

Fig. 4.1 shows how the speed of an object varies during a period of 30 s.

1.

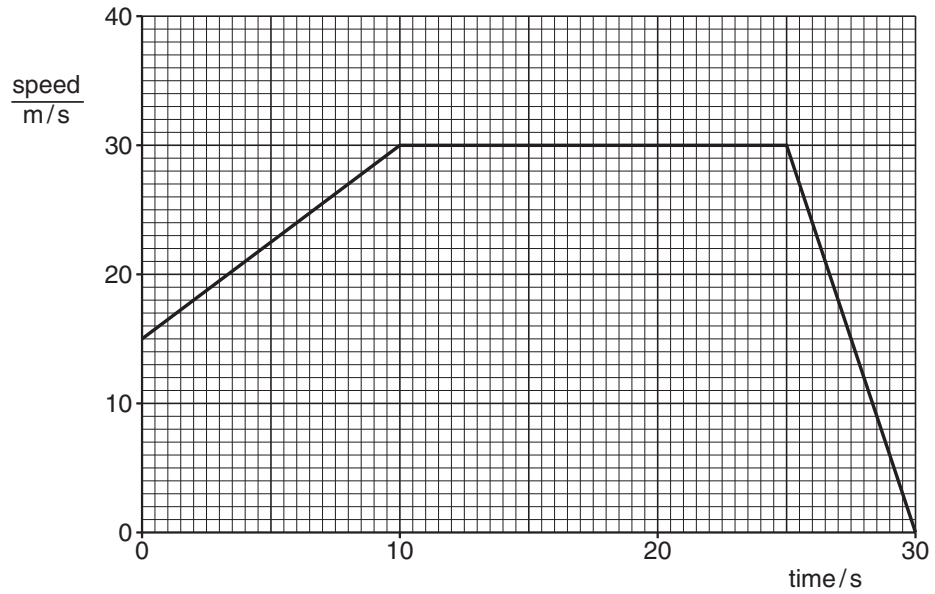


Fig. 4.1

(a) State the speed of the object

(i) at the start of the 30 s,

speed = m/s

(ii) at the end of the 30 s.

speed = m/s
[2]

(b) Describe what is happening to the speed during the period

(i) 0 s – 10 s,

(ii) 10 s – 25 s,

(iii) 25 s – 30 s.
[3]

(c) Determine the distance travelled in the last 5 s.

distance = m [3]

(d) The total distance travelled in the 30 s is 750 m.

Calculate the average speed of the object during the 30 s.

average speed = m/s [3]

[Total: 11]

2.

- 1 A car is travelling along a level road at a steady speed. Fig. 1.1 shows the speedometer in the car. A speedometer registers how fast the car is going.

