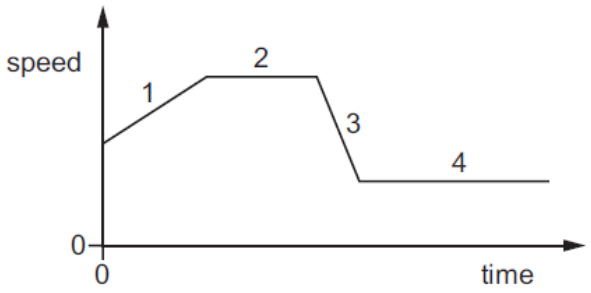
Motion – 2020 IGCSE 0625

1. March/2020/Paper_12/No.2

The graph shows how the speed of a car changes with time over part of a journey.



Which section of the graph shows acceleration and which section of the graph shows deceleration?

	acceleration	deceleration
A	1	2
B	1	3
C	2	4
D	3	1

2. March/2020/Paper_12/No.3

A steel ball is dropped from the top floor of a building. Air resistance can be ignored.

Which statement describes the motion of the ball?

A The ball falls with constant acceleration.

B The ball falls with constant speed.

C The ball falls with decreasing speed.

D The ball falls with increasing acceleration.

3. March/2020/Paper_32/No.3(b),(c),(d)

(b) Fig. 3.1 shows the speed of the ball while it is falling. The points **S**, **T**, **U**, **V** and **W** are shown on the graph.

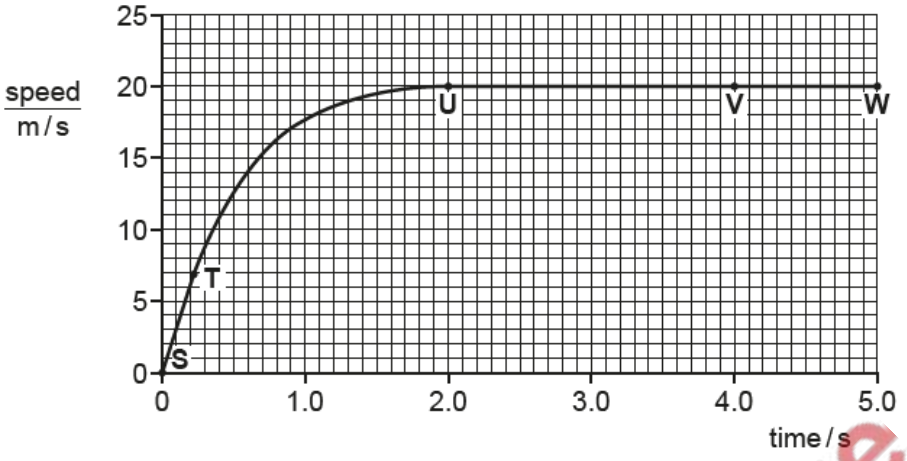


Fig. 3.1

Draw **one** line from each section of the graph to the correct description of the motion.

One has been drawn for you.

section of graph	description of motion
	at rest
S–T	decreasing acceleration
T–U	constant acceleration
	moving with constant speed
U–V	slowing down

[2]

(c) Determine the distance fallen by the ball in section **U – V** of the graph.

distance = ... m [3]

(d) State the distance fallen by the ball in section **V – W** of the graph.

distance = ... m [1]

4. March/2020/Paper_42/No.1

A rocket is launched vertically upwards from the ground. The rocket travels with uniform acceleration from rest. After 8.0 s, the speed of the rocket is 120 m/s.

(a) Calculate the acceleration of the rocket.

acceleration = ... [2]

(b) **(i)** On Fig. 1.1, draw the graph for the motion of the rocket in the first 8.0 s.

