1.

A person travelling in a straight line moves with a constant velocity v_1 for a certain distance 'x' and with a constant velocity v_2 for the next equal distance. The average velocity v is given by the relation:

1. $\frac{1}{v} = \frac{1}{v_1} + \frac{1}{v_2}$
2. $\frac{2}{v} = \frac{1}{v_1} + \frac{1}{v_2}$
3. $\frac{v}{2} = \frac{v_1+v_2}{2}$
4. $v = \sqrt{v_1 v_2}$

2.

If a body travels some distance in a given time interval, then for that time interval, its

1. Average speed ≥ |Average velocity|
2. |Average velocity| ≥ Average speed
3. Average speed < |Average velocity|
4. |Average velocity| must be equal to average speed.

3.

When the velocity of the body is variable, then;

(1) its speed may be constant.

(2) its acceleration may be constant.

(3) its average acceleration may be constant.

(4) All of these

4.

If a particle is moving along a straight line with increasing speed, then:

(1) its acceleration is negative.

(2) its acceleration may be decreasing.

(3) its acceleration is positive.

(4) Both (2) & (3)

5.

A particle moves along a straight line such that its displacement at any time *t* is given by $S = t^3 - 6t^2 + 3t + 4$ metres. The velocity when the acceleration is zero is:

1. $4\ ms^{-1}$
2. $-12\ ms^{-1}$
3. $42\ ms^{-1}$
4. $-9\ ms^{-1}$

6.

A particle moves along a straight line and its position as a function of time is given by $x = t^3 - 3t^2 + 3t + 3$, then the particle:

(1) stops at t=1 sec and reverses its direction of motion.

(2) stops at t=1 sec and continues further without a change of direction.

(3) stops at t=2 sec and reverses its direction of motion.

(4) stops at t=2 sec and continues further without a change of direction.

7.

The relation $3t = \sqrt{3x} + 6$ describes the displacement of a particle in one direction where *x* is in metres and *t* in sec. The displacement, when velocity is zero, is

1. 24 metres
2. 12 metres
3. 5 metres
4. Zero

8.

A body in one-dimensional motion has zero speed at an instant. At that instant, it must have:

(1) zero velocity.

(2) zero acceleration.

(3) non-zero velocity.

(4) non-zero acceleration.

9.

A body is projected vertically in the upward direction from the surface of the earth. If the upward direction is taken as positive, then the acceleration of the body during its upward and downward journey is:

(1) Positive, negative

(2) Negative, negative

(3) Positive, positive

(4) Negative, positive

10.

The displacement of a particle is given by $y = a + bt + ct^2 - dt^4$. The initial velocity and acceleration are, respectively:

1. b, $-4d$
2. $-b$, $2c$
3. b, $2c$
4. $2c$, $-4d$

11.

The motion of a particle along a straight line is described by an equation $x = 8 + 12t - t^3$ where x is in metre and t is in second. The retardation of the particle when its velocity becomes zero is:

1. $6\ ms^{-2}$
2. $12\ ms^{-2}$
3. $24\ ms^{-2}$
4. zero

12.

The acceleration of a particle starting from rest varies with time according to the relation $A = -a\omega^2 \sin\omega t$. The displacement of this particle at a time t will be:

(1) $-\frac{1}{2}(a\omega^2 \sin\omega t)t^2$

(2) $a\omega \sin\omega t$

(3) $a\omega \cos\omega t$

(4) $a\sin\omega t$

13.

The acceleration 'a' in m/s^2 of a particle is given by $a = 3t^2 + 2t + 2$ where t is the time. If the particle starts out with a velocity, $u = 2$ *m/s* at $t = 0$, then the velocity at the end of 2 *seconds* is:

1. 12 *m/s*
2. 18 *m/s*
3. 27 *m/s*
4. 36 *m/s*

14.

If the velocity of a particle is $(10 + 2t^2)$ *m/s*, then the average acceleration of the particle between 2 *sec* and 5 *sec* is:

(1) $2\ m/s^2$

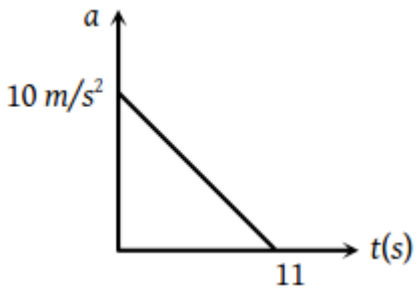
(2) $4\ m/s^2$

(3) $12\ m/s^2$

(4) $14\ m/s^2$

15.