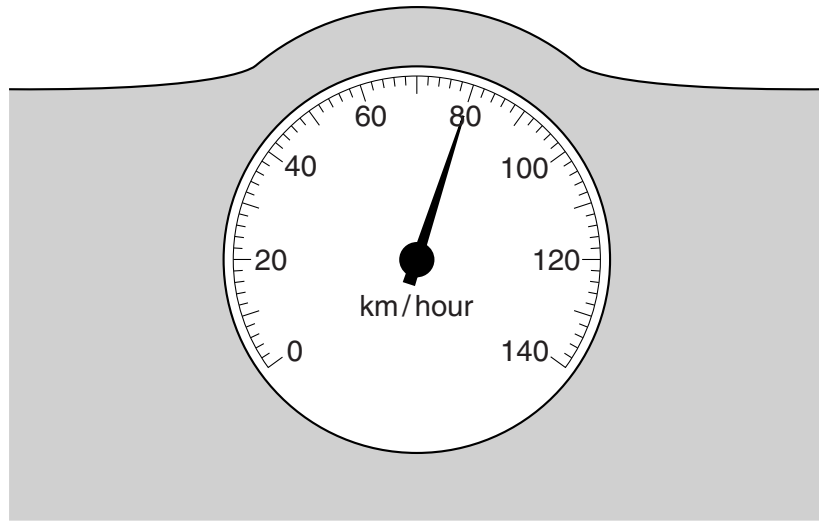
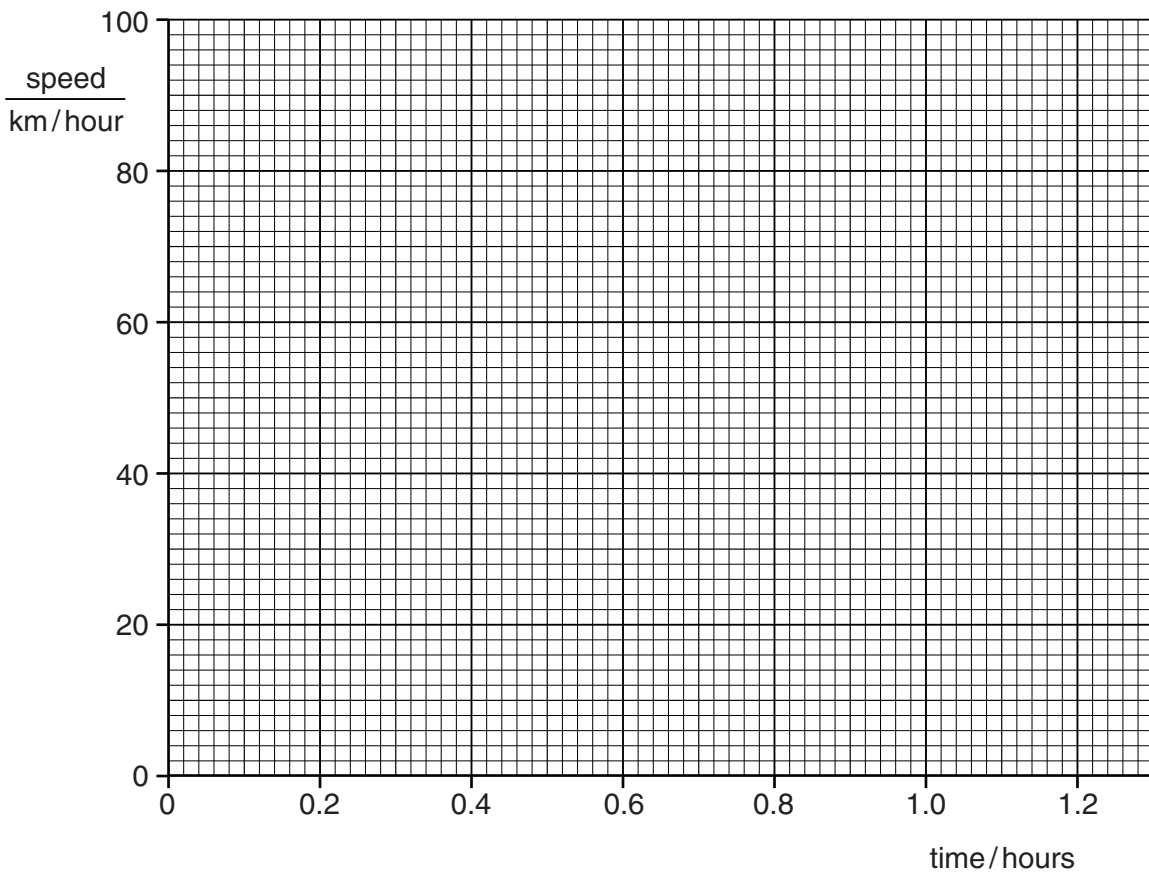


Fig. 1.1

- (a) How far, in km, does the car travel in $\frac{1}{2}$ hour at the speed shown in Fig. 1.1?

distance = km [3]

- (b) (i) On the axes shown in Fig. 1.2, draw a line representing the motion of the car for the $\frac{1}{2}$ hour mentioned in (a). Do not go beyond $\frac{1}{2}$ hour. [3]



- (ii) At the end of the $\frac{1}{2}$ hour, the car reaches a region where the road begins to rise up into some mountains. The car climbs the mountains for a further $\frac{1}{2}$ hour.

During the climb, its speed steadily decreases to 30 km/hour. The driver then stops the car so that he can admire the view.

