# KD EDUCATION ACADEMY [9582701166] STREET NO. 21 A-1 BLOCK BENGALI COLONY SANT NAGAR BURARI DELHI -110084

Time : 4 Hour

STD 11 Science class 11 physics
kd 90+ questions ch- 2 motion an a straight line

Total Marks : 123

* **Choose The Right Answer From The Given Options.[1 Marks Each]**                [71]

1.  Which of the following is not a vector quantity?
    (A) Acceleration.
    (B) Velocity.
    (C) Speed.
    (D) Displacement.

2.  An object thrown vertically upwards with a velocity of 25m/ s takes 4sec to reach the thrower. What is displacement of the object?
    (A) 100m          (B) 180m          (C) 0m          (D) 120m

3.  A car is moving with a velocity of $30ms^{-1}$. On applying the brakes, the velocity decreases to $15ms^{-1}$ in 2s. The acceleration of the car is:
    (A) $+7.5ms^{-2}$     (B) $-7.7ms^{-2}$     (C) $-75ms^{-2}$     (D) $+15ms^{-2}$

4.  The changes in displacement in three consecutive instances are 5m, 4m, 11m, the total time taken is 5s. What is the average velocity in m/ s?
    (A) 1          (B) 4          (C) 7          (D) 6

5.  A cyclist moving on a circular track of radius 40m completes half a revolution in 40s. Its average velocity is:
    (A) Zero          (B) $2ms^{-1}$          (C) $4\pi ms^{-1}$          (D) $8\pi ms^{-1}$

6.  Among the four graphs Fig. there is only one graph for which average velocity over the time interval (0, T ) can vanish for a suitably chosen T. Which one is
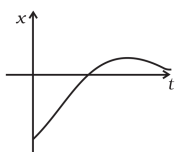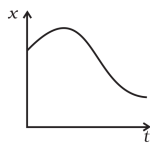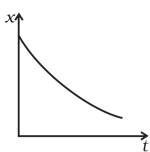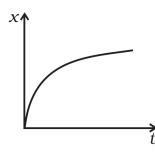


    it?

7.  A body is started from rest with acceleration $2m/ s^2$ till it attains the maximum velocity then retards to rest with $3m/ s^2$. If total time taken is 10 second then maximum speed attained is:

(A) 12m/ s      (B) 8m/ s      (C) 6m/ s      (D) 4m/ s

8.  The displacement of a particle is represented by the following equation $s = 2t^3 + 7t^2 + + 5t + 8$ where s is in metres and t in seconds. The acceleration of the particle at t = ls is:

(A) $18m/s^2$      (B) $32m/s^2$      (C) zero      (D) $14m/s^2$

9.  Distance-time graph of a body at rest is:
    (A) Parallel to time-axis.
    (B) Parallel to distance-axis.
    (C) Inclined to time-axis.
    (D) Perpendicular to both axes.

10.  A car starts from rest from origin 0 and continues to move till point C as shown in the graph. Select the correct statement about the motion of car as
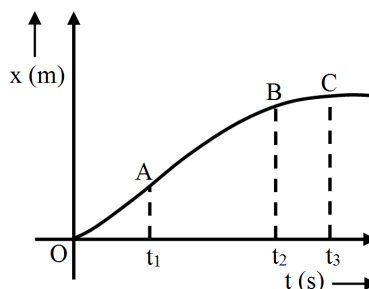


shown in the graph.
    (A) Part AB represents non-uniform motion.
    (B) At instant time $t = t_2$, brakes must have been applied.
    (C) At $= t_3$, the car must have accelerated.
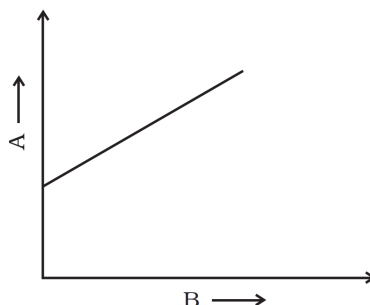    (D) All of the above.

11.  If the velocity of a body does not change, its acceleration is:
    (A) Zero      (B) Infinite      (C) Unity      (D) None of these

12.  The displacement of an object at any instant is given by $x = 30 + 20t^2$ , where x is in metres and t in seconds. The acceleration of the object will be:
    (A) $40ms^{-2}$      (B) $50ms^{-2}$      (C) $30ms^{-2}$      (D) Zero

13.  The variation of quantity A with quantity B, plotted in Fig. describes the



motion of a particle in a straight line.
    (A) Quantity B may represent time.
    (B) Quantity A is velocity if motion is uniform.
    (C) Quantity A is displacement if motion is uniform.
    (D) Quantity A is velocity if motion is uniformly accelerated.

