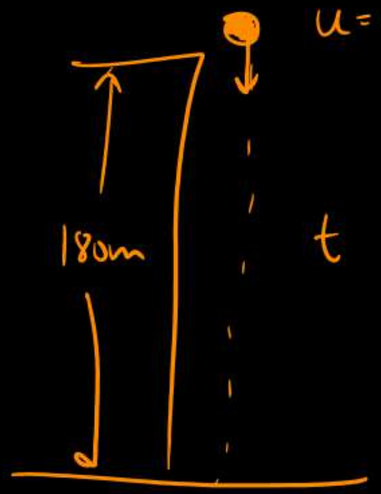
ARJUNA NEET BATCH

Practice Test - 02

1. Object is dropped from height 180 m from ground then find time of flight.

(A) 4s (B) 2s

(C) 3s (D) 6s



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

$$180 = 0 + \frac{1}{2}(10)\,t^2$$

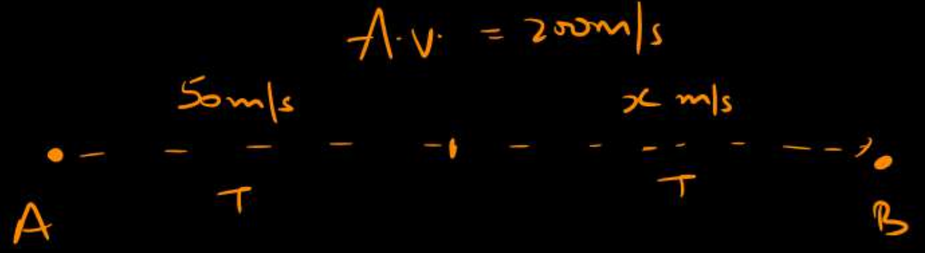
$$36 = t^2$$

$$6s = t$$

2. Average velocity of car between two city is 200 m/s if it moves with 50m/s for half of the total time of journey then find speed of other half time.

(A) 200m/s
(B) 350 m/s
(C) 100 m/s
(D) 150 m/s

$A.V./A.S. = \frac{V_1 + V_2}{2}$



$200 = \frac{50 + x}{2}$

$400 = 50 + x$

$x = 350\ m/s$

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3. Object is moving on circular path then find ratio of displacement to distance when it completes half of circular path

(A) $\frac{\pi}{2}$

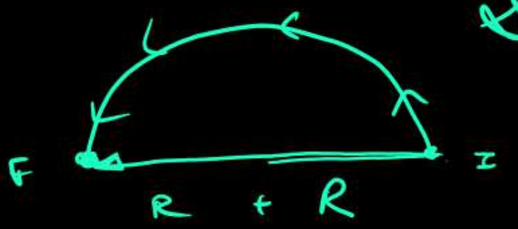
(B) $\frac{2}{\pi}$

(C) 2π

(D) $\frac{1}{2\pi}$

$D = \pi R$

$S = 2R$



$\frac{S}{D} = \frac{2R}{\pi R} = \frac{2}{\pi}$

4. Velocity of object $V = t^2 - 8t + 4$ then time of which acceleration of object will be zero

(A) 4s (B) 2s

(C) 0s (D) 8s

$$v = t^2 - 8t + 4$$

$$a = \frac{dv}{dt} = 2t - 8$$

$$a = 2t - 8$$

$$0 = 2t - 8$$

$$8 = 2t$$

$$4s = t$$

5. Velocity of object is constant with time then acceleration of object must be

(A) constant (B) variable

(C) zero (D) minimum

$$\text{Acceleration} = \frac{dv}{dt} = 0$$

6. Position of object $x = t^2 + 4t + 6$ then. Find nature of acceleration.

(A) zero (B) constant

(C) variable (D) can't say

$x = t^2 + 4t + 6$

$v = \frac{dx}{dt} = 2t + 4$

$a = \frac{dv}{dt} = 2$

$a = 2\ m/s^2$

$x \propto t^2$

$s = ut + \frac{1}{2}at^2$ → Constant $\propto a$

$s \propto t^2$

7. Object is moving on straight line without change in direction then

(A) |Avg. velocity| = Avg. speed

(B) Avg. velocity > Avg. speed

(C) Avg. velocity < Avg. speed

(D) Avg. velocity ≤ Avg. speed

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8. Which of the following is never possible for moving object.

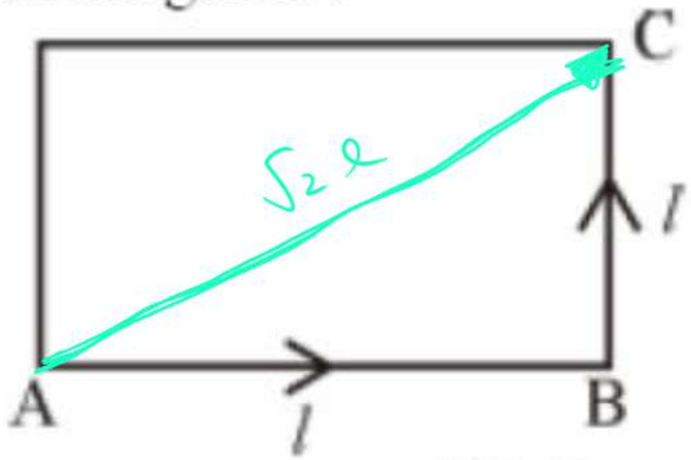
(A) Distance > Displacement

(B) Distance < Displacement

(C) Distance ≥ Displacement → U.T.

