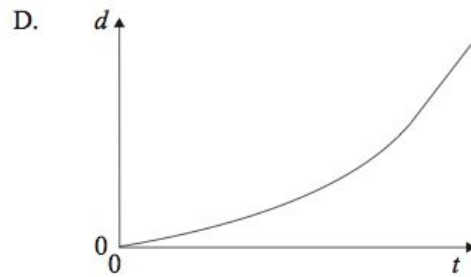
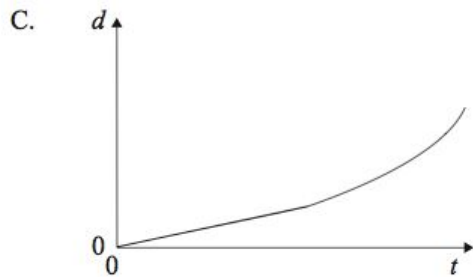
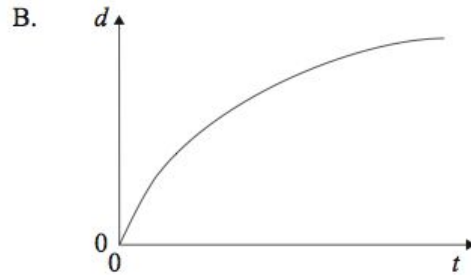
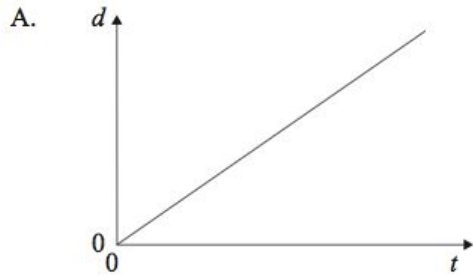


M05

5. Which **one** of the following is a correct definition of *displacement*?

- A. Distance from a fixed point
- B. Distance moved from a fixed point
- C. Distance from a fixed point in a given direction
- D. Distance moved in a given direction

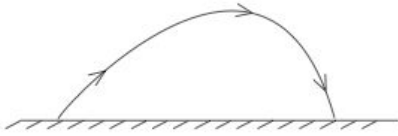
6. A ball is held at rest in air. The ball is then released. Which **one** of the following graphs best shows the variation with time  $t$  of the distance  $d$  fallen by the ball?



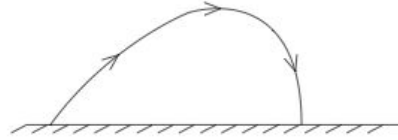
12. A boy throws a small stone at an angle to the horizontal.

Which **one** of the following sketches best shows the path of the stone as it rises and then falls back to Earth? Air resistance is negligible and the acceleration of free fall is constant.

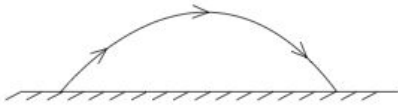
A.



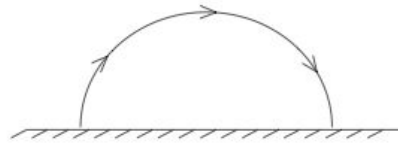
B.



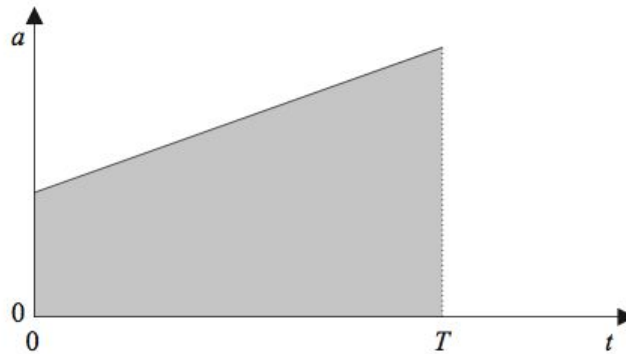
C.



D.



4. The graph below shows the variation with time  $t$  of the acceleration  $a$  of a spaceship.



The spaceship is at rest at  $t=0$ .

