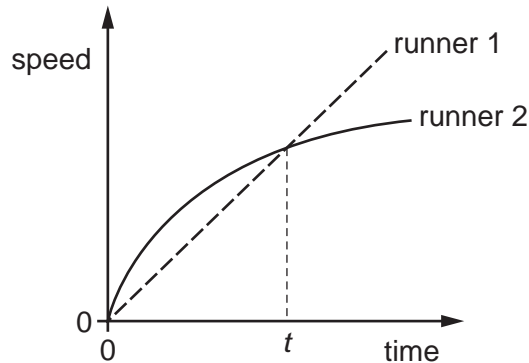1   A train begins a journey from a station and travels 60 km in a time of 20 minutes.

What is the average speed of the train?

**A**   3.0 m/s   **B**   5.0 m/s   **C**   50 m/s   **D**   60 m/s

2   Two runners take part in a race.

The graph shows how the speed of each runner changes with time.

What does the graph show about the runners at time t?

A   Both runners are moving at the same speed.

B   Runner 1 has zero acceleration.

C   Runner 1 is overtaking runner 2.

D   Runner 2 is slowing down.

3   The graph shows how the speed of a van changes with time for part of its journey.

In which labelled section is the van decelerating?
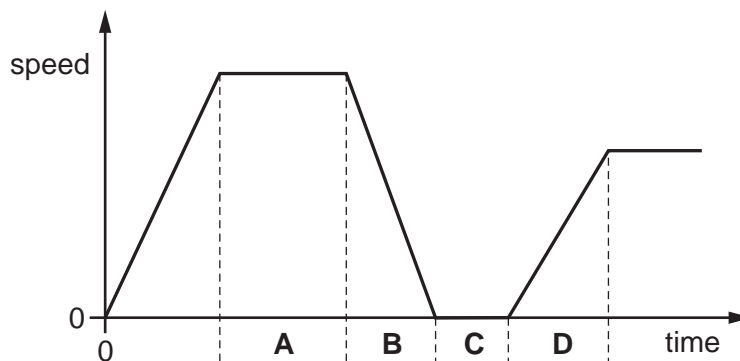
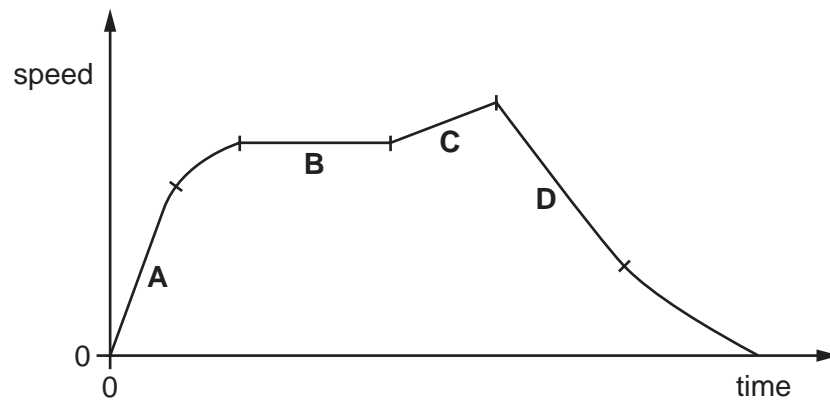4   A large stone is dropped from a bridge into a river. Air resistance can be ignored.

Which row describes the acceleration and the speed of the stone as it falls?

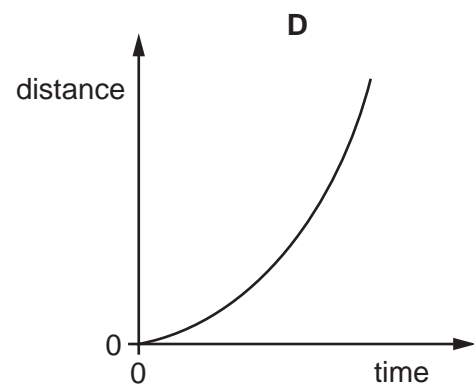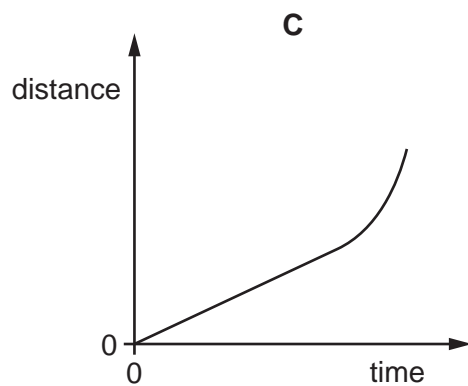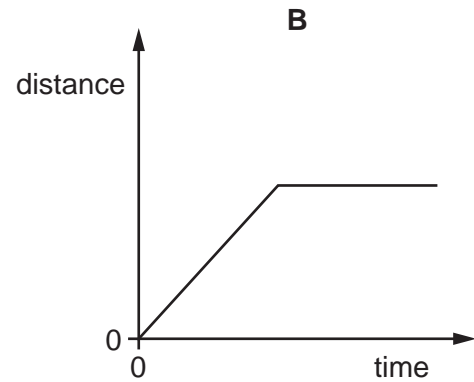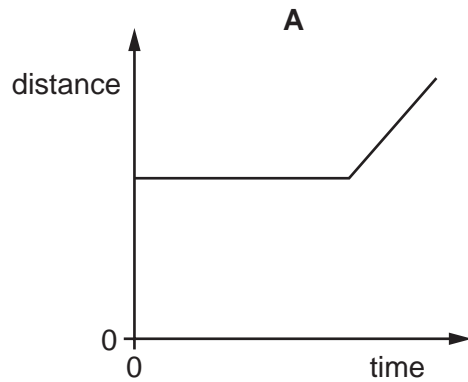|	acceleration of the stone	speed of the stone
A	constant	constant
B	constant	increasing
C	increasing	constant
D	increasing	increasing

5   A car travels along a straight road.

The speed-time graph for this journey is shown.

During which labelled part of the journey is the resultant force on the car zero?