(D) Distance = Displacement

9. Object moving on square path then find displacement when it moves from A→ B → C. If side length is l



(A) l

(B) 0

(C) $2l$

(D) $\sqrt{2}\,l$

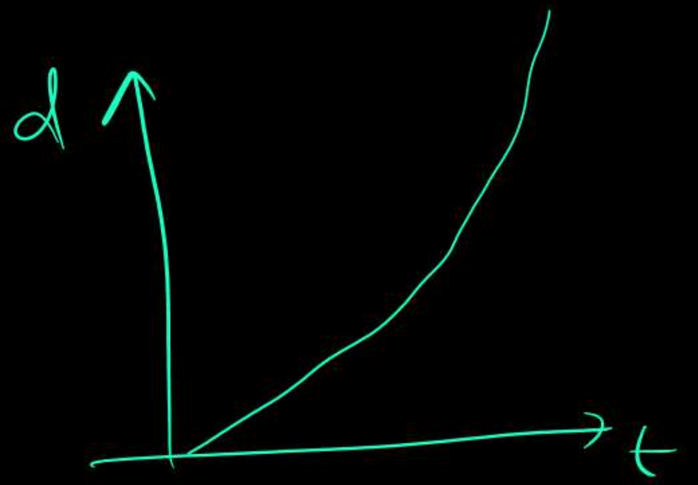
10. Which of the following correct for distance?

(A) it may be -ve

(B) it may decrease with time

(C) does not depends upon path taken

(D) always +ve



11. Object starts his motion from rest and constant acceleration and moves 80 m in 10s then find displacement in 20 s.

(A) 320 m (B) 160 m

(C) 80 m (D) 180 m

$u = 0$

$s = 80m$

$t = 10$

$a = a$

$s_1 = \frac{1}{2} a t_1^2$

$u = 0$

$s = ?$

$t = 20s$

$a = a$

$s_2 = \frac{1}{2} a t_2^2$

$\frac{s_1}{s_2} = \frac{\frac{1}{2} a t_1^2}{\frac{1}{2} a t_2^2}$

$\frac{80}{s_2} = \left(\frac{10}{20}\right)^2$

$\frac{80}{s_2} = \frac{100}{400}$

$320\ m = s_2$

12. Object starts his motion from rest on constant acceleration then ratio of displacement in 1st sec: 2nd sec : 3rd sec will be

(A) 3 : 2 : 1 (B) 5 : 3 : 1

(C) 1 : 2 : 3 (D) 1 : 3 : 5

$$S_{nth} = u + \frac{a}{2}(2n-1)$$

$$S_{1st} = \frac{a}{2}(2-1) \quad : \quad S_{2nd} = \frac{a}{2}(2(2)-1) \quad : \quad S_{3rd} = \frac{a}{2}(2(3)-1)$$

$$\frac{a}{2} : \frac{a}{2}(3) : \frac{a}{2}(5)$$

$$1 : 3 : 5$$

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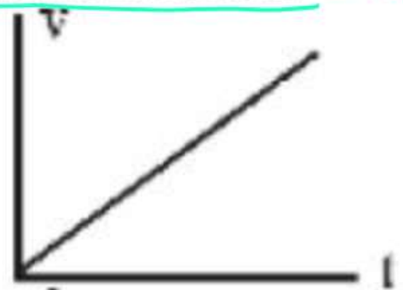
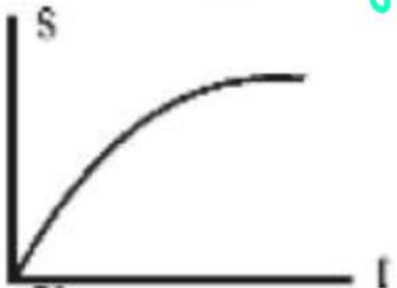
13. Which of the following graph represent uniform motion? → constant velocity →

(A)

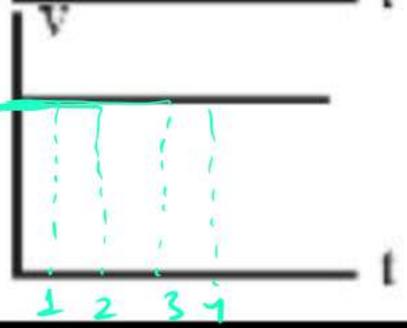


(B)



(C)