On Fig. 1.2, draw a line representing the climb and the stopping of the car. [4]

[Total: 10]

3. Fig. 1.1 shows how the speed of a truck varies during a period of 80 s.

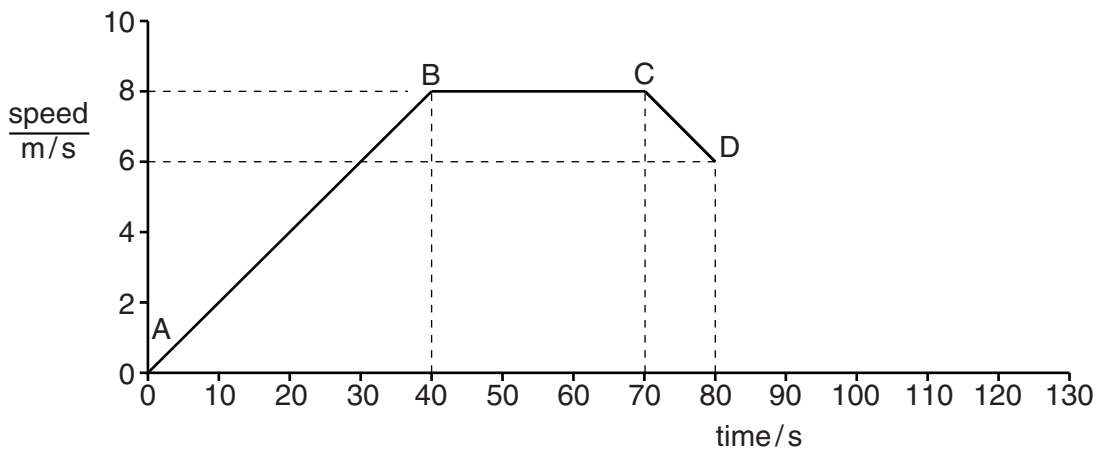


Fig. 1.1

- (a) In which section of the journey is the truck

(i) travelling at constant speed,

(ii) increasing its speed?

[2]

- (b) Calculate the distance travelled by the truck in

(i) the section BC,

distance = m [4]

(ii) the section CD.

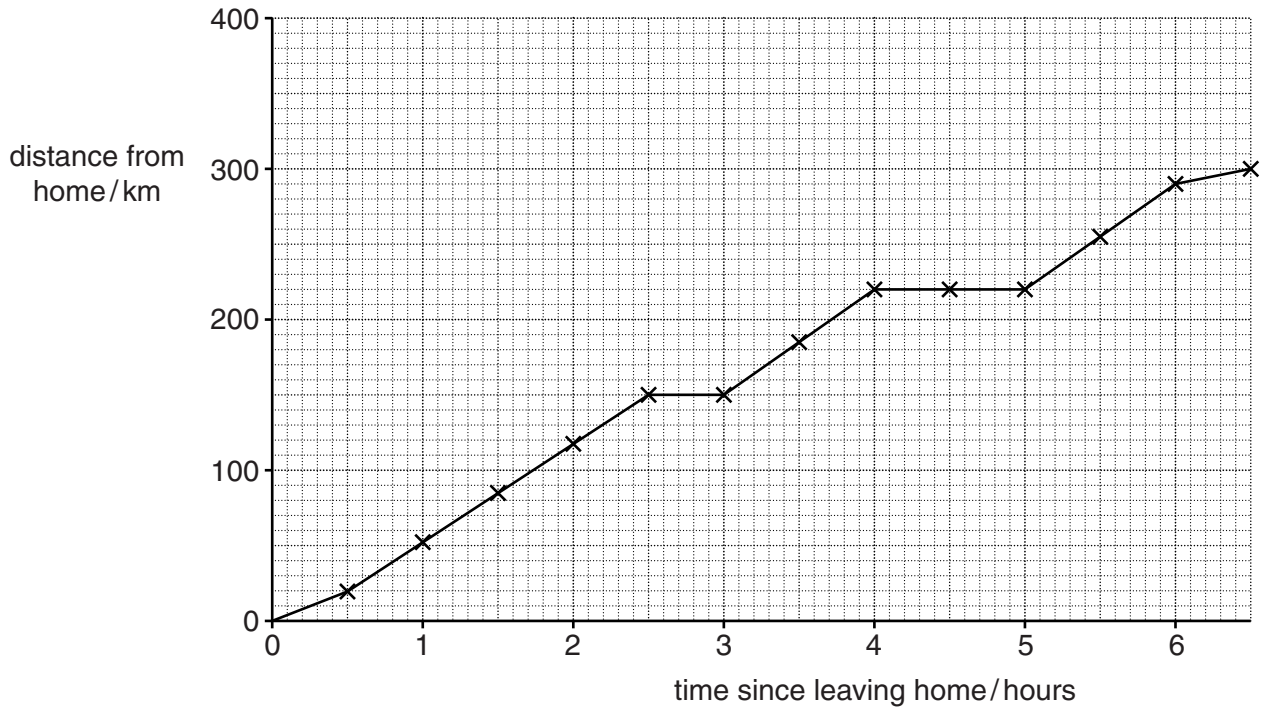
distance = m [2]