6   An object moves at a constant speed for some time, then begins to accelerate.
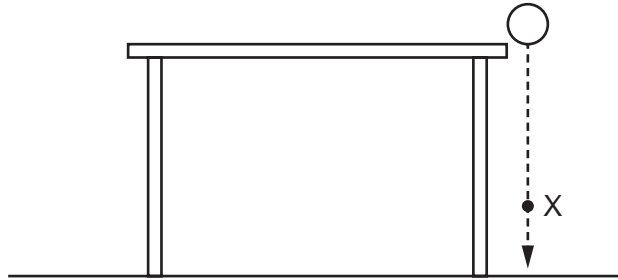
Which distance-time graph shows this motion?

A

distance

0
  0   time

B

distance

0
  0   time

C

distance

0
  0   time

D

distance

0
  0   time

7   A car travels at an average speed of 60 km/h for 15 minutes.

How far does the car travel in this time?

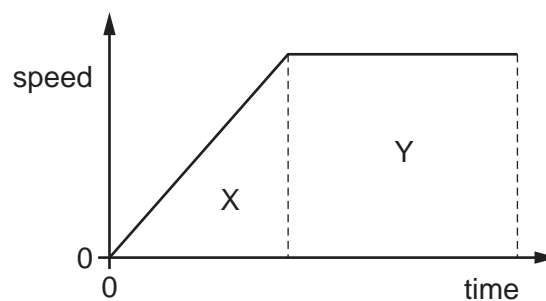**A**   4.0 km   **B**   15 km   **C**   240 km   **D**   900 km

8   A ball is dropped from a table-top. Air resistance may be ignored.

Which row describes the velocity and the acceleration of the ball at point X?

	acceleration	velocity
A	constant	constant
B	constant	increasing
C	increasing	constant
D	increasing	increasing

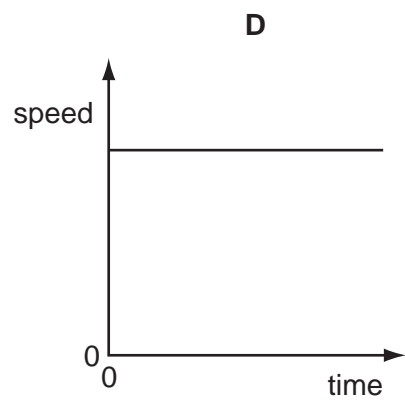9   The diagram shows the speed-time graph for a car.
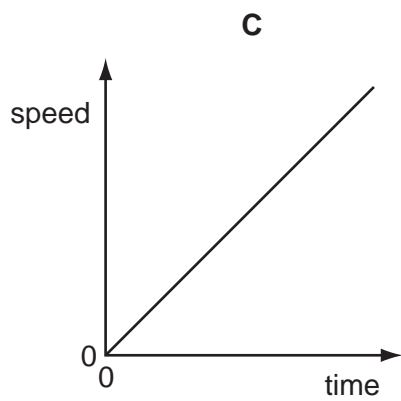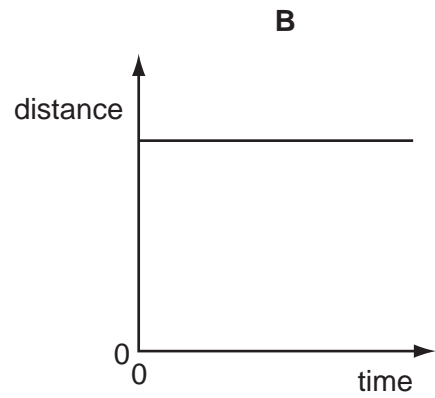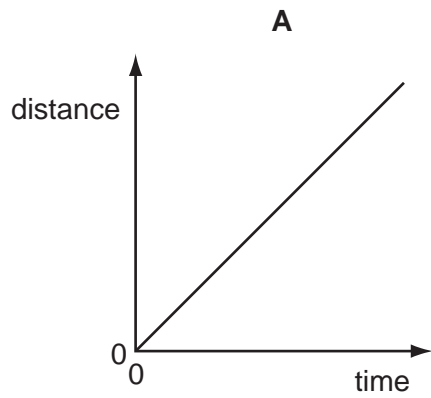

Which area represents the distance travelled while the car is accelerating?

A X   **B** X + Y   **C** Y   **D** Y – X

10   Two distance-time graphs and two speed-time graphs are shown.

Which graph represents an object that is at rest?

A

B

C

D

11 A geologist compares the volumes of three rocks, X, Y and Z. Three measuring cylinders contain different volumes of water. He places each rock into one of the measuring cylinders.