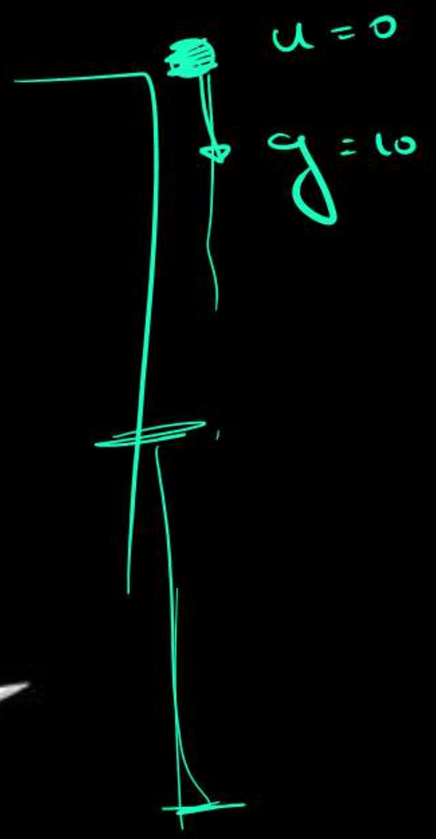
(D)



14. Object is dropped then find displacement in 4^{th} sec.

(A) 5m (B) 45m

(C) 65m (D) 35m



$$S_{4^{th}} = u + \frac{a}{2}(2n-1)$$

$$S_{4^{th}} = 0 + \frac{10}{2}(2(4)-1)$$

$$= 35m$$

15. Object is projected up with 50 m/s then find displacement in 6^{th} sec of its motion

(A) 5 m (B) 10 m

(C) 15 m (D) 20 m

$$s_{n^{th}} = u + \frac{a}{2}(2n-1)$$

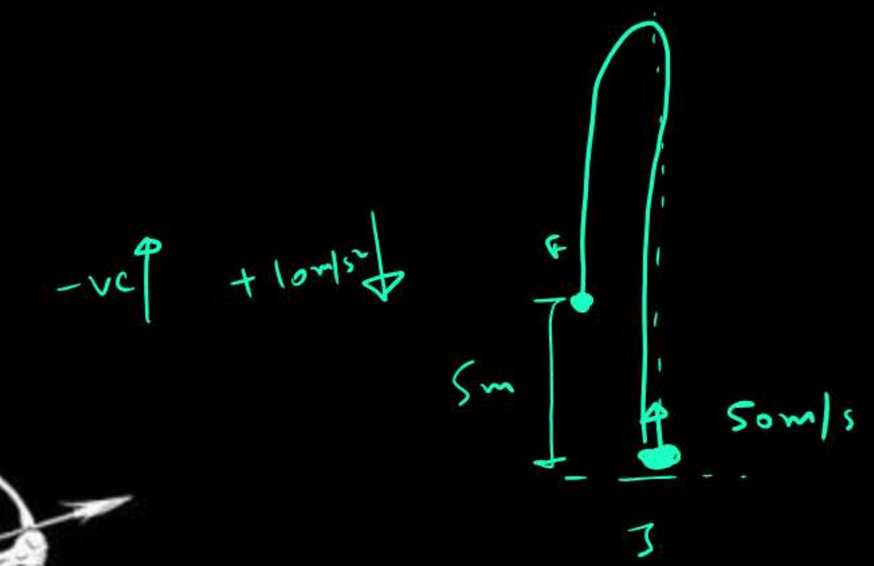
$u = -50$ m/s

$s = ?$

$$s_{6^{th}} = -50 + \frac{10}{2}(2(6)-1)$$

$$= -50 + 55$$

$$s_{6^{th}} = 5 \text{ m}$$



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16. Car is moving with speed 100 m/s then it stop after 50 m due to application of break, now if same car is moving with 50 m/s then it will stop after application of break.

(A) $\frac{50}{2}$ m

(B) 50 m

(C) $\frac{50}{4}$

(D) 200 m

$2as = v^2 - u^2$

$s = 0 - \frac{u^2}{2a}$

$s = \frac{u^2}{2a}$

$50 = \frac{100^2}{2a}$ — (I)

$x = \frac{(50)^2}{2a}$ — (II)