- (c) After point D, the truck takes 30 s to come to rest.

On Fig. 1.1, draw a line to show this part of the motion of the truck. [1]

[Total: 9]

4. A family goes on holiday in a car. To stop the journey being boring for the children, every half an hour they note down the distance they have travelled since they left home. They then plot the graph shown in Fig. 5.1.



The first half hour and the last half hour of their journey are on small roads. The rest of the journey is on major roads.

Answer the following questions using information from Fig. 5.1.

- (a) For how many hours were they travelling on major roads?

time = hours [1]

- (b) How far did they travel

- (i) in total,

total distance = km

- (ii) on small roads,

distance on small roads = km

- (iii) on major roads?

distance on major roads = km
[3]

(c) They had two refreshment stops whilst on the journey.

On Fig. 5.1, clearly mark where they had these stops. [1]

(d) Apart from the times when they stopped, during which section of the journey was their speed slowest? Explain your answer.

section

explanation

.....

[2]

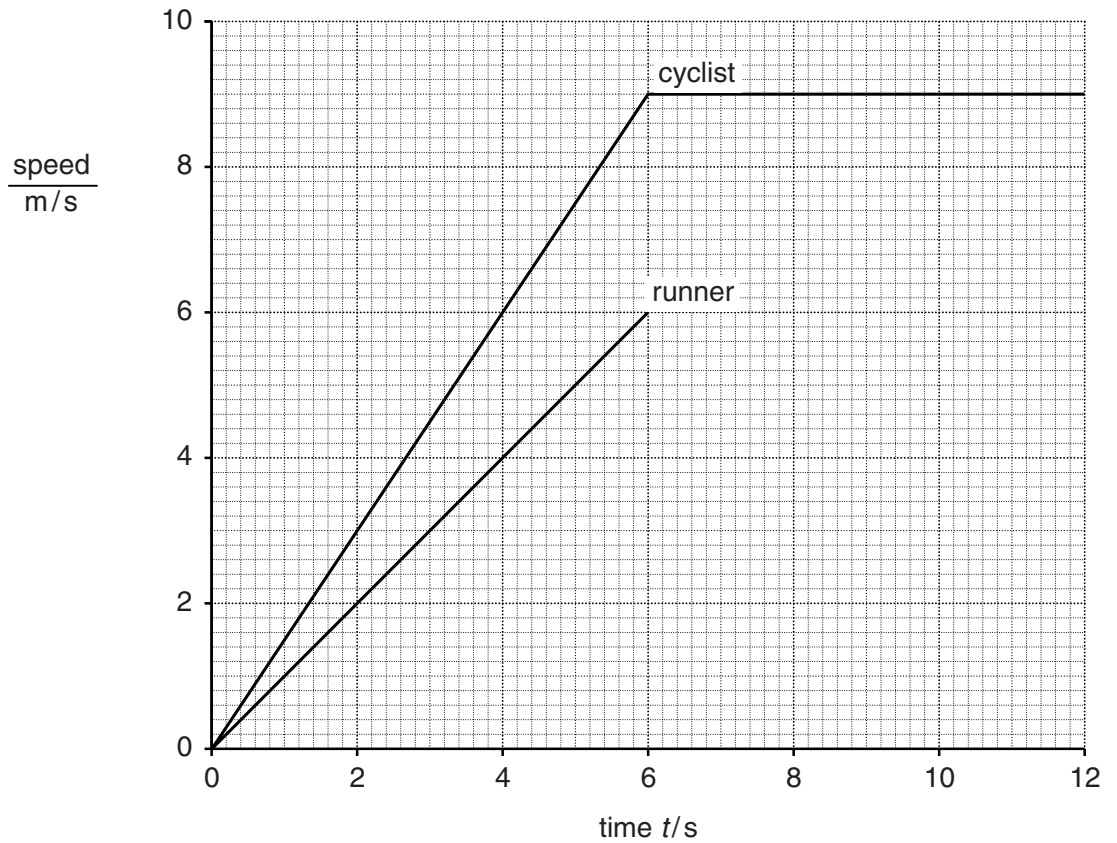
(e) Calculate the average speed for the whole journey. Your answer must include the unit.