The diagrams show the measuring cylinders before and after the rocks are put in.
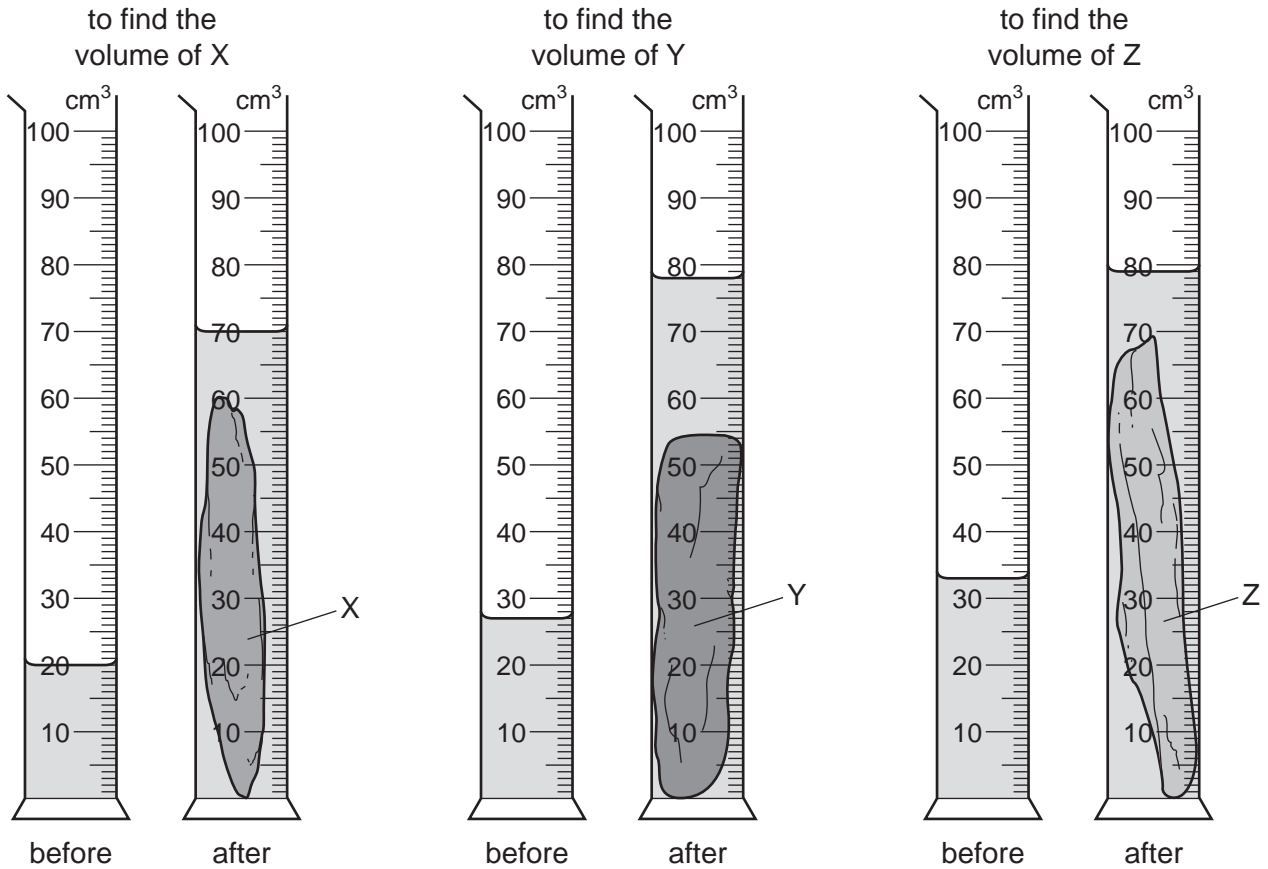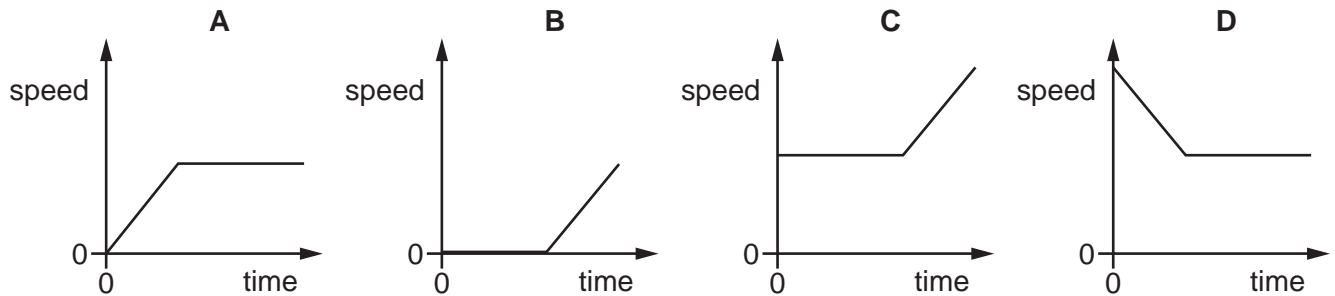

Which row shows the volumes of X, Y and Z in order, from largest to smallest?

	largest volume	⟶	smallest volume
A	X	Z	Y
B	Y	X	Z
C	Y	Z	X
D	Z	Y	X

12   A car moves with constant speed and then constant acceleration.

Which graph is the speed-time graph for the car?

13   What does the area under a speed-time graph represent?

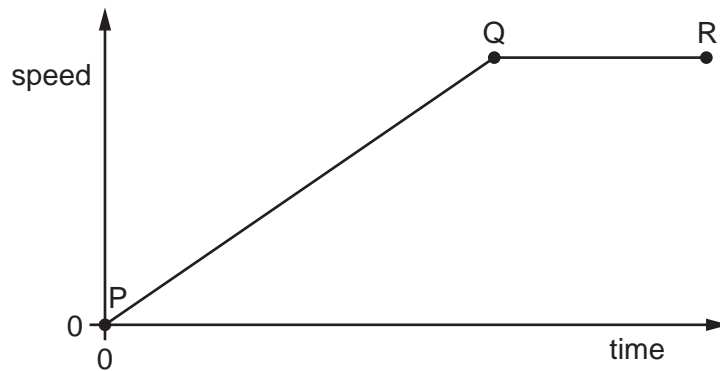   **A**   acceleration

   B   average speed

   C   deceleration

   D   distance travelled

14   A car travels 100 km. The journey takes two hours. The highest speed of the car is 80 km/h, and the lowest speed is 40 km/h.

What is the average speed for the journey?

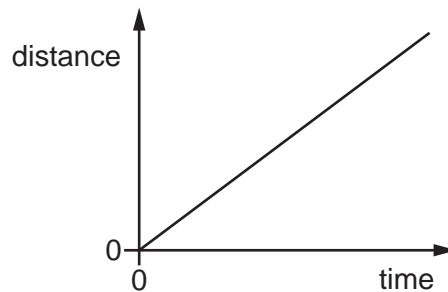   **A**   40 km/h   **B**   50 km/h   **C**   60 km/h   **D**   120 km/h

15   The speed-time graph shows the motion of a car.

Which row describes the motion?

	between P and Q	between Q and R
A	accelerating	moving at constant speed
B	accelerating	not moving
C	moving at constant speed	decelerating
D	moving at constant speed	not moving

16   The diagram shows the distance-time graph of an object.

Which statement describes the object?

A   It is accelerating.

B   It is moving at a constant speed.

C   It is slowing down.

D   It is stationary.