$\Rightarrow \frac{50}{x} = \frac{100 \times 100}{50 \times 50}$

$\frac{50}{4}\,m = x$

17. Object is projected up with 40 m/s then maximum height attain by the object is

(A) 80 m
(B) 160 m
(C) 40 m
(D) 125 m

$2as = v^2 - u^2$

$2(10)s = 0^2 - 40^2$

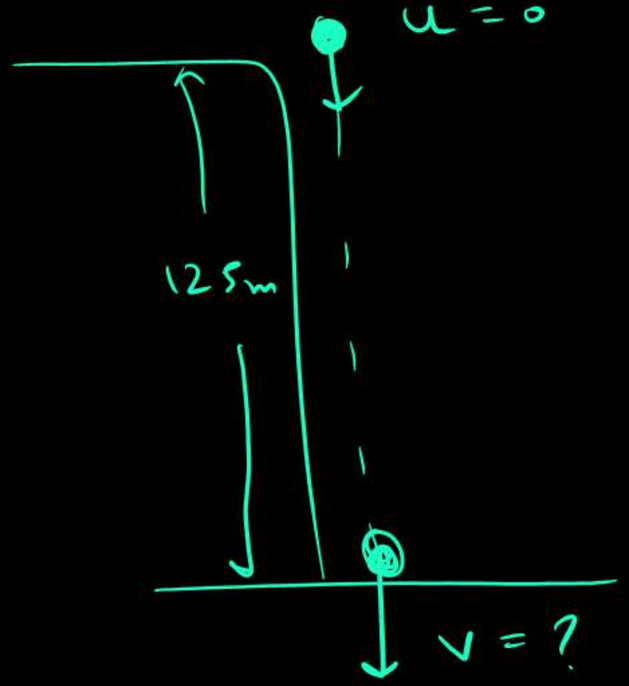
$2 \times 5 \times s = -1600$

$s = 80m$

18. Ball is dropped from height 125 m from ground then its velocity at the ground is

(A) 50 m/s (B) 80 m/s

(C) 125 m/s (D) 25 m/s



$2as = v^2 - u^2$

$2 \times 10 \times 125 = v^2 - 0^2$

$2 \times 2 \times 5 \times 5 \times 5 \times 5 = v^2$

$2 \times 5 \times 5 = v$

$v = 50 m/s$

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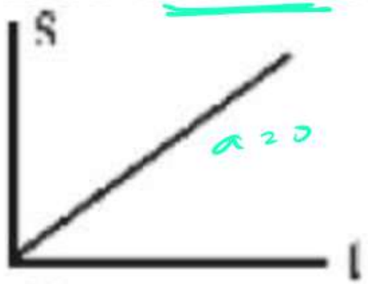
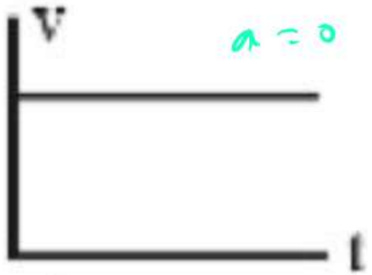
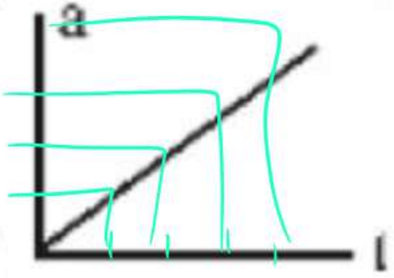
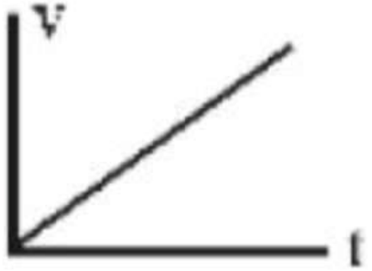
19. In which graph acceleration of object is non-zero uniform.

(A) 

(B) 

(C) 

(D) 

a = constant

$a \neq 0$

20. Object is moving with velocity V = 2x then acceleration of object at x = 2m.

(A) $2ms^2$ (B) $4ms^2$

(C) $8ms^2$ (D) $1ms^2$

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

$v = 2x$ $\quad a = ?, \; x = 2m$

$a = v \cdot \frac{dv}{dx}$

$\frac{dv}{dx} = 2$

$a = (2x)(2)$

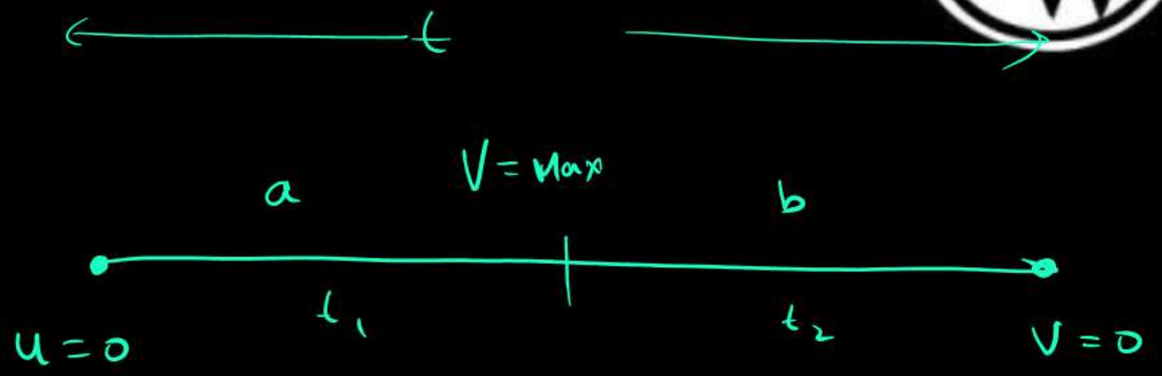
$a = 8 \, m/s^2$

21. A particle starts from rest with constant acceleration a and it is then decelerated with a constant value b till it is brought to rest. If the total time taken between these two rest positions is t. What is the maximum speed acquired by the particle?

