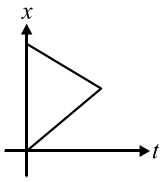
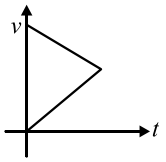
Short Practice Test-01

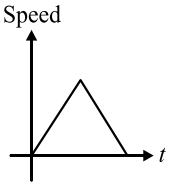
NEET (2023)

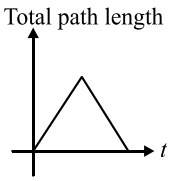
PHYSICS

1. Which of the following graphs can possibly represent the 1-*D* motion of a particle?

(1) 

(2) 

(3) 

(4) 

2. Which of the following statements is incorrect?
(1) Distance covered by a moving car can never be negative or zero.
(2) For a particle moving with non-zero constant acceleration, position time graph is a straight line.
(3) Distance is a scalar quantity, it never decreases with time for a moving body.
(4) Slope of velocity-time graph represents acceleration.

3. 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

4. Consider the motion of the tip of the second hand of a clock. In one minute (R be the length of second hand), its
(1) Displacement is $2\pi R$
(2) Distance covered is $2R$
(3) Displacement is zero
(4) Distance covered is zero

5. A particle moves along x-axis with speed 6 m/s for the first half distance of a journey and the second half distance with a speed 3m/s. The average speed in the total journey is
(1) 5 m/s
(2) 4.5 m/s
(3) 2 m/s
(4) 4 m/s

6. The position of a particle moving along x-axis is given by $x = 10t - 2t^2$. Then the time (t) at which it will momently come to rest is
(1) 0 (2) 2.5 s
(3) 5 s (4) 10 s

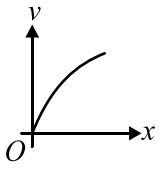
7. If the displacement of a particle varies with time as $\sqrt{x} = t + 7$, then
(1) Velocity of the particle is inversely proportional to t
(2) Velocity of the particle is proportional to t^2
(3) Velocity of the particle is proportional to $\sqrt{t}$
(4) The particle moves with constant acceleration

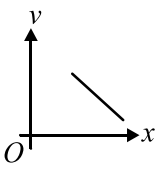
8. A particle starts moving with acceleration 2 m/s^2. Distance travelled by it in 5th half second is
(1) 1.25 m (2) 2.25 m
(3) 6.25 m (4) 30.25 m

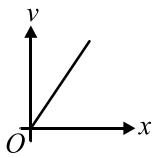
9. A car travelling at a speed of 30 km/h is brought to rest in a distance of 8 m by applying brakes. If the same car is moving at a speed of 60 km/h then it can be brought to rest with same brakes in
(1) 64 m (2) 32 m
(3) 16 m (4) 4 m

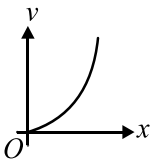
10. A boy throws a ball into air at regular interval of 2 second. The next ball is thrown when the velocity of first ball is zero. How high do the ball rise above his hand? [Take g = 9.8 m/s^2]
(1) 4.9 m (2) 9.8 m
(3) 19.6 m (4) 29.4 m

11. A body starts from rest and moves with uniform acceleration along straight line, the variation of its velocity (v) with position (x) is best represented by

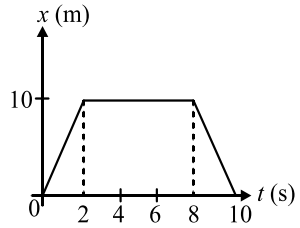
(1) 

(2) 

(3) 

(4) 

12. The position – time graph for a particle moving along a straight line is shown in figure. The total distance travelled by it in time $t = 0$ to $t = 10$ s is



(1) Zero (2) 10 m

(3) 20 m (4) 80 m

ANSWER KEY

1.	**(3)**	**7.**	**(4)**
2.	**(2)**	**8.**	**(2)**
3.	**(1)**	**9.**	**(2)**
4.	**(3)**	**10.**	**(3)**
5.	**(4)**	**11.**	**(1)**
6.	**(2)**	**12.**	**(3)**

Hint and Solutions

1. (3)

In option 3, initially the speed of a particle is increasing linearly with time and then, decreasing linearly. So, it can possibly represent motion of a particle.