17 A tennis player hits a ball hard and 0.40 s later hears the echo from a wall.
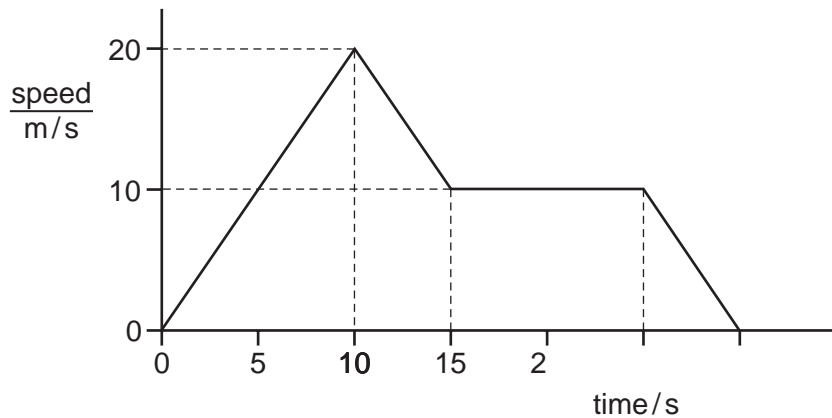
The speed of sound in air is 330 m/s.

How far away is the player from the wall?

A 66 m   **B** 132 m   **C** 264 m   **D** 825 m
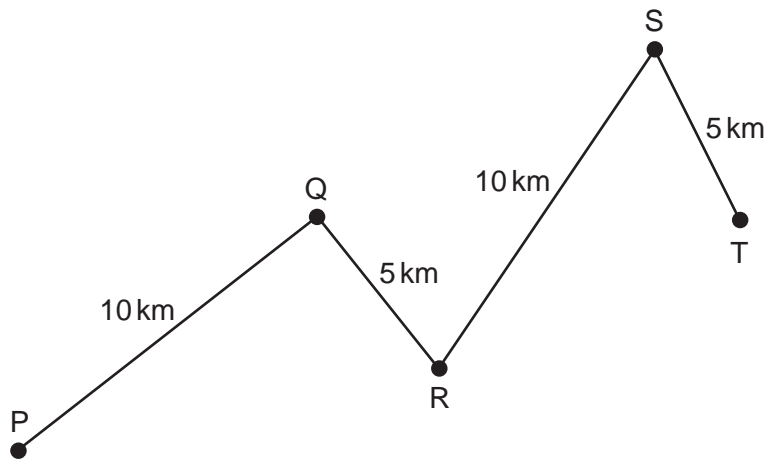
18 The graph represents the motion of a car.

What is the distance travelled by the car while it is moving at a constant speed?

A 100 m   **B** 150 m   **C** 250 m   **D** 300 m

19 A car travels along the route PQRST in 30 minutes.

What is the average speed of the car?

A 10 km/hour   **B** 20 km/hour   **C** 30 km/hour   **D** 60 km/hour

20 The table shows the readings on a car speedometer at 5 second intervals.

time/s	$\dfrac{\text{speed}}{\text{km/h}}$
0	0
5	30
10	50
15	60
20	65

Which row describes the speed and the acceleration of the car?

	speed	acceleration
A	decreasing	zero
B	decreasing	not zero
C	increasing	zero
D	increasing	not zero

21 The diagram shows the distance-time graph for a car.

At which labelled point is the car moving with constant speed?
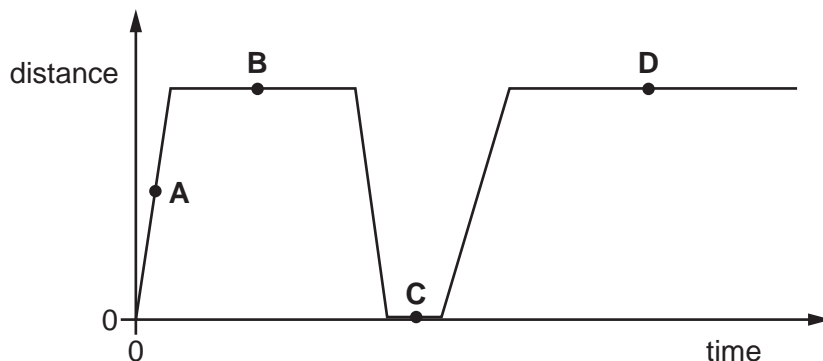
22 The graph represents the motion of a train travelling between two stations.
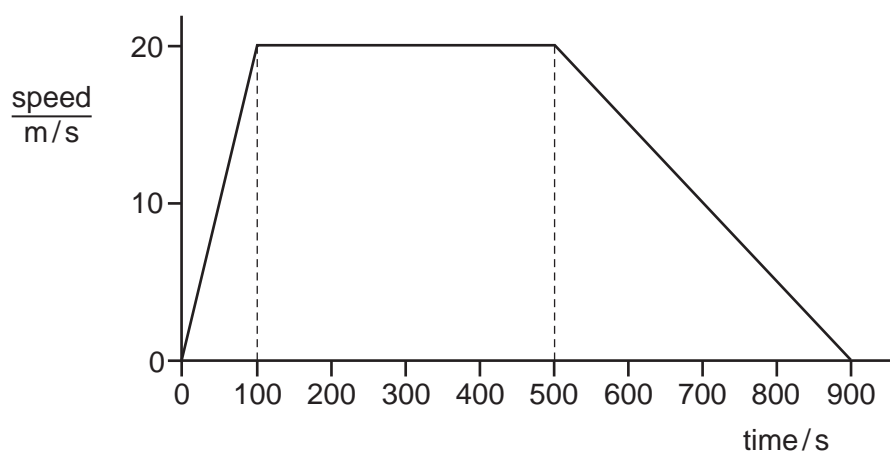
Which statement about the train is correct?

A Its acceleration takes a longer time than its deceleration.

B It travels at constant speed for less than half of its journey time.

C It travels 2000 m in the first 100 s.

D It travels 10 000 m at constant speed.

23 A car travels 6.0 km along a main road in 6.0 minutes. It then travels 2.0 km along a minor road in 6.0 minutes.

minor
road

6.0 km

2.0 km

6.0 minutes

6.0 minutes

main
road
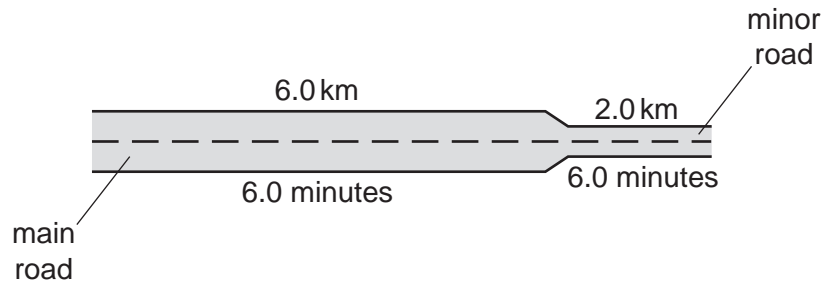
Which calculation of average speed for the whole journey is correct?