(A) $\frac{a+b}{2}t$ (B) $(a-b)\frac{t}{2}$

(C) $\left(\frac{ab}{a+b}\right)t$ (D) $\left(\frac{a+b}{ab}\right)t$

$t_1 + t_2 = t$



$V = u + at$

$V = 0 + at_1$

$V = at_1$

$V = u + at$

$0 = V - bt_2$

$0 = at_1 - bt_2$

$at_1 = bt_2$

$t_2 = \frac{a}{b}t_1$

$t_1 + \frac{a}{b}t_1 = t$

$t_1\left(1 + \frac{a}{b}\right) = t$

$t_1\left(\frac{a+b}{b}\right) = t$

$t_1 = \frac{tb}{a+b}$

$V = \frac{abt}{a+b}$

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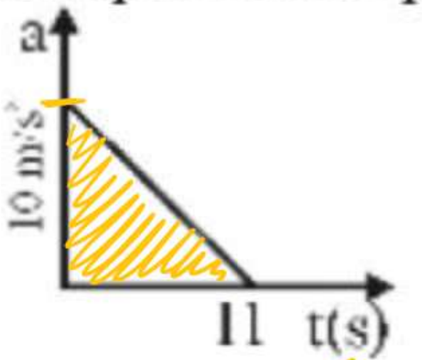
22. A particle starts from rest. Its acceleration (a) versus time (t) is as shown in the figure. The maximum speed of the particle will be:



(A) 110 m/s (B) 55 m/s
(C) 550 m/s (D) 660 m/s

$u = 0$

$t = 0$

$a = 10 m/s^2$

Area of a-t graph $= |\Delta V|$

$\frac{1}{2} \times 11 \times 10^5$

$55 = \Delta V$

$\Delta V = V - u$

$V - u = 55$

$V - 0 = 55$

$V = 55 m/s$

23. A motor car moving with a uniform speed of 20 m/sec comes to stop on the application of brakes after travelling a distance of 10m, its acceleration is:

(A) $20\ m/sec^2$ (B) $-20\ m/sec^2$

(C) $-40\ m/sec^2$ (D) $+2\ m/sec^2$

$u = 20\ m/s$

$v = 0\ m/s$

$s = 10m$

$a = ?$

$2as = v^2 - u^2$

$2(a)\ 10 = 0^2 - 20^2$

$20a = -400$

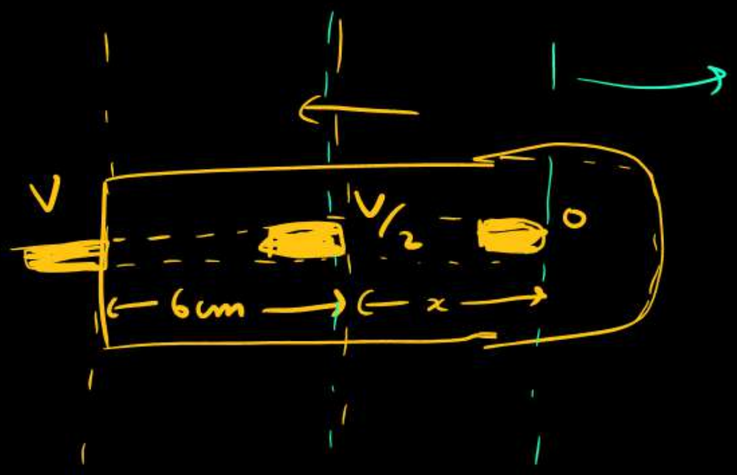
$a = -\frac{400}{20}$

$a = -20\ m/s^2$

24. A bullet fired into a fixed target loses half of its velocity after penetrating 6 cm. How much further it will penetrate before coming to rest assuming that it faces constant resistance to motion?

(A) 1.5 cm (B) 1.0 cm

(C) 3.0 cm (D) 2.0 cm



$$2as = v^2 - u^2$$

$$2a(0.06) = \left(\frac{V}{2}\right)^2 - (V)^2 \quad - (1)$$

$$2ax = 0^2 - \left(\frac{V}{2}\right)^2 \quad - (2)$$

$$\frac{2ax}{2a(0.06)} = \frac{-\frac{V^2}{4}}{\frac{V^2}{4} - V^2}$$

$$\frac{x}{0.06} = \frac{-\frac{1}{4}}{\frac{1}{4} - 1}$$

$$\frac{x \times 100}{6_2} = \frac{1\frac{1}{2}}{+\frac{3}{4}}$$

$$x = \frac{2}{100} = 2\text{ cm}$$

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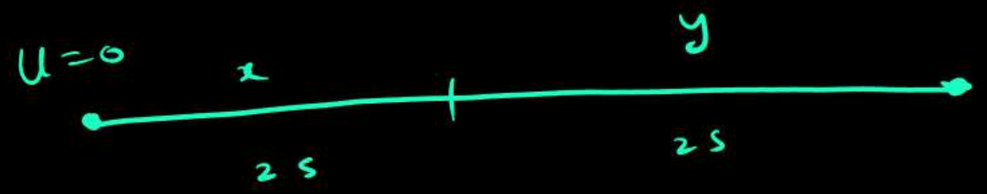
25. A particle starting from rest with constant acceleration travels a distance x in first 2s and a distance y in next 2s, then