2. (2)

Slope of position-time graph represents velocity and if position time graph is a straight line for a particle, then velocity of the particle must be constant and thus, acceleration will be zero.

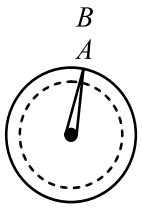
3. (1)

Magnitude of velocity = Speed

So, if the speed is zero then it must have zero velocity also.

4. (3)

The second hand of the clock in minute covers an angle of 360° and the initial and final positions are same.



So, Displacement = 0

5. (4)

If a body travels equal distance with speed v_1 and v_2 then average speed is given by

$$v_{av} = \frac{2v_1v_2}{v_1+v_2} = \frac{2\times6\times3}{6+3} = 4ms^{-1}$$

6. (2)

$x = 10t - 2t^2$

$$v = \frac{dx}{dt} = 10 - 4t$$

$v = 0$, at the rest, so

$10 - 4t = 0$

$t = 2.5$ s

7. (4)

$$\sqrt{x} = t + 7$$

$$\Rightarrow x = (t+7)^2$$

$\Rightarrow x = t^2 + 49 + 14t$ (squaring)

$$\frac{dx}{dt} = 2t + 14$$

$v = 2t + 14 \Rightarrow v \propto t$

Acceleration:

$$a = \frac{dv}{dt}$$

$a = 2$ ms^{-2} $\rightarrow$ constant

8. (2)

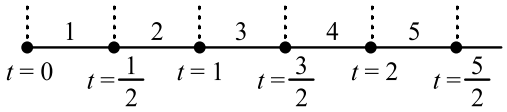
$S_{2.5} - S_2 = ?$

(distance travelled in 5th half second)

$$S_{2.5} = ut + \frac{1}{2}at^2$$

$$\Rightarrow S_{2.5} = \frac{1}{2}\times2\times(2.5)^2 = 6.25m \ (\because u = 0)$$

$a = 2$ ms^{-2}



$$S_2 = \frac{1}{2}\times2\times4 = 4m$$

So, $S_{2.5} - S_2 = 2.25$ m

9. (2)

$$d = \frac{u^2}{2a} \Rightarrow d \propto u^2$$

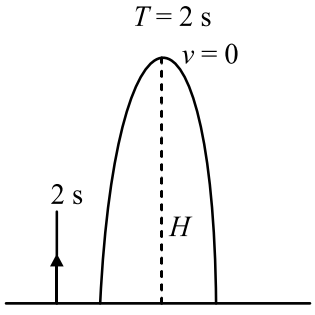
$u' = 2u$

$$\frac{d'}{d} = \frac{(2u)^2}{u^2}$$

$$\Rightarrow \frac{d'}{8} = 4$$

$\Rightarrow d' = 32$

10. (3)

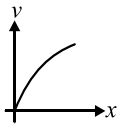


$$2T = \frac{2u}{g} \Rightarrow 2 = \frac{u}{9.8} \Rightarrow u = 19.6$$

$$H = \frac{u^2}{2g} = \frac{19.6\times19.6}{2\times9.8}$$

$H = 19.6$m

11. **(1)**

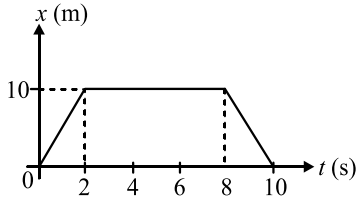


For uniform acceleration, $a \rightarrow$ constant

$v^2 = u^2 + 2as$

$\Rightarrow v^2 \propto x$ ($\because$ u = rest)

12. **(3)**



The total distance travelled from 0 to 2s is 10 m

2 s to 8 s $\rightarrow$ Zero distance

And from 8 s to 10 s $\rightarrow$ 10 m

So, Total distance = 10 + 0 + 10 = 20 m