A 8.0 ÷ 12.0 = 0.67 km / minute

B 12.0 ÷ 8.0 = 1.5 km / minute

C 8.0 + 12.0 = 20 km / minute

D 8.0 × 12.0 = 96 km / minute

24 Which distance / time graph represents the motion of an object moving at constant speed?

A

distance

0
0   time

B

distance

0
0   time

C

distance

0
0   time

D

distance

0
0   time
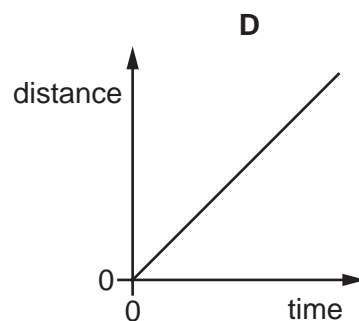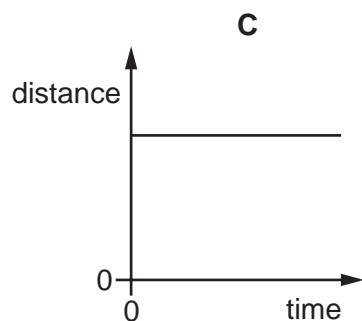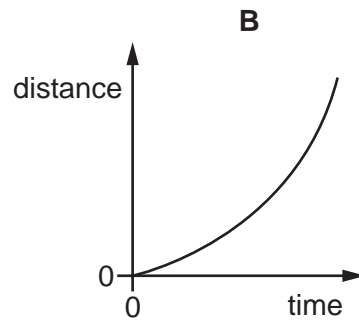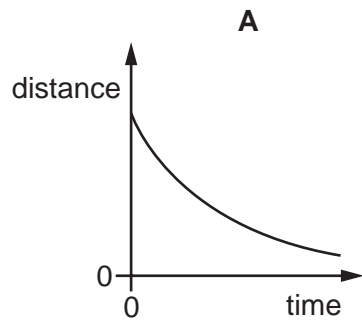
25   The graph shows how the speed of a car changes with time.
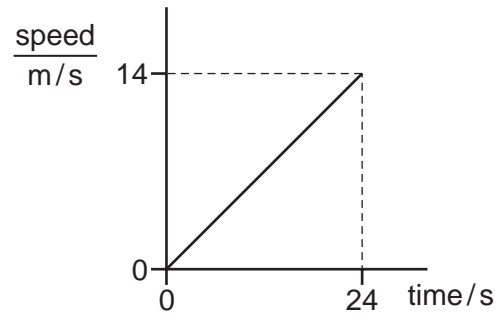
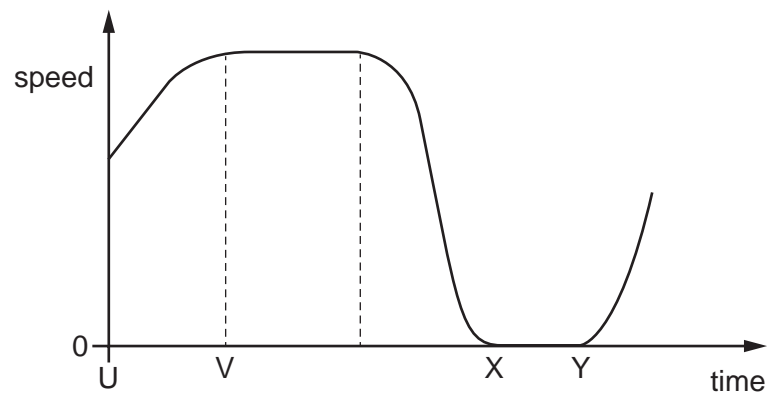Which calculation gives the distance travelled by the car in 24 seconds?

A $\left(\dfrac{14}{24}\right)$m

B $\left(\dfrac{24}{14}\right)$m

C $\left(\dfrac{24 \times 14}{2}\right)$m

D (24×14)m

26 A car takes 15 minutes to travel along a road that is 20 km long.

What is the average speed of the car?

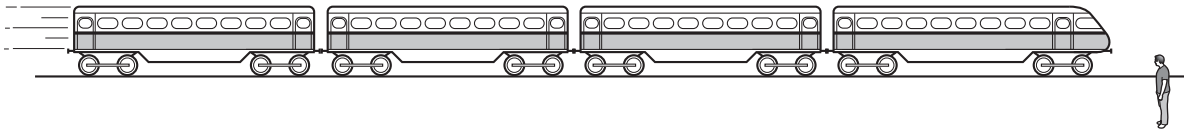**A** 0.75 km/h   **B** 5.0 km/h   **C** 80 km/h   **D** 300 km/h

27 The graph shows how the speed of a car changes with time.

Between which two times is the car stationary?

A U and V   **B** V and W   **C** W and X   **D** X and Y

28 A man stands by a railway track.
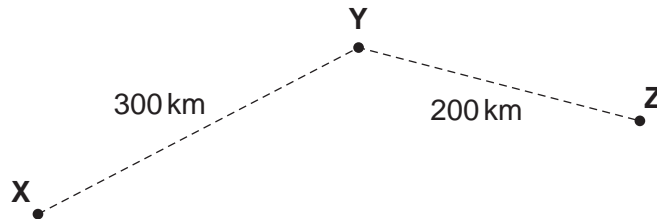

A train travelling at 40 m/s takes 2.0 s to pass the man.

What is the length of the train?

A   20 m   **B**   38 m   **C**   40 m   **D**   80 m

29 An aeroplane flies from town **X** to town **Z**, stopping for 1 hour at town **Y** to pick up more passengers. The distances between the towns are shown in the diagram.

The total time taken between leaving **X** and arriving at **Z** is 3 hours.

What is the average speed of the aeroplane **in the air**?