(A) $y = x$ (B) $y = 2x$

(C) $y = 3x$ (D) $y = 4x$



$u = 0$

$s_1 = x$

$t_1 = 2s$

$s_2 = y$

$t_1 + t_2 = 2 + 2 = 4s$

$$x = \frac{1}{2}(a)(2)^2 \quad --(1)$$

$$x + y = \frac{1}{2}a(4)^2 \quad ---(2)$$

$$\frac{x}{x+y} = \frac{4}{16}$$

$$4x = x + y$$

$$3x = y$$

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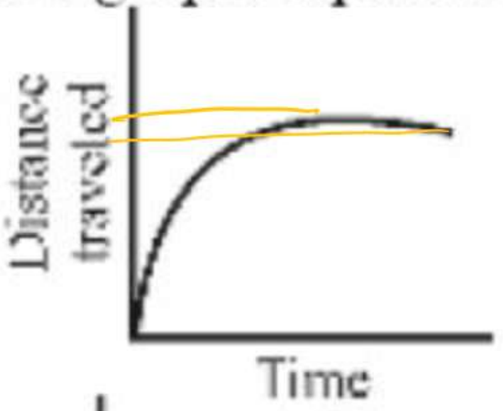
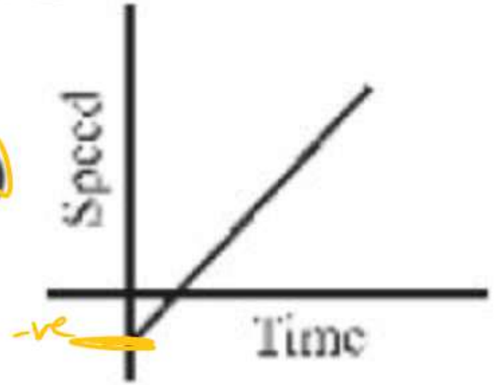
26. Which graph is practically possible:

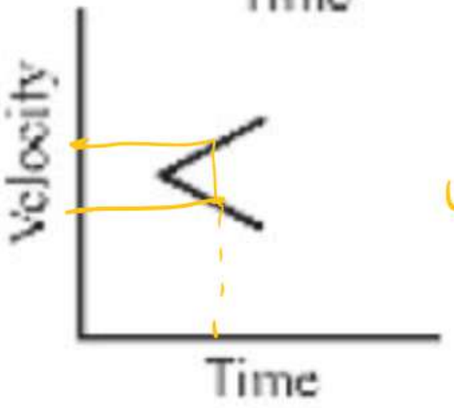
(A)



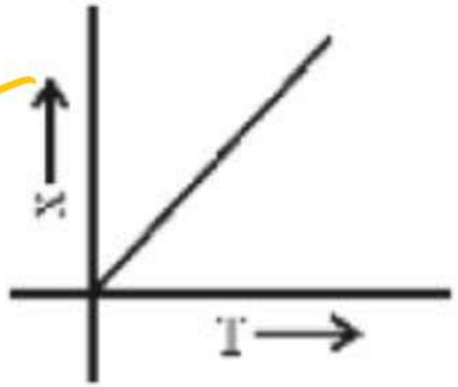
(B)



(C)



(D)



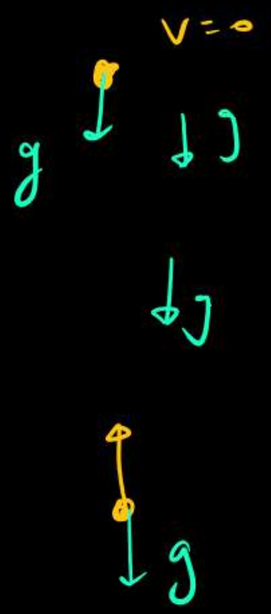
27. A ball is projected upwards. Its acceleration at the highest point is:

(A) zero

(B) directed upwards

(C) directed downwards

(D) such as cannot be predicted



28. Which of the following statement is not true?

(A) If displacement covered of a particle is zero, then distance covered may or may not be zero

(B) If the distance covered is zero then the displacement must be zero

(C) The numerical value of ratio of displacement to distance is equal to or less than one

(D) The numerical value of the ratio of velocity to speed is always less than one

T

T

T

D=0, s=0

$\frac{s}{D} = 1$, $\frac{s}{D} < 1$

29. The displacement of a moving particle is given by, $x = at^3 + bt^2 + ct + d$. The acceleration of particle at $t = 3$ s would be

(A) $2(a + 9b)$

(B) $2(9a + b)$

(C) $9(a + b)$

(D) $3(2a + b)$

$x = at^3 + bt^2 + ct + d$

$V = 3at^2 + 2bt + c$

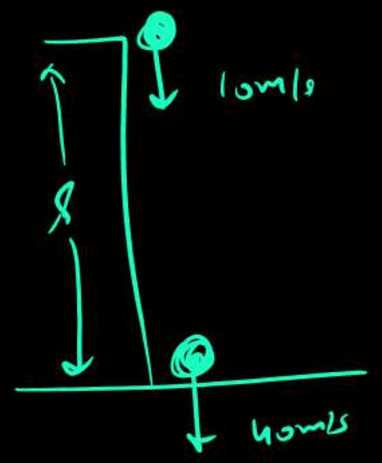
$a = 6at + 2b$

$a = 18a + 2b$

$a = 2(9a + b)$

30. A stone is thrown downwards with velocity 10 m/s from the roof of a building and it reaches the ground with speed 40 m/s. The highest of the building would be

