SAPTARSHI CLASSES PVT. LTD.

NEET-2020 **Time : 60 Min** **PHYSICS** **Marks :** 180

Topic wise Test 1 Motion In One Dimensions

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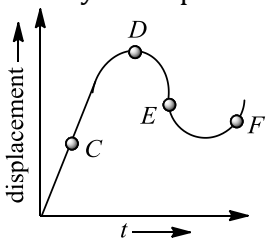
1. The displacement-time graph of a moving particle is shown below. The instantaneous velocity of the particle is negative at the point

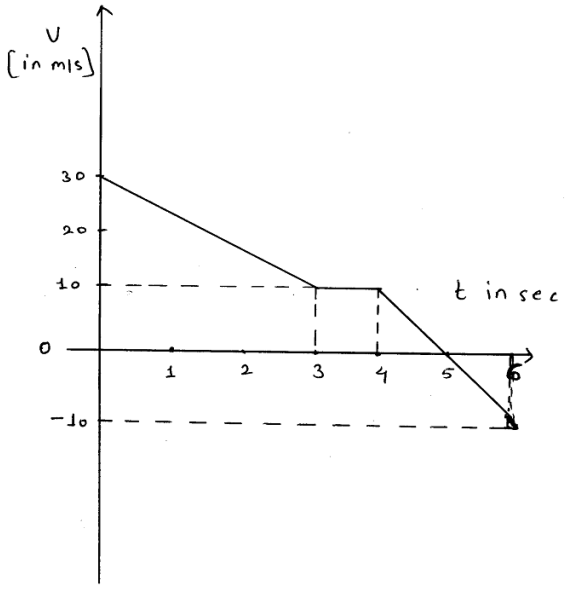


a) C b) D c) E d) F

2. A stone thrown vertically upward files past a window one second after it was thrown upward and after three second on its way downward. The height of the window above the ground is (Take g $= 10ms^{-2}$)

a) 20 m b) 15 m
c) 10 m d) 5 m

3. In the given $v - t$ graph, the distance travelled by the body in 5 will be

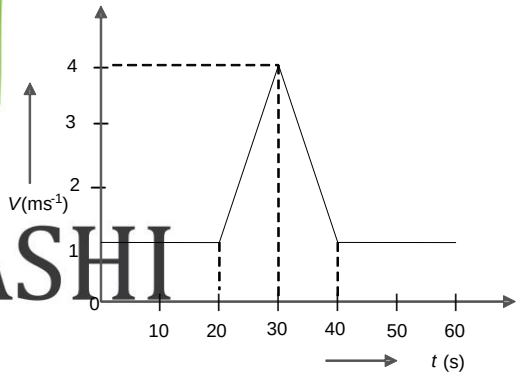


a) 20 m b) 45 m c) 80 m d) 100 m

4. The displacement of a particle undergoing rectilinear motion along the x-axis is given by $x = (2t^2 + 21t^2 + 60t + 6)$. The acceleration of the particle when its velocity is zero is

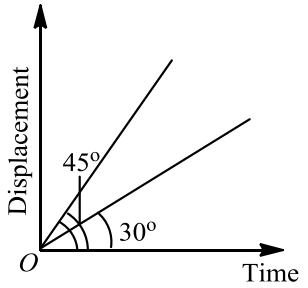
a) $36ms^{-2}$ b) $9ms^{-2}$
c) $-9ms^{-2}$ d) $-18ms^{-2}$

5. Velocity-time $(v - t)$ graph for a moving object is shown in the figure. Total displacement of the object during the time interval when there is non-zero acceleration and retardation is



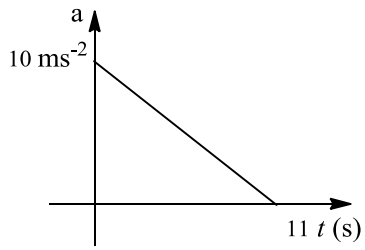
a) 60 m b) 50 m c) 30 m d) 40 m

6. The displacement-time graphs of two moving particles make angles of 30° and 45° with the x −axis. The ratio of their velocities is



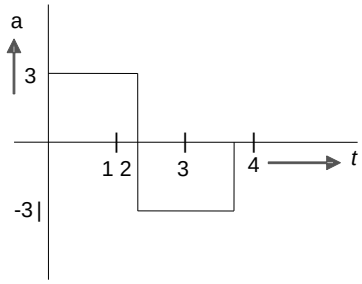
a) $1 : \sqrt{3}$ b) $1 : 2$ c) $1 : 1$ d) $\sqrt{3} : 2$