A $\dfrac{500}{4}$ km/h   **B** $\dfrac{500}{3}$ km/h   **C** $\dfrac{500}{2}$ km/h   **D** $\dfrac{500}{1}$ km/h

30 Which person is experiencing an acceleration?

   A   a driver of a car that is braking to stop at traffic lights

   B   a passenger in a train that is stationary in a railway station

   C   a shopper in a large store ascending an escalator (moving stairs) at a uniform rate

   D   a skydiver falling at constant speed towards the Earth

31   A car travels at various speeds during a short journey.

The table shows the distances travelled and the times taken during each of four stages P, Q, R and S.

stage	P	Q	R	S
distance travelled / km	1.8	3.6	2.7	2.7
time taken / minutes	2	2	4	3

During which two stages is the car travelling at the same average speed?

A P and Q   **B** P and S   **C** Q and R   **D** R and S

32   A heavy metal ball falls vertically downwards through air past four equally spaced levels J, K, L and M.
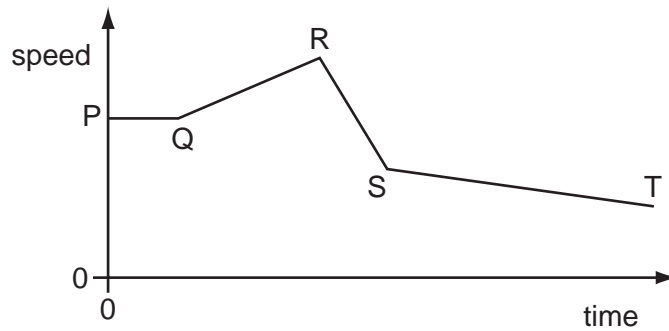
metal ball

---------------- level J

---------------- level K
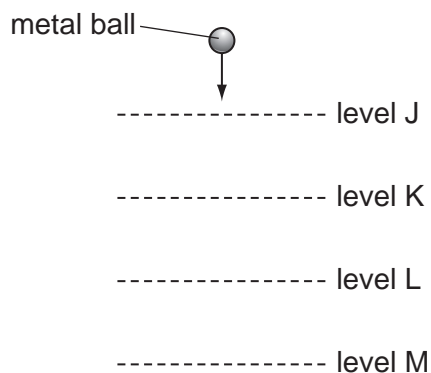
---------------- level L

---------------- level M

The times taken to fall from one level to the next are measured.

Where is the speed of the ball greatest and which time is shortest?

	speed is greatest between	time is shortest between
A	J and K	J and K
B	J and K	L and M
C	L and M	J and K
D	L and M	L and M

33 The diagram shows the speed/time graph for a train as it travels along a track.

For which part of the graph is the train's speed changing at the greatest rate?

A PQ **B** QR **C** RS **D** ST

34 A small steel ball is dropped from a low balcony.

Ignoring air resistance, which statement describes its motion?

A   It falls with constant acceleration.

B   It falls with constant speed.

C   It falls with decreasing speed.

D   It falls with increasing acceleration.

35 The graph shows how the distance travelled by a vehicle changes with time.
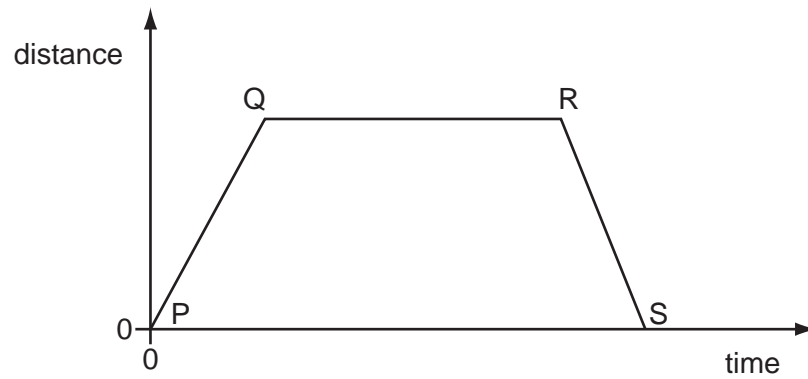
Which row describes the speed of the vehicle in each section of the graph?

	P to Q	Q to R	R to S
A	constant	zero	constant
B	constant	zero	decreasing
C	increasing	constant	decreasing
D	increasing	zero	decreasing

36   A car is moving downhill along a road at a constant speed.

Which graph is the speed/time graph for the car?