average speed = [4]

[Total: 11]

5.

Fig. 1.1 shows part of the speed-time graphs for a cyclist and for a runner.



(a) Compare the motion of the cyclist and the runner during the first 6 seconds. Explain your answer.

.....

 [3]

(b) Describe the motion of the cyclist between time $t = 6.0s$ and time $t = 12.0s$.

..... [1]

(c) Calculate the total distance travelled by the cyclist between $t = 0$ and $t = 12.0s$.

distance travelled = m [4]

(d) After the first 6.0 seconds, the runner moves at constant speed for 4.0 seconds. He then slows down uniformly and stops in a further 2.0 seconds.

On Fig. 1.1, complete the graph for the runner's motion. [2]

[Total: 10]

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

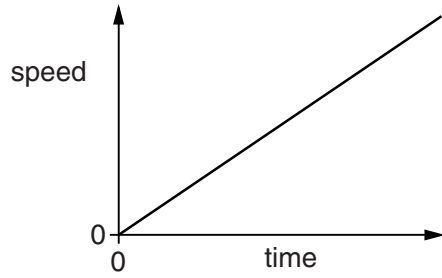


Fig. 1.1

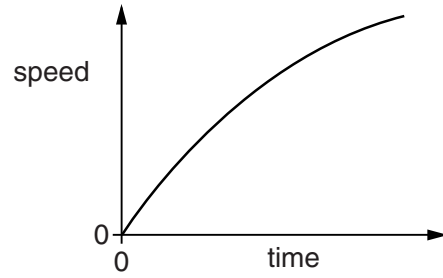


Fig. 1.2

(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]

7. (a) Fig. 1.1 shows the distance-time graphs for three different objects A, B and C.

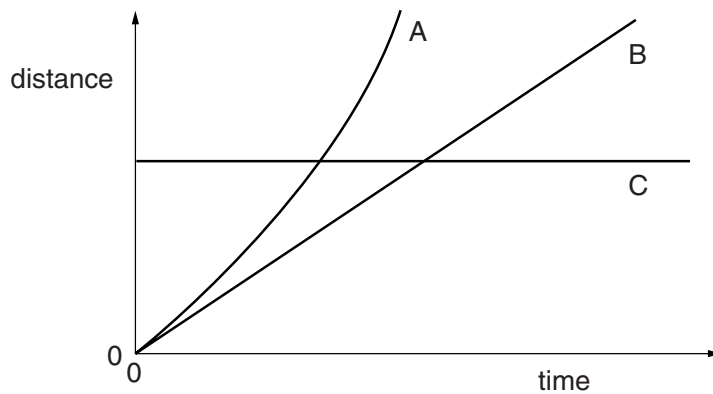


Fig. 1.1

Describe the motion of each of the objects A, B and C by selecting the appropriate description from the list below.

- constant speed increasing speed decreasing speed stationary

A

B

C

[2]

7b

(b) Fig. 1.2 shows the speed-time graphs for three more objects D, E, and F.