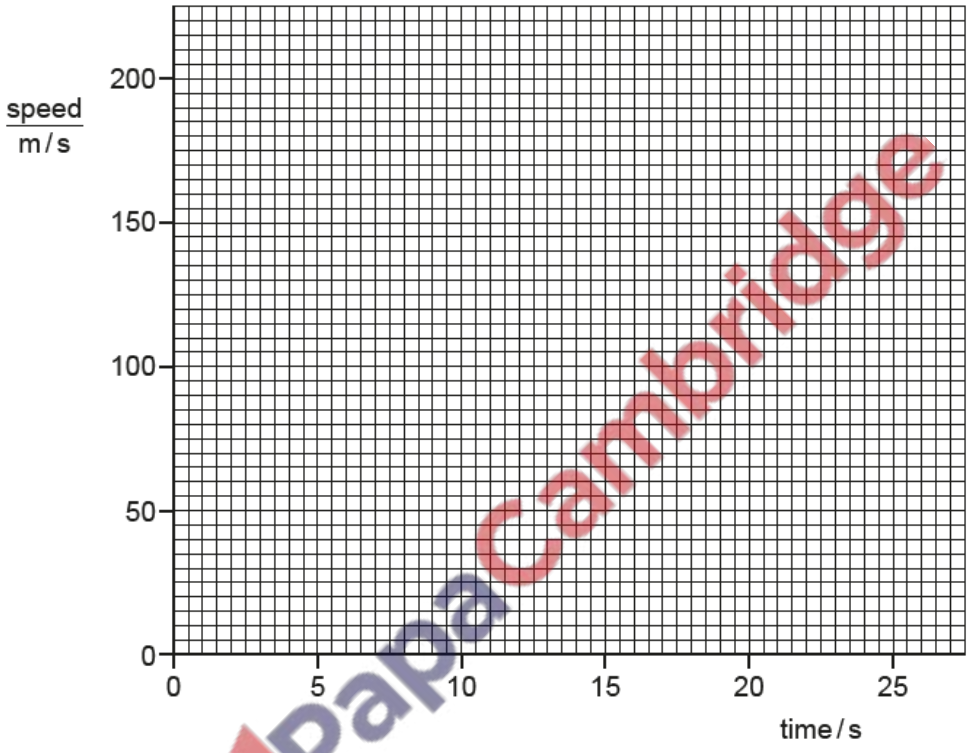


Fig. 1.1

[1]

(ii) Use the graph to determine the height of the rocket at 8.0 s.

height = ... [2]

(iii) From time = 8.0 s to time = 20.0 s, the rocket rises with increasing speed but with decreasing acceleration.

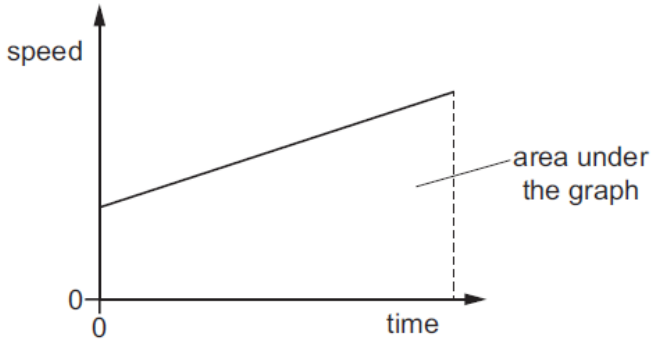
From time = 20.0 s to time = 25.0 s, the rocket has a constant speed of less than 200 m / s.

On Fig. 1.1, draw the graph for this motion. [3]

[Total: 8]

5. June/2020/Paper_11/No.2

The motion of an object is represented by the speed–time graph shown.



Which quantity is equal to the area under the graph?

A acceleration

B average speed

C distance travelled

D kinetic energy

6. June/2020/Paper_11/No.3

Which statement about acceleration is correct?

A It is related to the changing speed of an object.

B It is the distance an object travels in one second.