14. An object may have:
    I. varying speed without having varying velocity.
    II. varying velocity without having varying speed.
    III. non-zero acceleration without having varying velocity.
    IV. non-zero acceleration without having varying speed.

    (A) I and II are correct.
    (B) II and III are correct.
    (C) II and IV are correct.
    (D) None of the above.

15. A 50.0kg boy is sitting on an amusement park ride where he accelerates straight upward from rest to a speed of 30.0m/ s in 3.0s
    What is his mass as he accelerates upward?
    (A) 990.0kg         (B) 100.0kg         (C) 50.0kg         (D) 5.00kg

16. The displacement-time graphs of two moving particles make angles of 30°
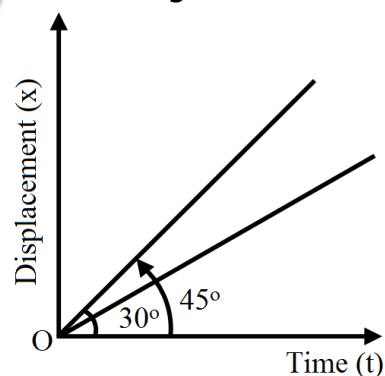


    and 45° with the x-axis. The ratio of their velocities is:
    (A) $1 : \sqrt{3}$                          (B) $1 : 2$
                                                (C) $1 : 1$

    (D) $\sqrt{3} : 2$

17. A person is moving with a velocity of 10ms$^{-1}$ towards North. A car moving with a velocity of 20ms$^{-1}$ towards South crosses the person. The velocity of car relative to the person is:
    (A) -30ms$^{-1}$         (B) +30ms$^{-1}$         (C) 10ms$^{-1}$         (D) -10ms$^{-1}$

18. The velocity of a ship varies with time as v = 5t$^3$. What is the acceleration at t = 2?
    (A) 60         (B) 56         (C) 40         (D) 100

19. A particle moves along a straight line as s = u(t - 2) + a(t - 2)$^2$
    (A) The acceleration of the particle is 'a'.
    (B) The initial velocity of the particle is 'v'.
    (C) At t = 2s, the particle is at rest.
    (D) The acceleration of the particle is '2a'.

20. The trajectory of an object is defined as x = (t - 4)$^2$, what is the velocity at t = 5?

(A) 2                (B) 5                (C) 1                (D) 4

21.  A body freely falling from the rest has a velocity v after his falls through a height h. The distance, it has to fall down further for its velocity to become double, is:

(A) 4h              (B) 3h              (C) h               (D) 16h

22.  An object starts from rest and moves with uniform acceleration a. The final velocity of the particle in terms of the distance x covered by it is given as:

(A) $\sqrt{2ax}$

(B) $2ax$

(C) $\sqrt{\frac{ax}{2}}$

(D) $\sqrt{ax}$

23.  A ball is thrown upwards with a velocity of 25m/s. What is the time taken by the ball to return to the thrower (g = 10m/s$^2$)

(A) 5sec            (B) 2.5sec          (C) 3sec            (D) 4.2sec

24.  A man throws ball into the air one after the other. Throwing one when other is at the highest point. How high the balls rise if he throws twice a second?

(A) 2.45m           (B) 1.225m          (C) 19.6m           (D) 4.9m

25.  The driver of an express train suddenly sees the red light signal 50m ahead and applies the brakes. If the average deceleration during braking is $10.0ms^{-2}$ and the reaction time of the driver is 0.75sec, the minimum speed at which the train should be moving so as not to cross the red signal is:

(A) 27km/ hr        (B) 144km/ hr       (C) 72km/ hr        (D) 83km/ hr

26.  Area under velocity time graph represents:

(A) Acceleration.                        (B) Displacement.

(C) Retardation.                         (D) Average speed.

27.  A and B start walking towards each other from the opposite ends of a 15km long straight road, at a speed of 5km/ hr and 7km/ hr respectively. How far apart will they be after one hour?

(A) 2km             (B) 3km             (C) 5km             (D) 7km

28.  Average speed of a car between points A and B is 20m/s, between B and C is 15m/s, between C and D is 10m/s. What is the average speed between A and D, if the time taken in the mentioned sections is 20s, 10s and 5s respectively?