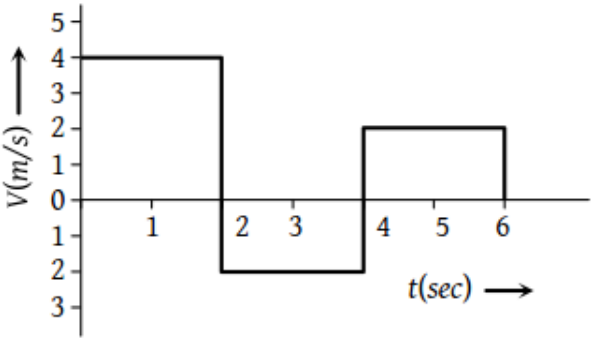
A particle starts from rest. Its acceleration (a) versus time (t) graph is as shown in the figure. The maximum speed of the particle will be:



1. 110 *m/s*
2. 55 *m/s*
3. 550 *m/s*
4. 660 *m/s*

16.

The velocity-time graph of a body moving in a straight line is shown in the figure. The displacement and distance travelled by the body in 6 *sec* are respectively:



(1) 8 *m*, 16 *m*

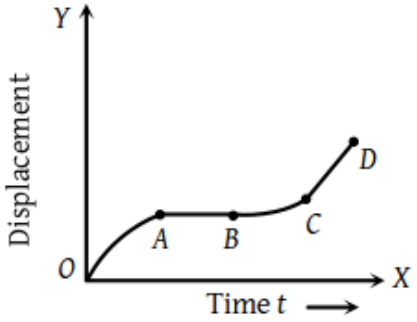
(2) 16 *m*, 8 *m*

(3) 16 *m*, 16 *m*

(4) 8 *m*, 8 *m*

17.

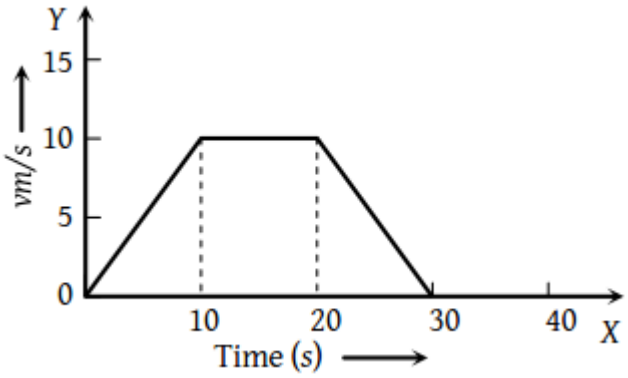
The graph between the displacement x and time t for a particle moving in a straight line is shown in the figure. During the interval OA, AB, BC and CD, the acceleration of the particle is:



	OA	AB	BC	CD
(1)	+	0	+	+
(2)	–	0	+	0
(3)	+	0	–	+
(4)	–	0	–	0

18.

In the following graph, the distance travelled by the body in metres is:



(1) 200

(2) 250

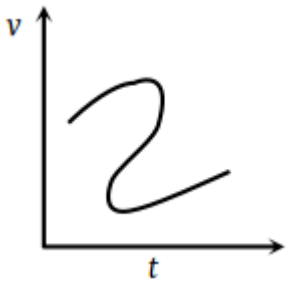
(3) 300

(4) 400

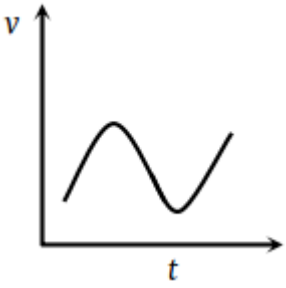
19.

Which of the following velocity-time graphs shows a realistic situation for a body in motion?

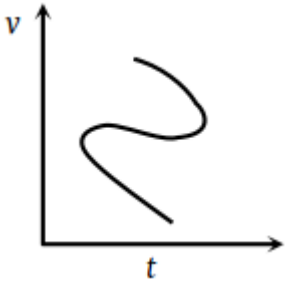
1.



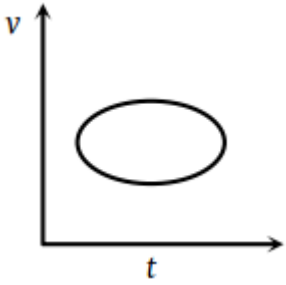
2.



3.

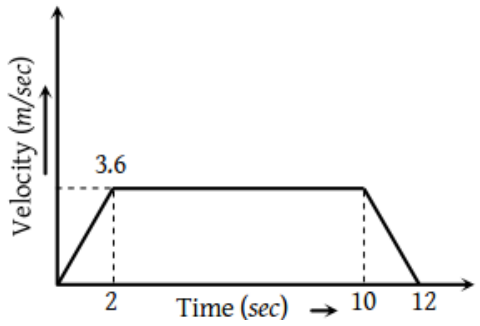


4.



20.

A lift is going up. The variation in the speed of the lift is as given in the graph. What is the height to which the lift takes the passengers?



(1) 3.6 *m*

(2) 28.8 *m*

(3) 36.0 *m*

(4) Cannot be calculated from the above graph

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