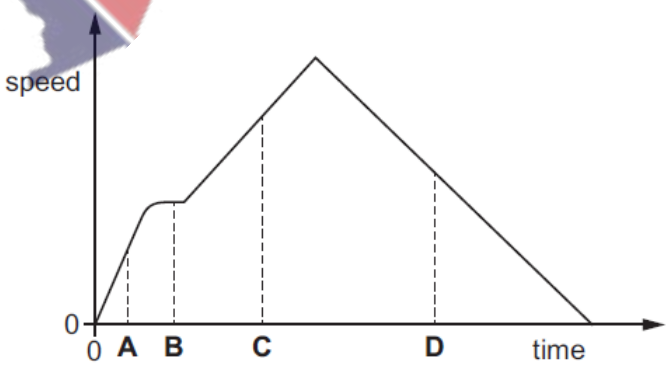
C It is the force acting on an object divided by the distance it travels in one second.

D It is the force acting on an object when it is near to the Earth.

7. June/2020/Paper_12/No.2

The graph shows how the speed of an object varies with time.

At which labelled time is the acceleration greatest?



8. June/2020/Paper_12/No.3

Which statement about acceleration is correct?

A It is related to the changing speed of an object.

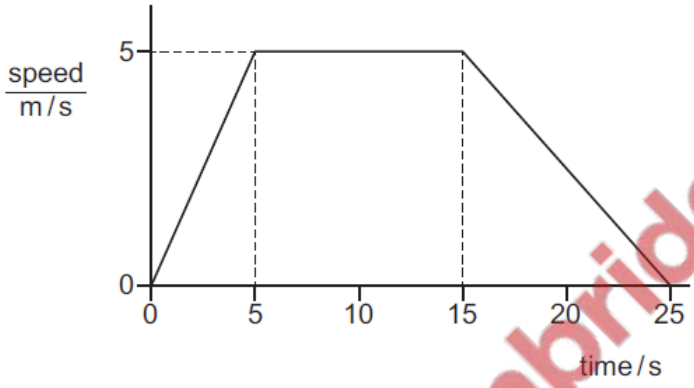
B It is the distance an object travels in one second.

C It is the force acting on an object divided by the distance it travels in one second.

D It is the force acting on an object when it is near to the Earth.

9. June/2020/Paper_13/No.2

The speed–time graph shows the motion of an object.



How far does the object travel at constant speed?

A 25 m **B** 50 m **C** 75 m **D** 125 m

10. June/2020/Paper_13/No.3

Which statement about acceleration is correct?

A It is related to the changing speed of an object.

B It is the distance an object travels in one second.

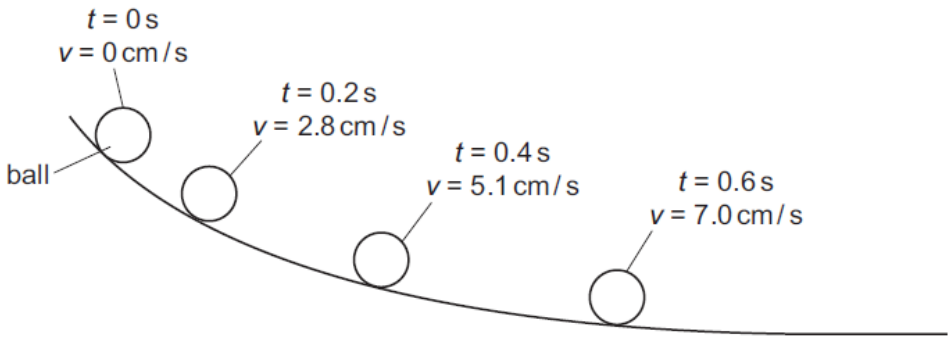
C It is the force acting on an object divided by the distance it travels in one second.

D It is the force acting on an object when it is near to the Earth.

11. June/2020/Paper_21/No.2

A student investigates the motion of a ball rolling down a slope.

The diagram shows the speed v of the ball at different times t.



Which statement describes the motion of the ball?

A The acceleration is not constant.

B The acceleration is negative.

C The speed is decreasing.

D The velocity is constant.

12. June/2020/Paper_21/No.3

Which statement about acceleration is correct?

A It is related to the changing speed of an object.

B It is the distance an object travels in one second.

