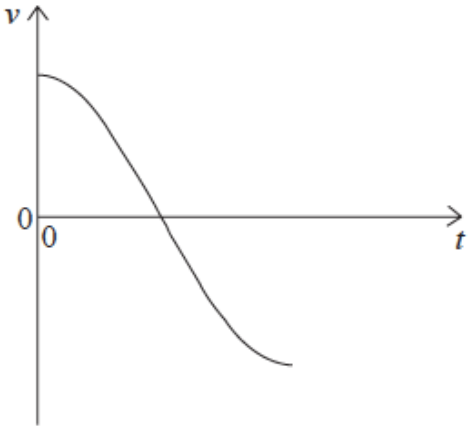
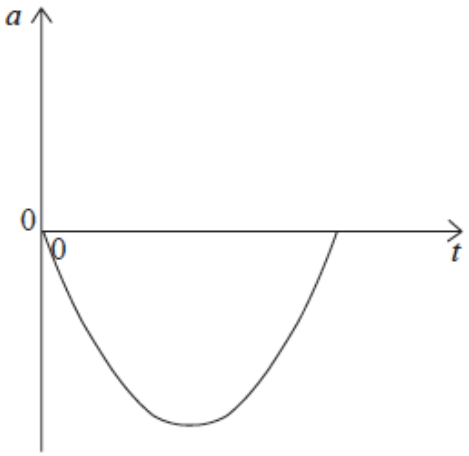
1) The graph shows the variation with time *t* of the velocity *v* of an object moving along a straight lin

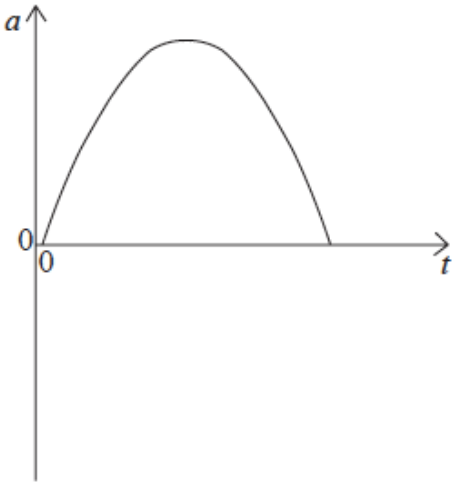


Which graph shows the variation with time *t* of the acceleration *a* of the object?

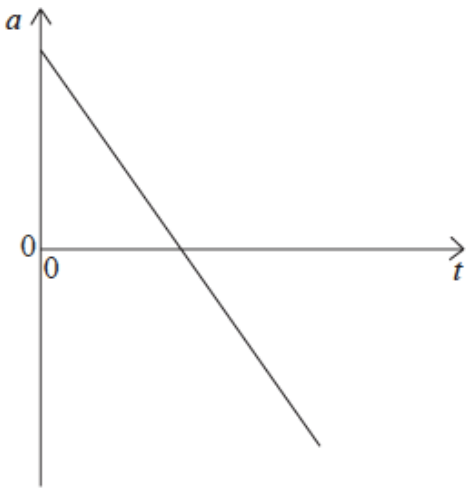
A.



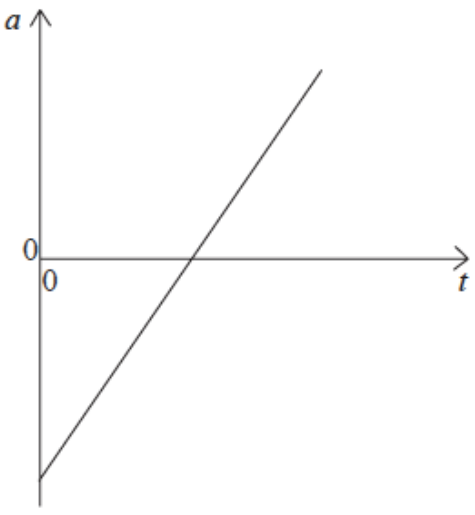
B.



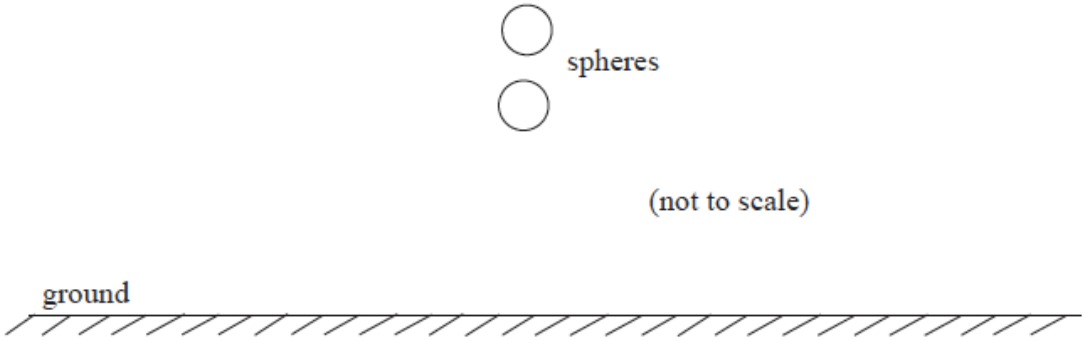
C.



D.



2) Two identical metal spheres are held above the ground as shown.