The shaded area represents

- A. the distance travelled by the spaceship between  $t=0$  and  $t=T$ .
- B. the speed of the spaceship at  $t=T$ .
- C. the rate at which the speed of the spaceship changes between  $t=0$  and  $t=T$ .
- D. the rate at which the acceleration changes between  $t=0$  and  $t=T$ .

5. A particle moves from a point P to a point Q in a time  $T$ . Which **one** of the following correctly defines both the average velocity and average acceleration of the particle?

	Average velocity	Average acceleration
A.	$\frac{\text{displacement of Q from P}}{T}$	$\frac{\text{change in speed from P to Q}}{T}$
B.	$\frac{\text{displacement of Q from P}}{T}$	$\frac{\text{change in velocity from P to Q}}{T}$
C.	$\frac{\text{distance between Q and P}}{T}$	$\frac{\text{change in speed from P to Q}}{T}$
D.	$\frac{\text{distance between Q and P}}{T}$	$\frac{\text{change in velocity from P to Q}}{T}$

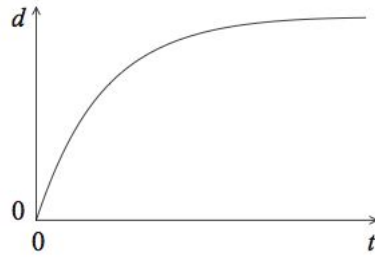
6. Two stones, X and Y, of different mass are dropped from the top of a cliff. Stone Y is dropped a short time after stone X. Air resistance is negligible.

Whilst the stones are falling, the distance between them will

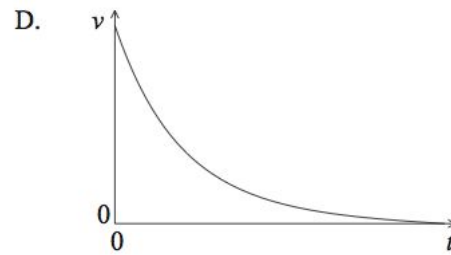
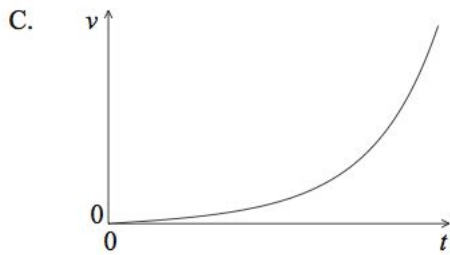
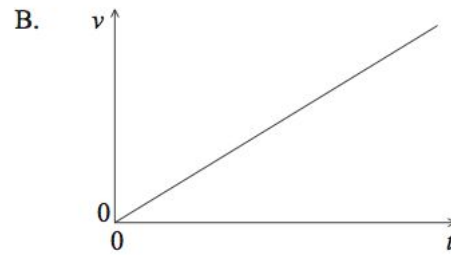
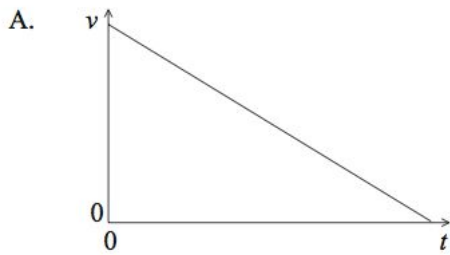
- A. decrease if the mass of Y is greater than the mass of X.  
 B. increase if the mass of X is greater than the mass of Y.  
 C. decrease whether the mass of X is greater or less than the mass of Y.  
 D. increase whether the mass of X is greater or less than the mass of Y.
11. A stone is projected horizontally from the top of a cliff. Neglecting air resistance, which **one** of the following correctly describes what happens to the horizontal component of velocity and to the vertical component of velocity ?