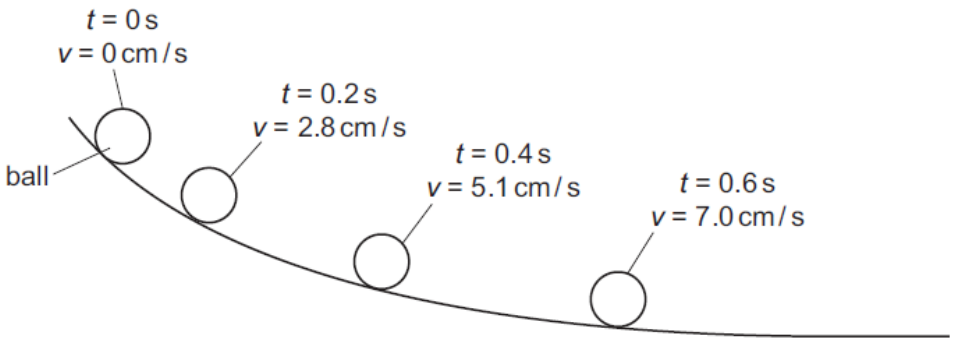
C It is the force acting on an object divided by the distance it travels in one second.

D It is the force acting on an object when it is near to the Earth.

13. June/2020/Paper_22/No.2

A student investigates the motion of a ball rolling down a slope.

The diagram shows the speed v of the ball at different times t.



Which statement describes the motion of the ball?

A The acceleration is not constant.

B The acceleration is negative.

C The speed is decreasing.

D The velocity is constant.

14. June/2020/Paper_22/No.3

Which statement about acceleration is correct?

A It is related to the changing speed of an object.

B It is the distance an object travels in one second.

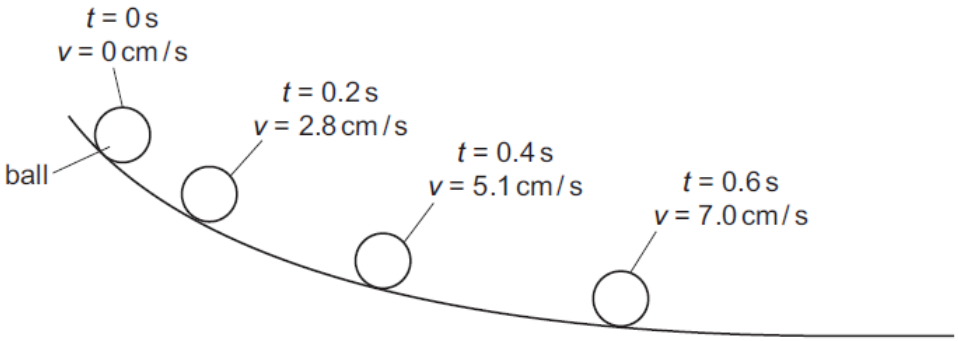
C It is the force acting on an object divided by the distance it travels in one second.

D It is the force acting on an object when it is near to the Earth.

15. June/2020/Paper_23/No.2

A student investigates the motion of a ball rolling down a slope.

The diagram shows the speed v of the ball at different times t.



Which statement describes the motion of the ball?

A The acceleration is not constant.

B The acceleration is negative.

C The speed is decreasing.

D The velocity is constant.

16. June/2020/Paper_23/No.3

Which statement about acceleration is correct?

A It is related to the changing speed of an object.

B It is the distance an object travels in one second.

C It is the force acting on an object divided by the distance it travels in one second.

D It is the force acting on an object when it is near to the Earth.

17. June/2020/Paper_31/No.4(a),(b)

(a) During part of a race, a skier travels a distance of 200 m in a time of 6.4 s.

Calculate the average speed of the skier.

average speed = ... m/s [3]

(b) Fig. 4.1 shows a speed–time graph for the skier in another part of the race.