7. 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



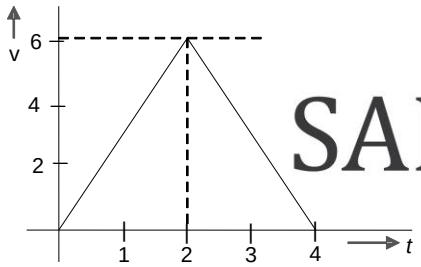
a) $110\ \text{ms}^{-1}$ b) $55\ \text{ms}^{-1}$
c) $550\ \text{ms}^{-1}$ d) $660\ \text{ms}^{-1}$

8. A particle starts from rest at $t = 0$ and undergoes an acceleration a in ms^{-2} with time t in second which is as shown

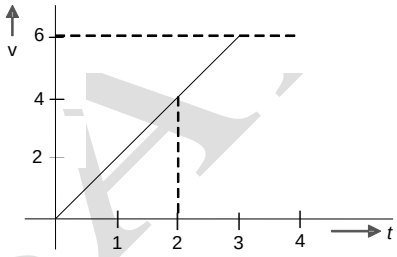


Which one of the following plot represents velocity v in ms^{-1} *versus* time t in second?

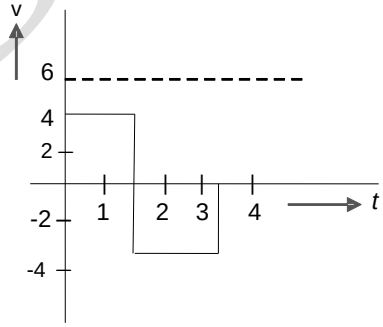
a)



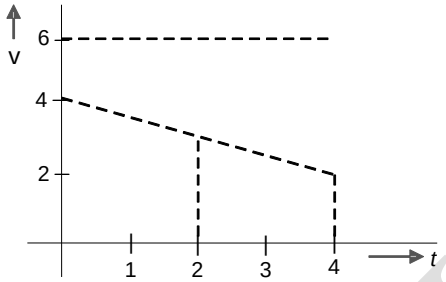
b)



c)



d)



9. A car starting from rest, accelerates at the rate f through a distance S, then continues at constant speed for time t and then decelerates at the rate $f/2$ to come to rest. If the total distance travelled is 15 S, then

a) $S = ft$ b) $S = \frac{1}{6}ft^2$
c) $S = \frac{1}{2}ft^2$ d) None of these

10. A particle moves along x −axis as $x = 4(t-2) + a(t-2)^2$ Which of the following is true?
a) The initial velocity of particle is 4
b) The acceleration of particle is $2a$
c) The particle is at origin at $t = 0$
d) None of the above

11. A car moves from X to Y with a uniform speed v_u and returns to Y with a uniform speed v_d. The average speed for this round trip is

a) $\frac{2v_dv_u}{v_d+v_u}$ b) $\sqrt{v_uv_d}$
c) $\frac{v_dv_u}{v_d+v_u}$ d) $\frac{v_u+v_d}{2}$

12. A body projected vertically upwards crosses a point twice in its journey at a height h just after t_1 and t_2 second. Maximum height reached by the body is

a) $\frac{g}{4}(t_1+t_2)^2$ b) $g\left(\frac{t_1+t_2}{4}\right)^2$
c) $2g\left(\frac{t_1+t_2}{4}\right)^2$ d) $\frac{g}{4}(t_1t_2)$

13. A body starting from rest moves with uniform acceleration. The distance covered by the body in time t is proportional to
a) $\sqrt{t}$ b) $t^{3/2}$ c) $t^{2/3}$ d) t^2

14. A particle located at $x = 0$ at time $t = 0$, starts moving along the positive x −direction with a velocity v that varies as $v = \alpha\sqrt{x}$. The

displacement of the particle varies with time as
a) t^2 b) t c) $t^{1/2}$ d) t^3

15. A parachutist after bailing out falls 50 m without friction. When parachute opens, it decelerates at 2 ms^{-2}. He reaches the ground with a speed of 3 ms^{-1}. At what height, did he bail out?
a) 91 m b) 182 m c) 293 m d) 111 m

