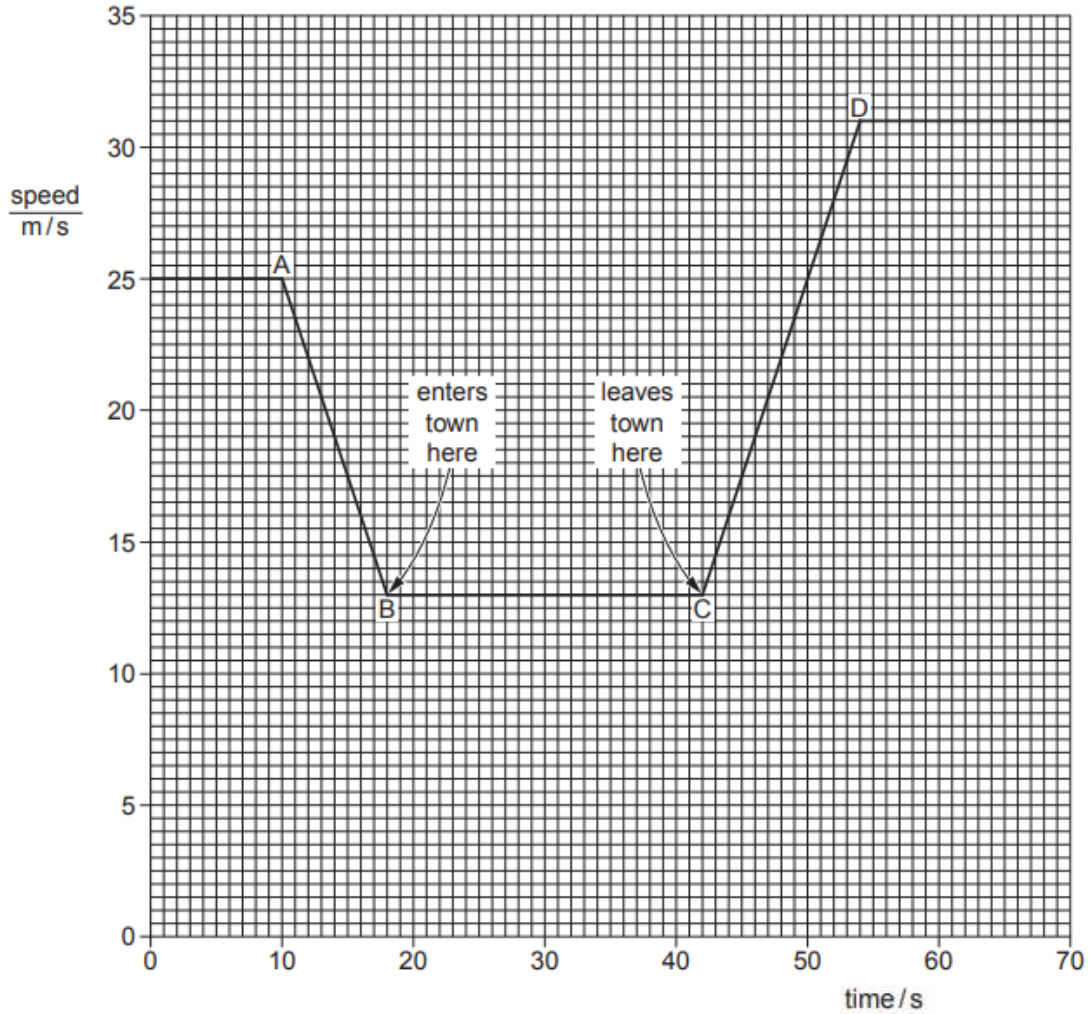

Fig. 1.1

(a) Calculate the distance between the start of the town and the end of the town.

distance = ... [3]

(b) Calculate the acceleration of the car between C and D.

acceleration = ... [3]

(c) State how the graph shows that the deceleration of the car has the same numerical value as its acceleration.

....

.... [1]

[Total: 7]

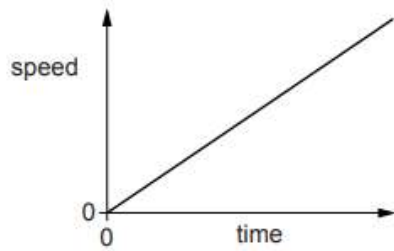3 (a) Figs. 1.1 and 1.2 show speed-time graphs for two objects, each moving in a straight line.
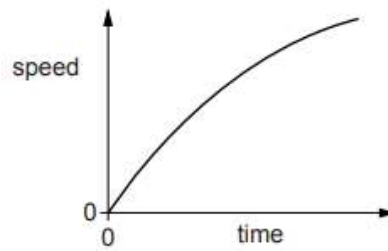

Fig. 1.1   **Fig. 1.2**

(i)   Describe the motion of the object shown by the graph in Fig. 1.1.

....

....

(ii) Describe the motion of the object shown by the graph in Fig. 1.2.

....

....

[3]

(b) On a day with no wind, a large object is dropped from a tall building. The object experiences air resistance during its fall to the ground.

State and explain, in terms of the forces acting, how the acceleration of the object varies during its fall.

....

....

....

....

....

....

....

.... [4]

[Total: 7]

4 At a sports event, a champion runner and a car take part in a race.

(a) The runner runs at a constant speed of 10 m/s from the start of the race. During the first 5.0 s of the race, the car's speed increases from 0 m/s to 25 m/s at a uniform rate.

On Fig. 1.1, draw

(i) a graph to show the motion of the runner, [1]
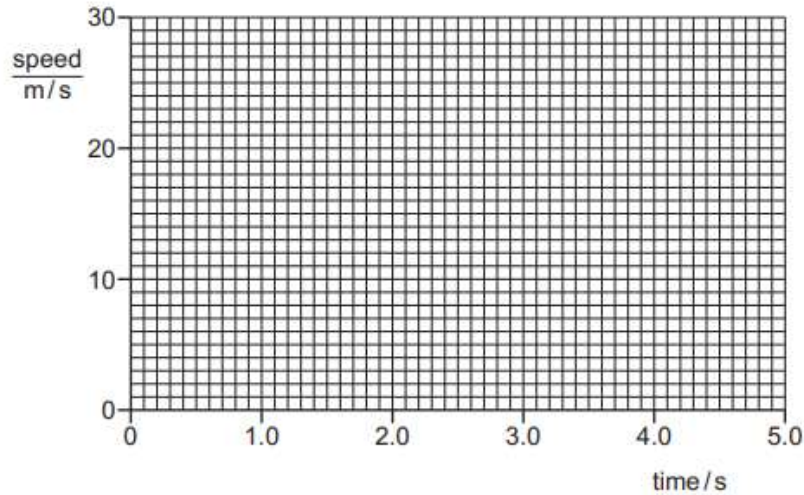
(ii) a graph to show the motion of the car.

Fig. 1.1

[1]

(b) Use your graphs to determine

(i) the distance travelled by the runner in the 5.0 s,

distance = ...[1]

(ii) the distance travelled by the car in the 5.0 s,

distance = ...[2]

(iii) the time at which the car overtakes the runner.

time = ...[2]

[Total: 7]