	Horizontal component of velocity	Vertical component of velocity
A.	Decreases	Increases
B.	Decreases	Constant
C.	Constant	Constant
D.	Constant	Increases

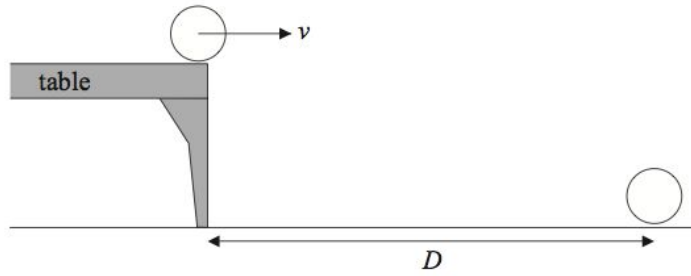
4. The graph below shows the variation with time  $t$  of the displacement  $d$  of a body moving along a straight-line.



Which graph best represents the variation with time  $t$  of the velocity  $v$  of the body?



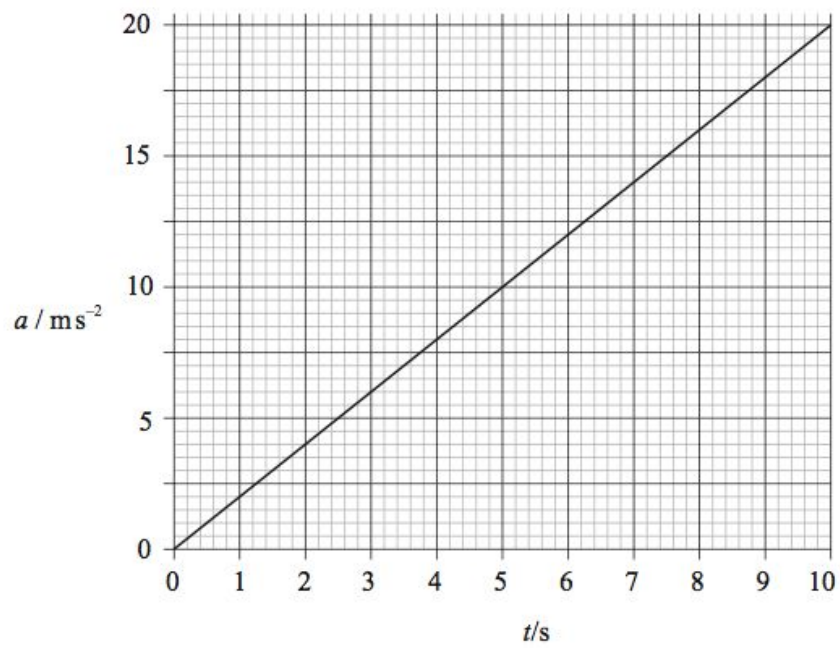
12. A ball rolls off a horizontal table with velocity  $v$ . It lands on the ground a time  $T$  later at a distance  $D$  from the foot of the table as shown in the diagram below. Air resistance is negligible.



A second **heavier** ball rolls off the table with velocity  $v$ . Which **one** of the following is correct for the heavier ball?

	<b>Time to land</b>	<b>Distance from table</b>
A.	$T$	$D$
B.	$T$	less than $D$
C.	less than $T$	$D$
D.	less than $T$	less than $D$