A

speed

0
  0   time

B

speed

0
  0   time

C

speed

0
  0   time
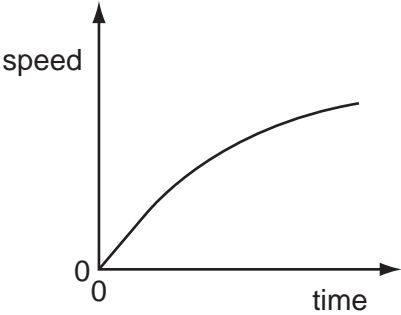
D

speed

0
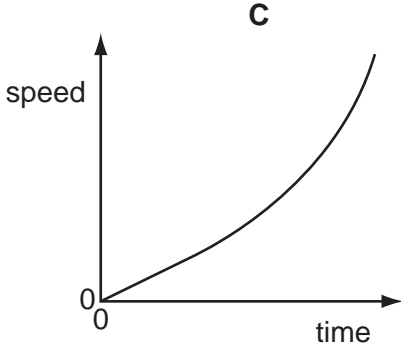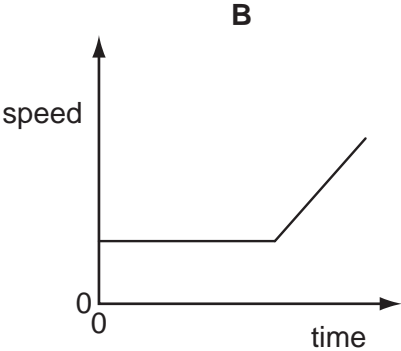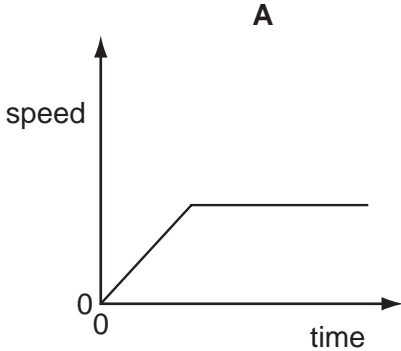 0   time
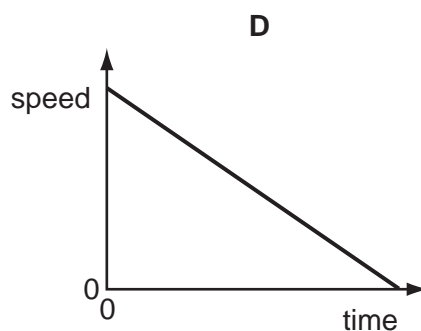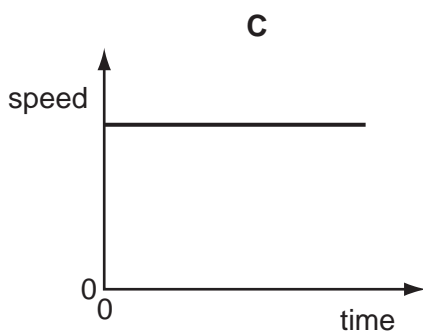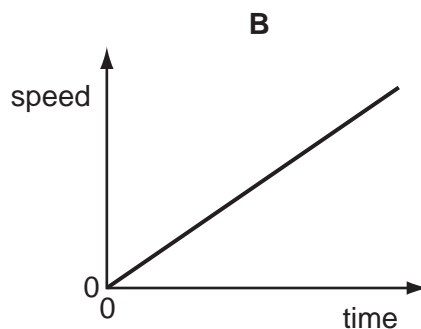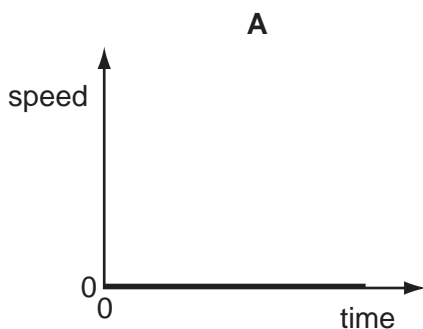
37   In a race, a car travels 60 times around a 3.6 km track. This takes 2.4 hours.

What is the average speed of the car?

A   1.5 km/h   **B**   90 km/h   **C**   144 km/h   **D**   216 km/h

38 An object moves initially with constant speed and then with constant acceleration.

Which graph shows this motion?

A

speed

time

B

speed

time

C

speed

time

speed

time

39 A tennis player hits a ball hard and 0.40 s later hears the echo from a wall.
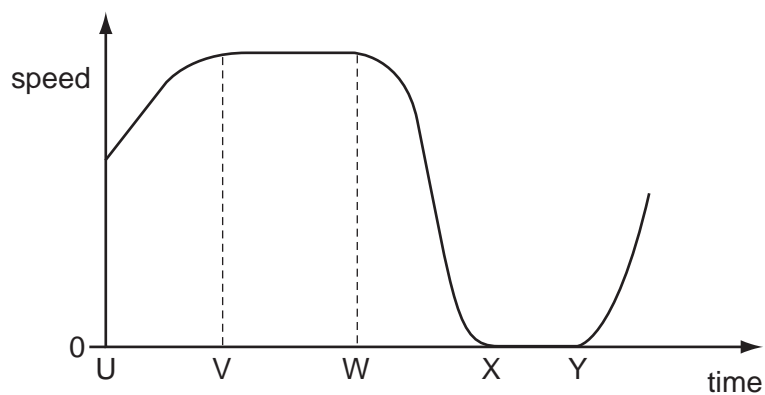
The speed of sound in air is 330 m/s.

How far away is the player from the wall?

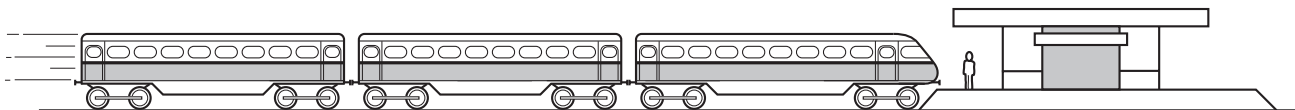**A** 66 m   **B** 132 m   **C** 264 m   **D** 825 m

40 The graph shows how the speed of a car changes with time.

Between which two times is the car stationary?

A U and V   **B** V and W   **C** W and X   **D** X and Y
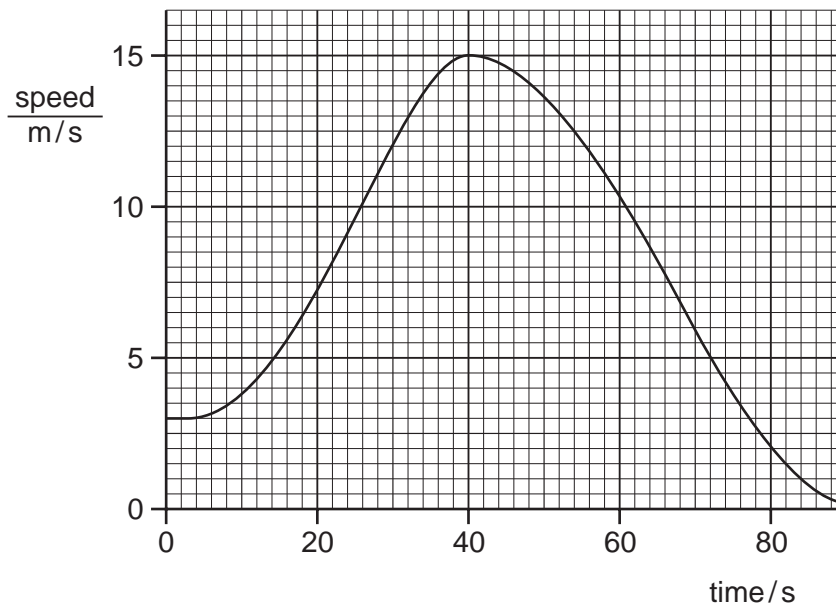
41   A child is standing on the platform of a station.

A train travelling at 30 m / s takes 3.0 s to pass the child.

What is the length of the train?