16. The acceleration a of a particle starting from rest varies with time according to relation $a = \alpha t + \beta$. The velocity of the particle after a time t will be
a) $\frac{\alpha t^2}{2} + \beta$ b) $\frac{\alpha t^2}{2} + \beta t$
c) $\alpha t^2 + \frac{1}{2}\beta t$ d) $\frac{(\alpha t^2 + \beta)}{2}$

17. The displacement of particle is given by $x = a_0 + \frac{a_1 t}{2} - \frac{a_2 t^2}{3}$
What is its acceleration?
a) $\frac{2a_2}{3}$ b) $-\frac{2a_2}{3}$ c) a_2 d) Zero

18. A train started from rest from a station and accelerated at 2 ms^{-2} for 10 s. Then, it ran at constant speed for 30 s and thereafter it decelerated at 4 ms^{-2} until it stopped at the next station. The distance between two stations is
a) 650 m b) 700 m c) 750 m d) 800 m

19. A point initially at rest moves along x −axis. Its acceleration varies with time as $a = (6t + 5) ms^{-2}$. If it starts from origin, the distance covered in 2 s is
a) 20 m b) 18 m c) 16 m d) 25 m

20. The numerical ratio of average velocity to average speed is
a) Always less than one
b) Always equal to one
c) Always more than one
d) Equal to or less than one

21. A particle starts from rest and experiences constant acceleration for 6 s. if it travels a distance d_1 in the first two second, a distance d_2 in the next two seconds and a distance d_3 in the last two second, then
a) $d_1 : d_2 : d_3 = 1 : 1 : 1$
b) $d_1 : d_2 : d_3 = 1 : 2 : 3$
c) $d_1 : d_2 : d_3 = 1 : 3 : 5$
d) $d_1 : d_2 : d_3 = 1 : 5 : 9$

22. Two bodies of different masses are dropped from heights of 16 m and 25 m respectively. The ratio of the time taken by them to reach the ground is
a) $\frac{25}{16}$ b) $\frac{5}{4}$ c) $\frac{4}{5}$ d) $\frac{16}{25}$

23. A body is thrown vertically upwards with velocity u. The distance travelled by it in the fifth and the sixth seconds are equal. The velocity u is given by (g = 9.8 ms^{-2})
a) 24.5 ms^{-1} b) 49.0 ms^{-1}
c) 73.5 ms^{-1} d) 98.0 ms^{-1}

24. A student is standing at a distance of 50 m from the bus. As soon as the bus begins its motion with an acceleration of 1 ms^{-2}, the students starts running towards the bus with a uniform velocity u. Assuming the motion to be along a straight road, the minimum value of u, so that the student is able to catch the bus is
a) 8 ms^{-1} b) 5 ms^{-1}
c) 12 ms^{-1} d) 10 ms^{-1}

25. From the top of tower a body A is projected vertically up, another body B is horizontally thrown and a third body C is thrown vertically down with same velocity. Then
a) B strikes the ground with more velocity
b) C strikes the ground with less velocity
c) A, B, C strike the ground with same velocity
d) A and C strike the ground with more velocity than B

26. A body dropped from top of a tower fall through 60 m during the last two second of its fall. The height of tower is (g = 10 ms^{-2})
a) 95 m b) 60 m c) 80 m d) 90 m

27. A particle moves along a straight line such that its displacement at any time t is given by $s = t^3 - 6t^2 + 3t + 4$. The velocity when its acceleration is zero is
a) 2 ms^{-1} b) 12 ms^{-1}
c) −9 ms^{-1} d) 2 ms^{-1}

28. Two spheres of same size, one of mass 2 kg and another of mass 4 kg, are dropped simultaneously from the top of Qutab Minar (height = 72 m). When they are 1 m above the ground, the two spheres have the same
a) Momentum b) Kinetic energy
c) Potential energy d) Acceleration

29. If the velocity of a particle is given by $v = (180 - 16x)^{1/2} ms^{-1}$, then its acceleration will be

a) Zero b) $8\ ms^{-2}$ c) $-8\ ms^{-2}$ d) $4\ ms^{-2}$

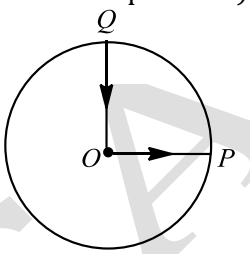
30. An object, moving with a speed of 6.25 m/s, is decelerated at a rate given by $\frac{dv}{dt} = -2.5\sqrt{v}$ where v is the instantaneous speed. The time taken by the object, to come to rest, would be
a) 2 s b) 4 s c) 8 s d) 1 s