The separation between them is small compared to their distance above the ground. When the spheres are released, the separation of the spheres will

A. remain constant.

B. decrease continuously.

C. increase continuously.

D. increase initially and then remain constant.

3) An object is falling, in air, towards the Earth's surface.

What changes occur in the acceleration and in the velocity of the object as it approaches terminal velocity?

	acceleration	**velocity**
A.	decreases to zero	increases continuously
B.	decreases to zero	increases to a constant value
C.	constant	increases to a constant value
D.	constant	increases continously

4) A car has a speed of $+15\,m\,s^{-1}$ relative to the ground. It passes a cyclist travelling in the same straight-line. The speed of the car relative to the cyclist is $+12\,m\,s^{-1}$.

The speed of the cyclist relative to the ground is

A. $-3.0\,m\,s^{-1}$.

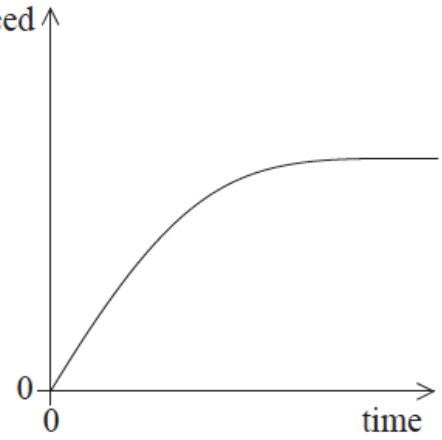
B. $-1.5\,m\,s^{-1}$.

C. $+1.5\,m\,s^{-1}$.

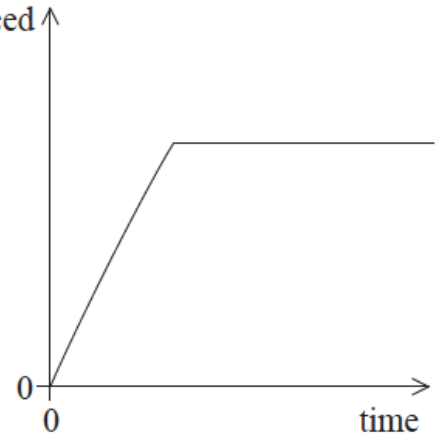
D. $+3.0\,m\,s^{-1}$.

5) A steel sphere is dropped from rest in oil. Which of the following graphs best represents the variat with time of the speed of the sphere?

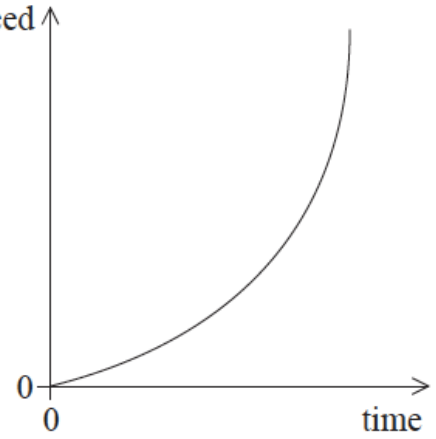
A.



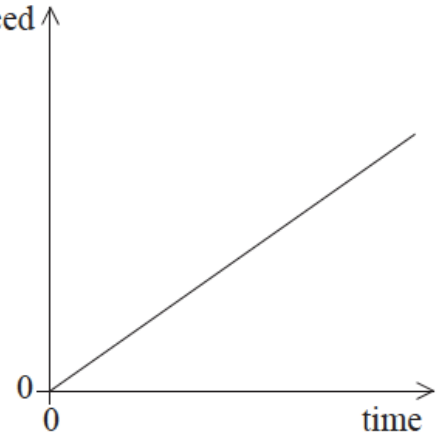
B.



C.



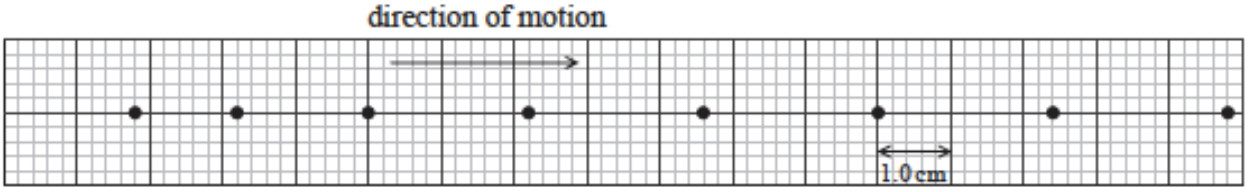
D.



Paper 2

6)

A car moves along a straight road. At time $t=0$ the car starts to move from rest and oil begins to drip from the engine of the car. One drop of oil is produced every 0.80 s. Oil drops are left on the road. The position of the oil drops are drawn to scale on the grid below such that 1.0 cm represents 4.0 m. The grid starts at time $t=0$.



(a) (i) State the feature of the diagram above which indicates that, initially, the car is accelerating. *[1]*

. . . . . .

(ii) On the grid above, draw further dots to show where oil would have dripped if the drops had been produced from the time when the car had started to move. *[2]*

(iii) Determine the distance moved by the car during the first 5.6 s of its motion. *[1]*

. . . . . .

. . . . . .

(b) Using information from the grid above, determine for the car,

(i) the final constant speed. *[2]*

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. . . . . .

. . . . . .

(ii) the initial acceleration. *[2]*

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