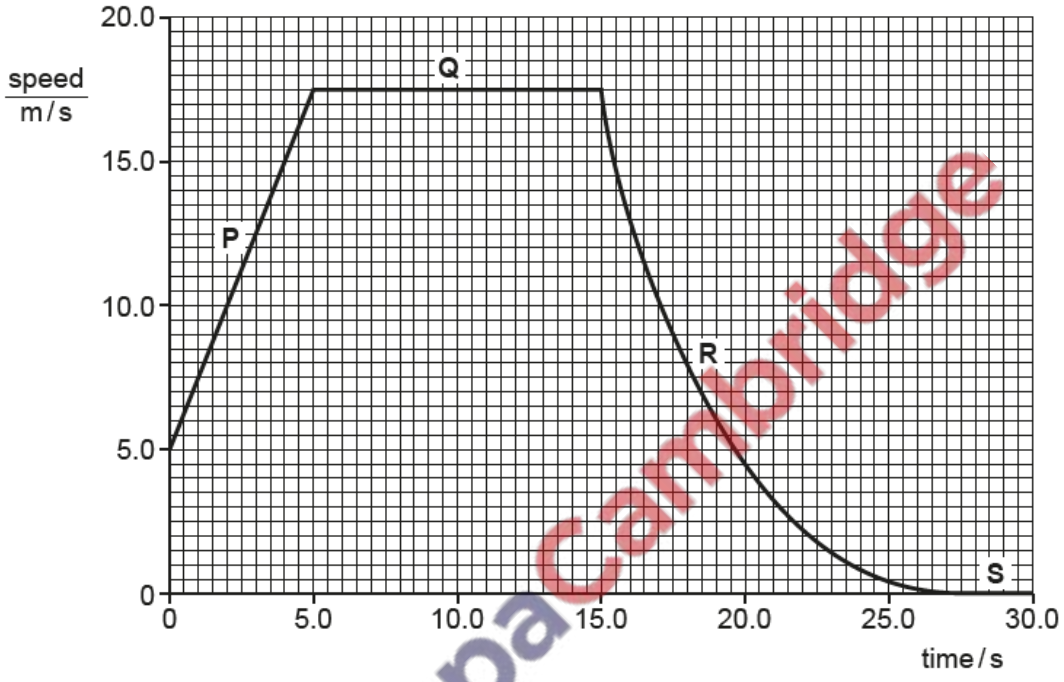


Fig. 4.1

Describe the motion of the skier at each point **P**, **Q**, **R** and **S** on the graph.

P .....

Q .....

R .....

S .....

[4]

18. June/2020/Paper_32/No.2

(a) Some students determine the speed of a car on a road. The students measure the time for the car to travel 30 m along the road. The time is 5.4 s.

Calculate the average speed of the car.

average speed = ... m/s [3]

(b) Another car moves at a constant speed of 16 m/s for 4.0 seconds. During the next 2.0 seconds, the car decelerates from a speed of 16 m/s to a speed of 13 m/s. It then continues at a constant speed of 13 m/s for 3.0 seconds.

On Fig. 2.1, plot the speed–time graph for the motion of the car during these 9.0 s.