4. The graph shows the variation with time  $t$  of the acceleration  $a$  of an object.



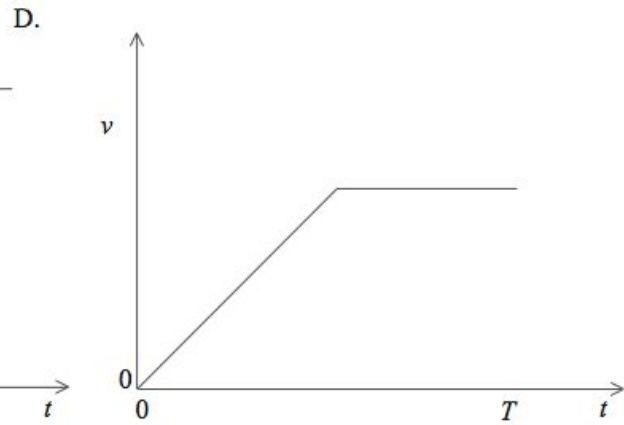
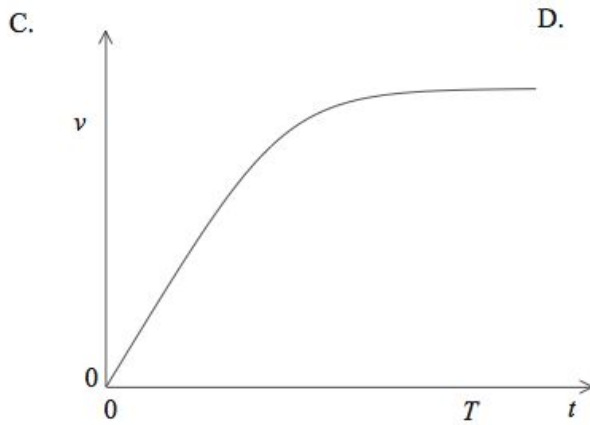
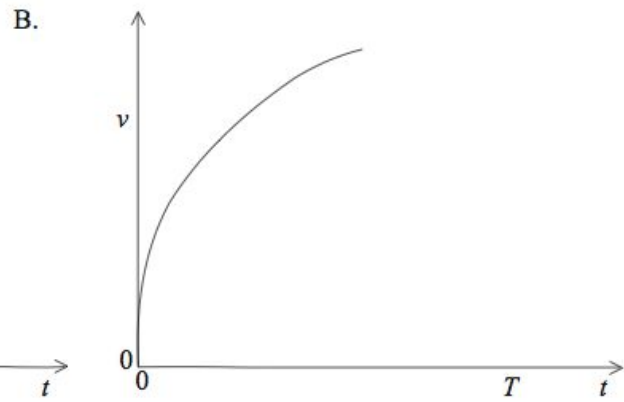
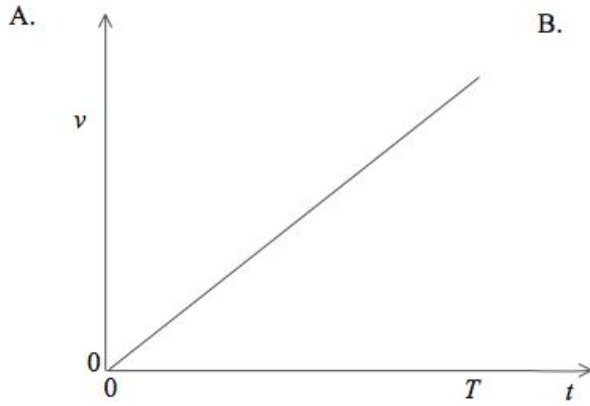
The object is at rest at time  $t = 0$ .

Which of the following is the velocity of the object at time  $t = 6.0 \text{ s}$ ?

- A.  $0.50 \text{ ms}^{-1}$
- B.  $2.0 \text{ ms}^{-1}$
- C.  $36 \text{ ms}^{-1}$
- D.  $72 \text{ ms}^{-1}$

5. An object is dropped from rest from a point several hundred metres above the surface of the Earth at time  $t = 0$ . The object strikes the ground at  $t = T$  and air resistance is **not** negligible.

Which of the following sketch graphs best shows the variation with time  $t$ , of the speed  $v$  of the object?