31. A bullet comes out of the barrel of gun of length 2m with a speed $80\ ms^{-1}$. The average acceleration of the bullet is
a) $1.6\ ms^{-2}$ b) $160\ ms^{-2}$
c) $1600\ ms^{-2}$ d) $16\ ms^{-2}$

32. A ball is dropped from top of a building. The ball take 0.5 s to fall past the 3 m length of window some distance from top of building with what speed does the ball pass the top of window?
a) $6\ ms^{-1}$ b) $12\ ms^{-1}$
c) $7\ ms^{-1}$ d) $3.5\ ms^{-1}$

33. A particle moves along a straight line such that its position x at any time t is $x = 6t^2 - t^3$. Where x in metre ant t is in second, then
a) At $t = 0$ acceleration is $12\ ms^{-2}$
b) $x - t$ curve has maximum at 4 s
c) Both (a) and (b) are wrong
d) Both (a) and (b) are correct

34. A cyclist starts from the centre O of a circular park of radius 1 km, reaches the edge P of the park, then cycles along the circumference and returns to the point O as shown in figure. If the round trip takes 10 min, the net displacement and average speed of the cyclist (in metre and kilometer per hour) are



a) 0, 1 b) $\frac{\pi + 4}{2}, 0$
c) $214, \frac{\pi + 4}{2}$ d) 0, 21.4

35. If a body loses half of its velocity on penetrating 3 cm in a wooden block, then how much will it penetrate more before coming to rest?
a) 1 cm b) 2 cm c) 3 cm d) 4 cm

36. A body moves for a total of nine second started from rest with uniform acceleration and then with uniform retardation, which is twice the value of acceleration and then stops. The duration of uniform acceleration
a) 3 s b) 4.5 s c) 5 s d) 6 s

37. A body thrown vertically up to reach its maximum height in t second. The total time from the time of projection to reach a point at half of its maximum height while returning (in second) is
a) $\sqrt{2}\,t$ b) $\left(1 + \frac{1}{\sqrt{2}}\right)t$
c) $\frac{3t}{2}$ d) $\frac{t}{\sqrt{2}}$

38. A balloon gong upward with a velocity of $12\ ms^{-1}$ is at a height of 65 m from the earth's surface at any instant. Exactly at this instant a ball drops from it. How much time will the ball take in reaching the surface of earth? ($g = 10\ ms^{-2}$)
a) 5 s b) 6 s
c) 10 s d) None of these

39. A particle moves for 20 s with velocity $3\ ms^{-1}$ and then moves with velocity $4\ ms^{-1}$ for another 20 s and finally moves with velocity $5\ ms^{-1}$ for next 20 s. What is the average velocity of the particle?
a) $3\ ms^{-1}$ b) $4\ ms^{-1}$ c) $5\ ms^{-1}$ d) Zero

40. A body moving with uniform acceleration, describes 40 m in the first 5 s and 65 m in next 5 s. its initial velocity will be
a) $4\ ms^{-1}$ b) $2.5\ ms^{-1}$
c) $3\ ms^{-1}$ d) $11\ ms^{-1}$

41. A particle moves along a straight line OX. At a time t (in second) the distance x (in metre) of the particle from O is given by $x = 40 + 12t - t^3$. How long would the particle travel before coming to rest?
a) 24 m b) 40 m c) 56 m d) 16 m

42. A body starting from rest moves with constant acceleration. The ratio of distance covered by the body during the 5 th second to that covered in 5 s is
a) $\frac{9}{25}$ b) $\frac{3}{5}$ c) $\frac{25}{5}$ d) $\frac{1}{25}$

43. In a system of units if force (F), acceleration (A), and time (T) are taken as fundamental units then the dimensional formula of energy is
a) FA^2T b) FAT^2 c) F^2AT d) FAT

44. The percentage errors in the measurement of a mass and speed are 2% and 3% respectively. How much will be the maximum error in the estimate of kinetic energy obtained by measuring mass and speed?
a) 11% b) 8% c) 5% d) 1%

45. $S = A(1 - e^{-Bxt})$, where S is speed and x is displacement. The unit of B is
a) $m^{-1}s^{-1}$ b) $m^{-2}s$ c) s^{-2} d) s^{-1}