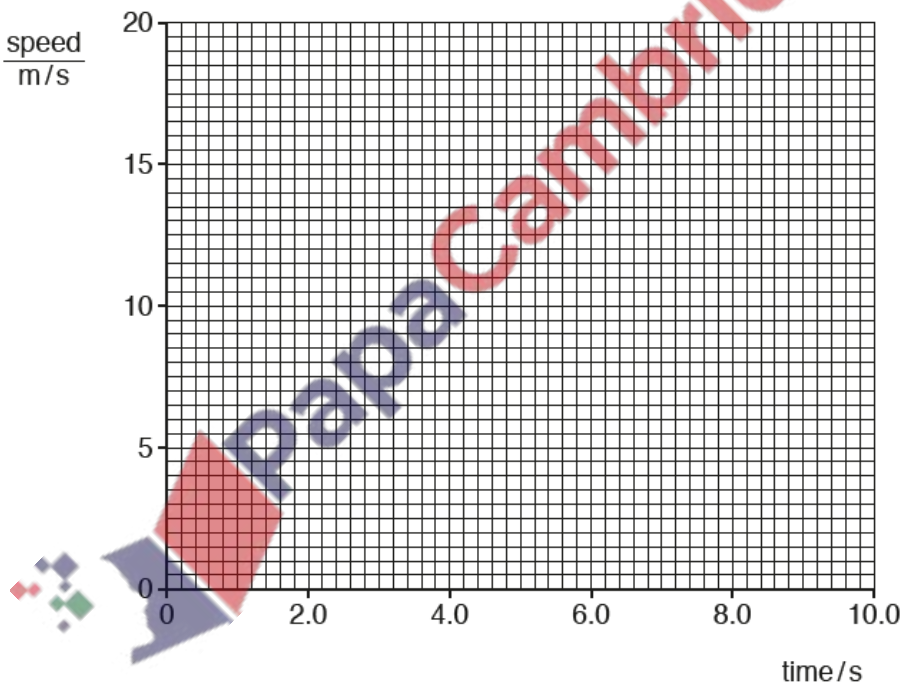


Fig. 2.1

[3]

(c) A motorcycle accelerates as shown in Fig. 2.2. Calculate the distance the motorcycle travels while it is accelerating. Use information from Fig. 2.2.

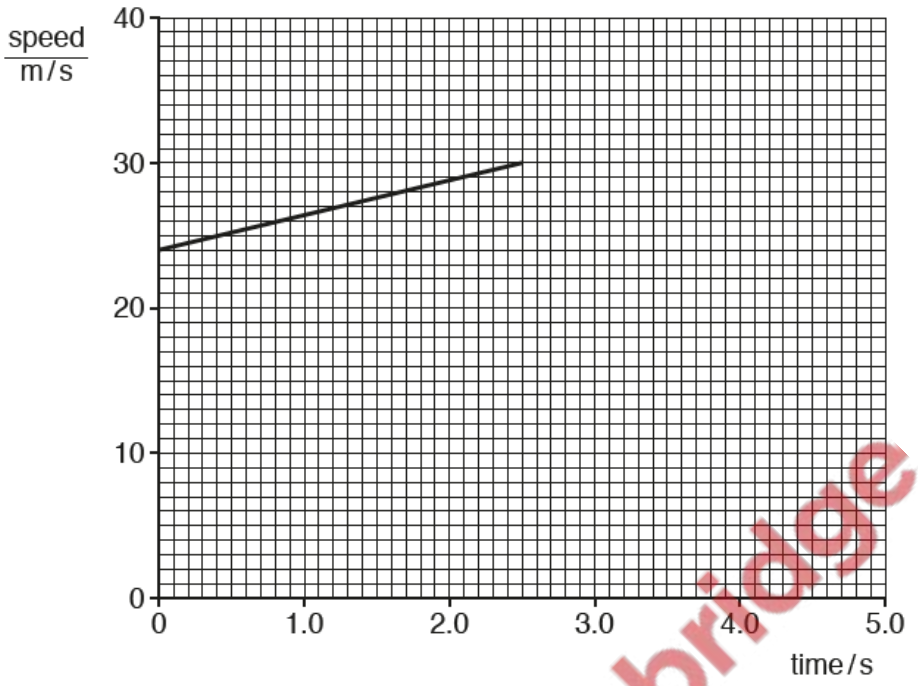


Fig. 2.2

distance travelled = ... m [3]

[Total: 9]

19. June/2020/Paper_41/No.1

An aeroplane of mass 2.5×10^5 kg lands with a speed of 62 m/s, on a horizontal runway at time $t = 0$. The aeroplane decelerates uniformly as it travels along the runway in a straight line until it reaches a speed of 6.0 m/s at $t = 35$ s.

(a) Calculate:

(i) the deceleration of the aeroplane in the 35 s after it lands

deceleration = ... [2]

(ii) the resultant force acting on the aeroplane as it decelerates

force = ... [2]

(iii) the momentum of the aeroplane when its speed is 6.0 m/s.

momentum = ... [2]

(b) At $t = 35$ s, the aeroplane stops decelerating and moves along the runway at a constant speed of 6.0 m/s for a further 15 s.