(A) 75 m
(B) 100 m
(C) 125 m
(D) 150 m



$2as = v^2 - u^2$

$2(10)s = 40^2 - 10^2$

$20s = 1600 - 100$

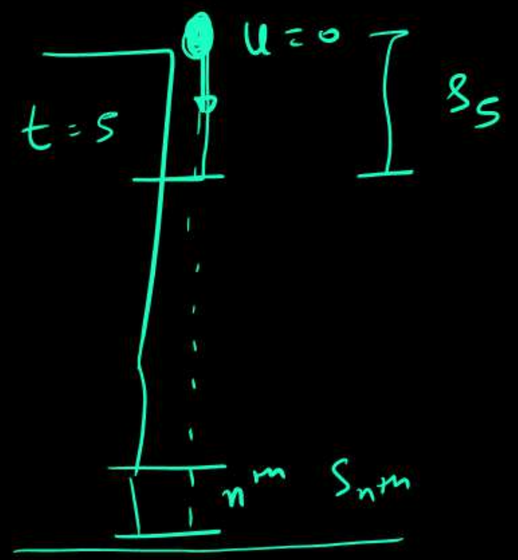
$s = \frac{1500}{20}$

$s = 75m$

31. A ball falls freely from rest and the total distance covered by it in the last second of its motion is equal to the distance covered by it in first five second of its motion. The total time of the stone when it is in motion would be

(A) 16.5 s (B) 17 s

(C) 15 s (D) 13 s



$s_5 = s_{nth}$

$s_5 = \frac{1}{2}(10)(5)^2$

$s_5 = 125\ m$

$s_{nth} = u + \frac{a}{2}(2n-1)$

$s_{nth} = 0 + \frac{10}{2}(2(n)-1)$

$125 = 5(2n-1)$

25

$26 = 2n$

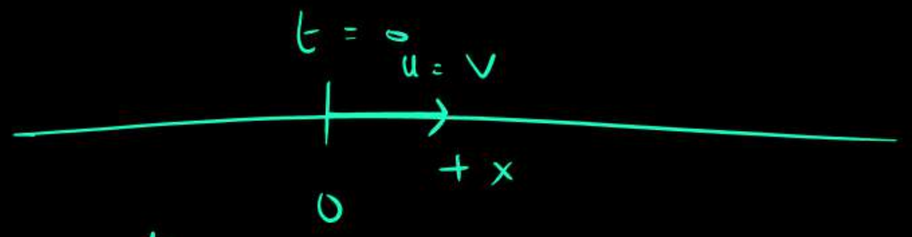
$n = \frac{26}{2} = 13\ s$

32. A particle located at x = 0 at time t = 0, moving along the positive x-direction with a velocity 'v' that varies as $v = a\sqrt{x}$, the displacement of the particle varies with time as