A   10 m   **B**   27 m   **C**   30 m   **D**   90 m

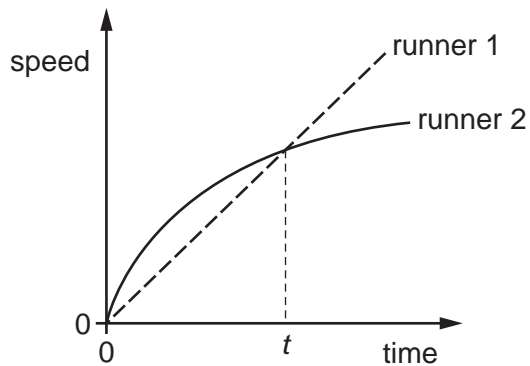42   The speed-time graph shown is for a car moving in a straight line.

What is the acceleration of the car when the time is 40 s?

A   0 m/s²   **B** $\dfrac{15 - 3}{40}$ m/s²   **C** $\dfrac{15}{40}$ m/s²   **D** $(15 - 3)$ m/s²

43 Two runners take part in a race.

The graph shows how the speed of each runner changes with time.

What does the graph show about the runners at time t?

A Both runners are moving at the same speed.

B Runner 1 has zero acceleration.

C Runner 1 is overtaking runner 2.

44 A car travels along a straight road.

The speed-time graph for this journey is shown.

During which labelled part of the journey is the resultant force on the car zero?
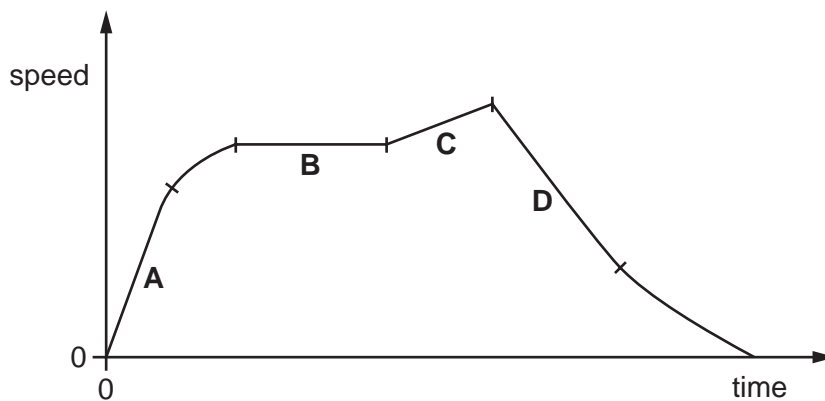
45   A large stone is dropped from a bridge into a river. Air resistance can be ignored.

Which row describes the acceleration and the speed of the stone as it falls?

|	mass	weight
A	decreases	decreases
B	decreases	stays the same
C	stays the same	decreases
D	stays the same	stays the same

46   Below are four statements about acceleration.
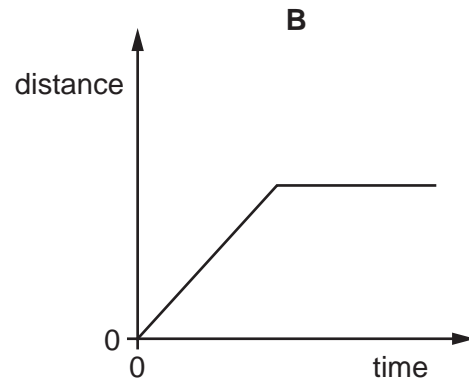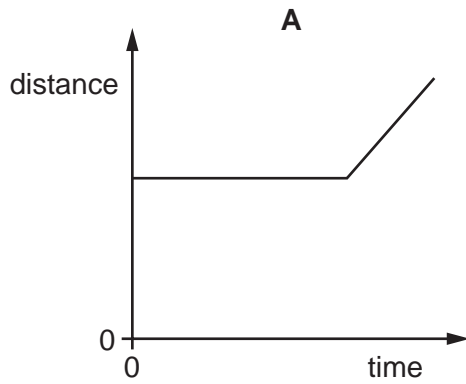
Which statement is **not** correct?

A   Acceleration always involves changing speed.

B   Changing direction always involves acceleration.

C   Changing speed always involves acceleration.

D   Circular motion always involves acceleration.

47 An object moves at a constant speed for some time, then begins to accelerate.

Which distance-time graph shows this motion?

A

distance

time

B

distance

time

C

distance

time

D

distance

time
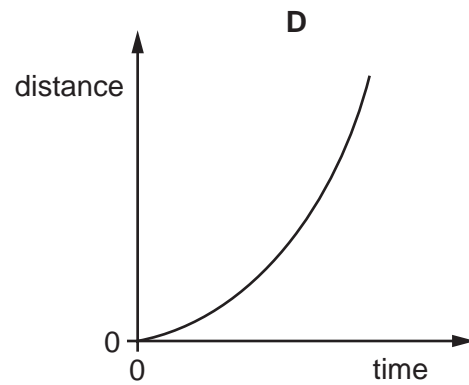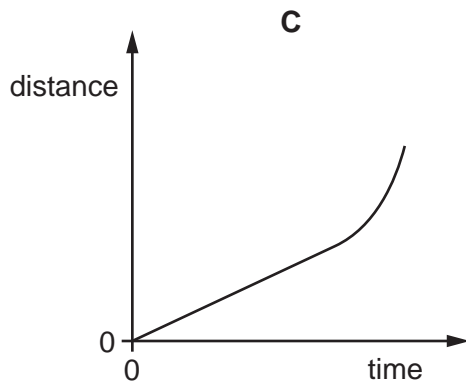
48 A heavy object is released near the surface of the Earth and falls freely. Air resistance can be ignored.

Which statement about the acceleration of the object due to gravity is correct?

A   The acceleration depends on the mass of the object.

B   The acceleration depends on the volume of the object.

C   The acceleration is constant.

D   The acceleration is initially zero and increases as the object falls.

49 An object is released from rest and falls to Earth. During its fall, the object is affected by air resistance. The air resistance eventually reaches a constant value.

Which description about successive stages of the motion of the object is correct?

A constant acceleration, then constant deceleration

B constant deceleration, then zero acceleration

C decreasing acceleration, then constant deceleration

D decreasing acceleration, then zero acceleration