On Fig. 1.1, sketch the shape of the graph for the distance travelled by the aeroplane along the runway between $t = 0$ and $t = 50$ s. You are **not** required to calculate distance values.

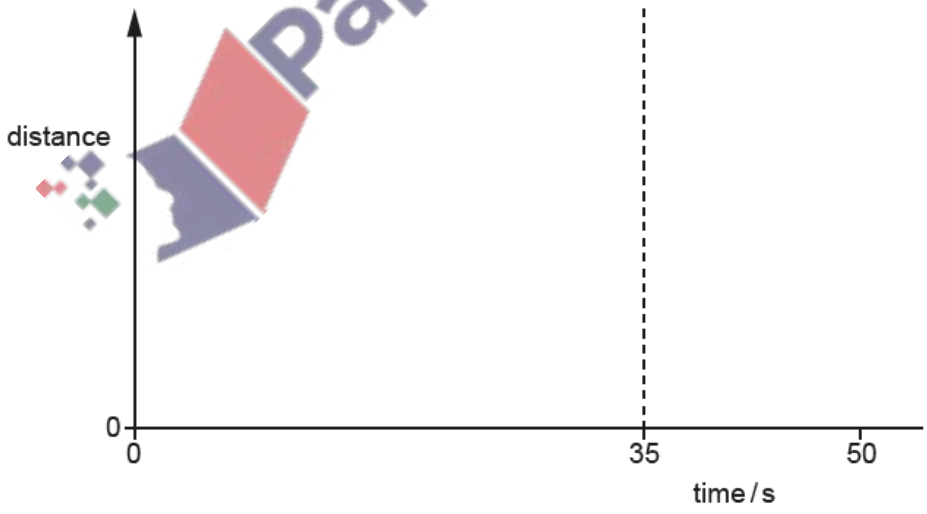


Fig. 1.1

[3]

(c) As the aeroplane decelerates, its kinetic energy decreases.

Suggest what happens to this energy.

.....

..... [1]

[Total: 10]

20. June/2020/Paper_43/No.1

(a) Define *acceleration*.

.....

..... [1]

(b) Fig. 1.1 shows two speed–time graphs, A and B, and two distance–time graphs, C and D.

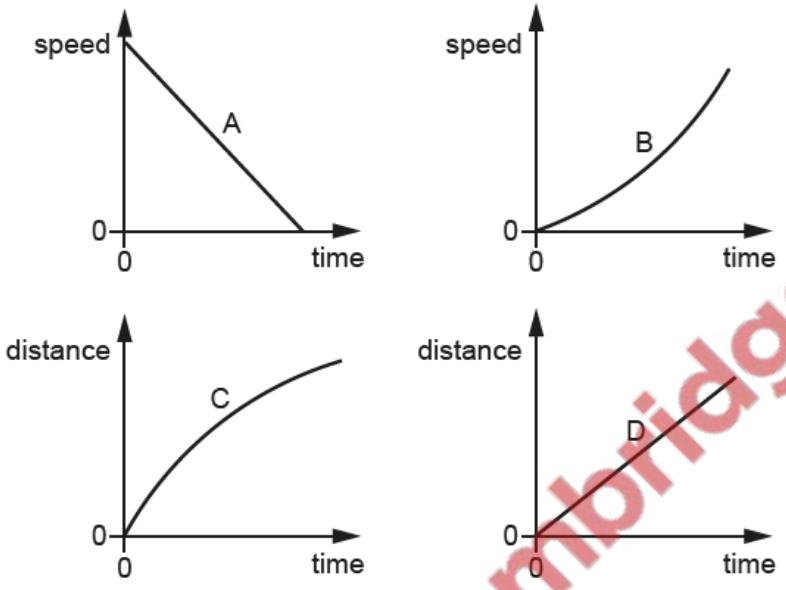


Fig. 1.1

Describe the motion shown by:

(i) graph A .....

..... [2]

(ii) graph B .....

..... [2]

(iii) graph C .....

..... [1]

(iv) graph D. .....

..... [1]

[Total: 7]