6. Which of the following is a correct definition of average acceleration?

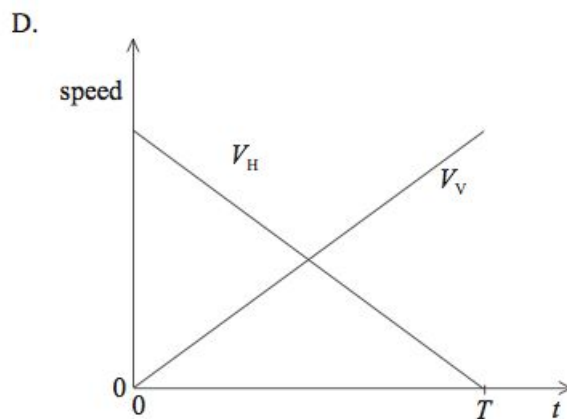
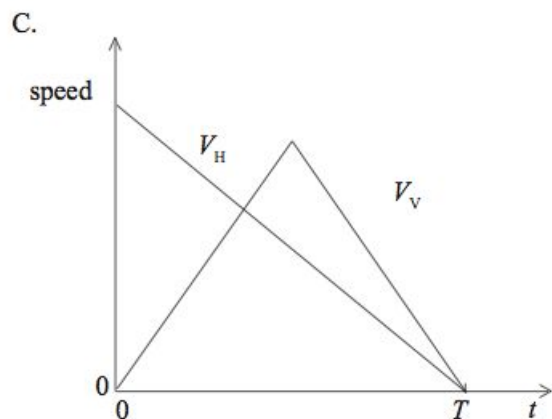
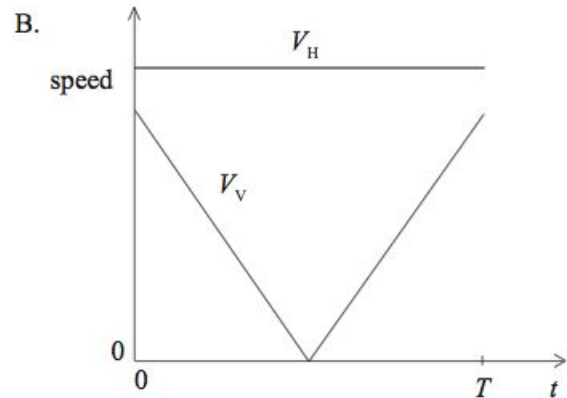
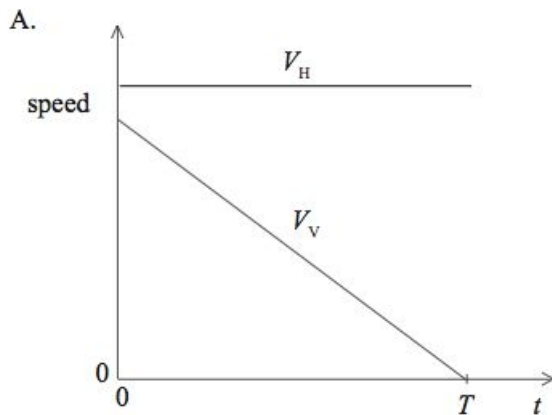
A.  $\frac{\text{change in velocity}}{\text{time taken}}$

B.  $\frac{\text{velocity}}{\text{time taken}}$

C.  $\frac{\text{change in speed}}{\text{time taken}}$

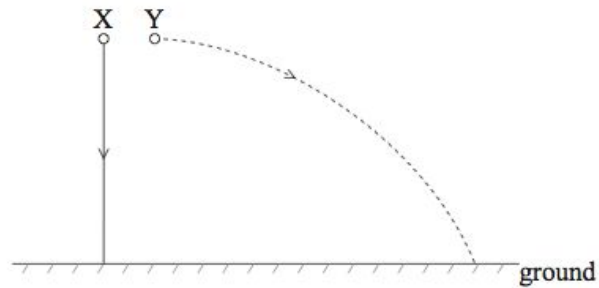
D.  $\frac{\text{speed}}{\text{time taken}}$

11. A projectile is fired from the ground at time  $t = 0$ . It lands back on the ground at time  $t = T$ . Which of the following sketch graphs best shows the variation with time  $t$  of the vertical speed  $V_v$  and horizontal speed  $V_h$  of the projectile? Air resistance is negligible.





12. Two identical metal spheres X and Y are released at the same time from the same height above the horizontal ground. Sphere X falls vertically from rest. Sphere Y is projected horizontally as shown below.



Air resistance is negligible.

Which of the following statements is correct?

- A. Sphere X hits the ground before sphere Y because it travels a shorter distance.
- B. Sphere Y hits the ground before sphere X because its initial velocity is greater.
- C. The spheres hit the ground at the same time because horizontal motion does not affect vertical motion.
- D. The spheres hit the ground at the same time because they have equal weights.

5 C 6 D 12 C	4 B 5 B 6 D 11 D	4 D 12 A	4 C 5 C 6 A 11 B	12 C
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