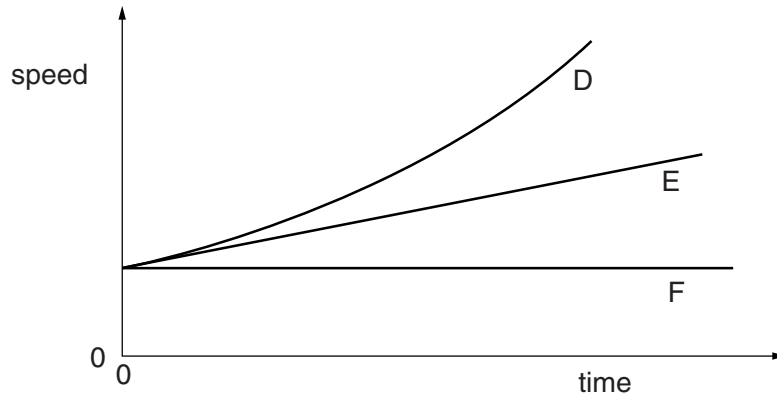


Fig. 1.2

Describe the motion of each of the objects D, E and F by selecting the appropriate description from the list below.

constant speed constant acceleration increasing acceleration stationary

D

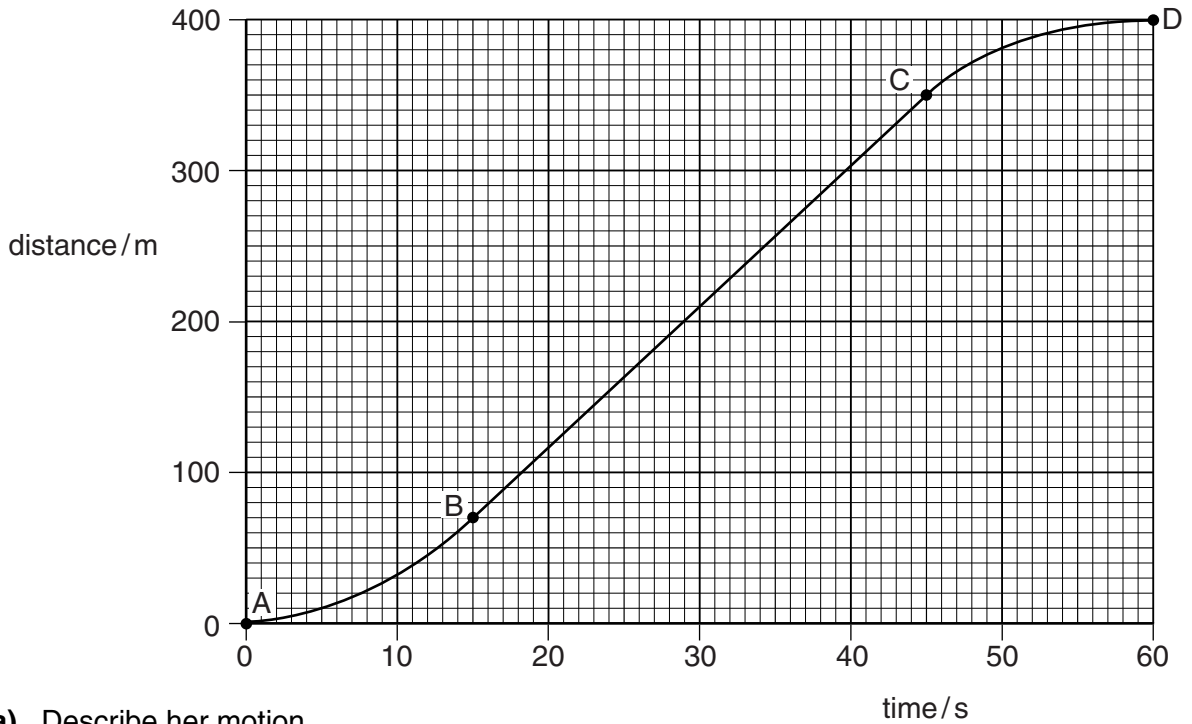
E

F

[2]

8.

A girl rides her bicycle along a straight level road. Fig. 2.1 shows a graph of her distance moved against time.



(a) Describe her motion

- (i) from A to B,
- (ii) from B to C,
- (iii) from C to D.

[3]

(b) Calculate

- (i) her average speed from A to D,

average speed = [2]

- (ii) her maximum speed.

maximum speed = [3]

[Total: 8]