(A) t^2 (B) t

(C) $\sqrt{t}$ (D) t^3

$V = a\sqrt{x}$



$$V = a\sqrt{x}$$

$$\frac{dx}{dt} = a\sqrt{x}$$

$$\int_0^x \frac{dx}{\sqrt{x}} = \int_0^t a \cdot dt$$

$$\int_0^x x^{-\frac{1}{2}} \cdot dx = a\int_0^t dt$$

$$\left[\frac{x^{-\frac{1}{2}+1}}{-\frac{1}{2}+1}\right]_0^x = a\cdot[t]_0^t$$

$$2x^{1/2} = a(t)$$

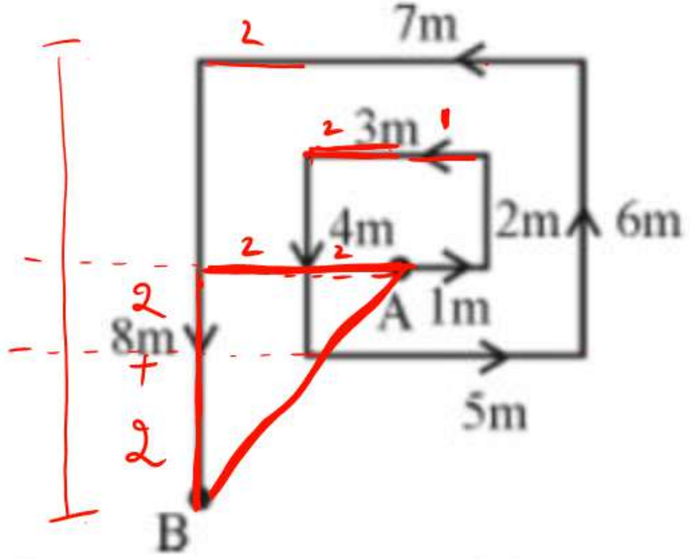
$$2\sqrt{x} = at$$

$$4x = a^2t^2$$

$$x = \frac{a^2t^2}{4}$$

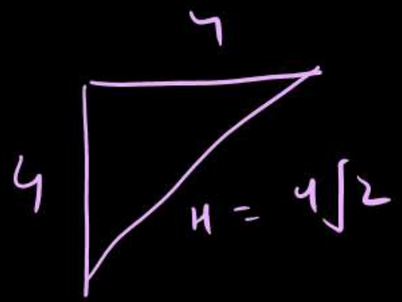
$$x \propto t^2$$

33. Object starts motion on a track as shown in figure then find displacement between 'A' and 'B'.



(A) 4m (B) 8m

(C) $4\sqrt{2}$m (D) $2\sqrt{2}$m



34. Which of the following option is correct for the value of sin θ.

(A) 2

(B) $\frac{1}{\sqrt{5}}$

(C) $\sqrt{2}$

(D) $\frac{\sqrt{5}}{2}$

35. If $\tan\theta = \frac{\sqrt{5}}{2}$ then; value of $\cos\theta$ is

(A) $\frac{2}{3}$

(B) $\frac{3}{2}$

(C) $\frac{\sqrt{5}}{3}$

(D) 5

$\tan\theta = \frac{\sqrt{5}}{2} = \frac{P}{B}$, $\cos\theta = ? = \frac{B}{H}$

$= \frac{2}{3}$

$H^2 = P^2 + B^2$

$H^2 = 5 + 4$

$H^2 = 9$

$H = \sqrt{9} = 3$

36. Correct value of cos (2°)

(A) 2°

(B) $\frac{\pi}{50}$

(C) 1

(D) 0

$\cos 2^\circ$

$\theta < 5^\circ$

$\theta \approx 0$

37. If $y = \sin 2\theta$ then find θ where y will be maximum

(A) 90°
(B) 45°
(C) 60°
(D) 30°

$y = \sin 2\theta = \text{Max}$

$y = \text{Max}$

$\sin 2\theta = 1$

$\sin 2\theta = \sin 90°$

$\theta = 45°$

38. The equation of straight line having slope $\sqrt{3}$ and y intercept of -2 will be:

(A) $y = \sqrt{3}x + 2$ (B) $y = \sqrt{3}x - 2$

(C) $y = -\sqrt{3}x - 2$ (D) $y = -\sqrt{3}x + 2$

$y = mx + c$ — slope, Intercept

$y = \sqrt{3}x - 2$

39. The equation of line making an angle 135° with the positive x-axis and passing through a point (2,3) will be:

(A) $y - x = 5$ (B) $y = x - 5$

(C) $y - x = 1$ (D) $y = -x + 5$

(x, y)

$2, 3$

Slope $= \tan\theta$

Slope $= \tan 135$

$y = (\tan 135)\, x + c$

$y = (-1)\, x + 5$

$\boxed{y = -x + 5}$

$y = mx + c$

$3 = (-1)\, 2 + c$

$3 = -2 + c$

$\boxed{c = 5}$

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40. $\int_0^{\pi/2} (\sin x + \cos x)dx$

(A) 2 (B) 1

(C) 3 (D) 4

$$\int_0^{\pi/2} \sin x \cdot dx + \int_0^{\pi/2} \cos x \cdot dx$$

$$(+1) + (+1) = 2$$

41. $\int_0^1 (x^3+1)dx$

(A) $\frac{1}{4}$ (B) $\frac{3}{4}$

(C) $\frac{5}{4}$ (D) $\frac{7}{4}$

$$\int_0^1 (x^3+1)\,dx$$

$$\frac{x^4}{4} + x \Big]_0^1$$

$$\frac{1}{4} + 1 = \frac{5}{4}$$

42. Dimensional formula of heat energy is

(A) ML^2T^{-2} (B) MLT^{-1}

(C) $M^\circ L^\circ T^{-2}$ (D) None of these

43. The dimensions of universal gravitational constant are

(A) $M^{-2}L^{2}T^{-2}$ (B) $M^{-1}L^{3}T^{-2}$

(C) $ML^{-1}T^{-2}$ (D) $ML^{2}T^{-2}$

$G = ?$

$$F = \frac{G M_1 M_2}{r^2}$$

$$\frac{F r^2}{M_1 M_2} = G$$

$$[G] = \frac{[ML T^{-2}][L]^2}{[M]^2}$$

$$= [M^{-1} L^{3} T^{-2}]$$

44. Two quantities A and B have different dimensions. Which mathematical operation given below is physically meaningful

(A) A/B

(B) A + B

(C) A – B

(D) None of these

45. If $x = at + bt^2$, where x is the distance travelled by the body in kilometres while t is the time in seconds, then the units of b are

(A) km/s (B) km–s

(C) km/s^2 (D) $km–s^2$

$x = at + bt^2$

$bt^2 = km$

$bs^2 = km$

$b = \frac{km}{s^2}$

Thank You