(A) 17.14 m/s                            (B) 15 m/s

(C) 10 m/s                               (D) 45 m/s

29.  If the velocity of a particle is v = At + Bt$^2$, where A and B are constants, then the distance travelled by it in 1s is:

(A) $3A + 7B$                            (B) $\frac{3}{2}A + \frac{7}{3}B$

(C) $\frac{A}{2} + \frac{B}{3}$          (D) $\frac{3}{2}A + 4B$

30. A body falling from a high Minaret travels 40m in the last 2 seconds of its fall to ground. Height of Minaret in metres is:

(take g = 10m/s$^2$)

(A) 60      (B) 45      (C) 80      (D) 50

31. A stone is thrown vertically up from a bridge with velocity $3 ms^{-1}$ if it strikes the water under the bridge after 2s, the bridge is at a height of (g = 10m/s$^2$)

(A) 26m      (B) 16m      (C) 14m      (D) 20m

32. The displacement of a particle is given by $x = (t - 2)^2$ where x is in metres and t in seconds. The distance covered by the particle in first 4 seconds is:

(A) 4m.      (B) 8m.      (C) 12m.      (D) 16m.

33. A stone is thrown with an initial speed of 4.9m/s from a bridge in vertically upward direction. It falls down in water after 2 seconds. The height of the bridge is:

(A) 4.9m      (B) 9.8m      (C) 19.8m      (D) 24.7m

34. A particle is dropped from a tower. It is found that it travels 55m in the last second of its journey. Then height of the tower is (g = 10m/s$^2$g = 10m/s$^2$)?

(A) 125m      (B) 180m      (C) 100m      (D) 55m

35. A parachutist after bailing out falls 50m without friction. When parachute opens, it decelerate at 2m/s$^2$. He reaches the ground with a speed of 3m/s. At what height, did he bail out nearly.

(A) 298m      (B) 111m      (C) 91m      (D) 182m

36. A ship is moving due east with a velocity of 12 m/sec. A truck is moving across on the ship with a velocity of 4m/sec. A monkey is climbing a vertical pole mounted on the truck, with a velocity of 3m/sec. Find the velocity of the monkey, as observed by a man on the shore. (m/sec).

(A) 10      (B) 15      (C) 13      (D) 16

37. A particle moving with a uniform acceleration travels 24 metre and 64 metre in first two consecutive intervals of 4 seconds each. Its initial velocity is:

(A) 1m/sec.      (B) 2m/sec.      (C) 5m/sec.      (D) 10m/sec.

38. From a 200m high tower, one ball is thrown upwards with speed of 10m/s and another is thrown vertically downwards at the same speed simultaneously. The time difference of their reaching the ground will be nearest to:

(A) 12s      (B) 6s      (C) 2s      (D) 1s

39. A vehicle travels half the distance L with speed $V_1$ and the other half with speed $V_2$, then its average speed is:

(A) $\frac{v_1 + v_2}{2}$

(B) $\frac{2v_1 + v_2}{v_1 + v_2}$

(C) $\frac{2v_1 v_2}{v_1 + v_2}$

(D) $\frac{L(v_1 + v_2)}{v_1 v_2}$

40. Figure shows the V−T graph for two particles P and Q. The relative velocity
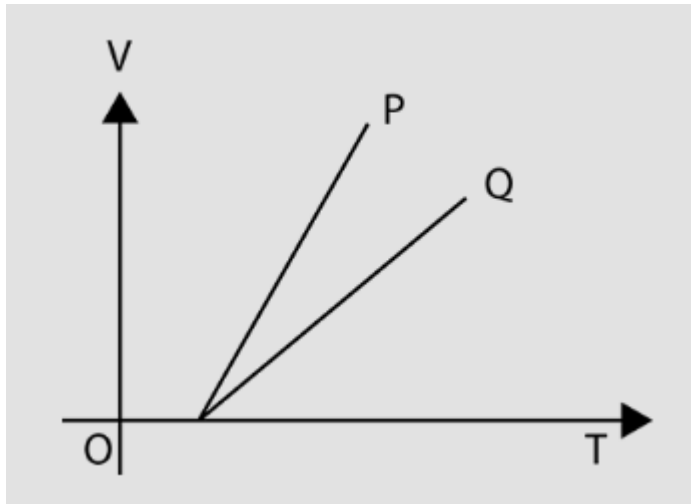
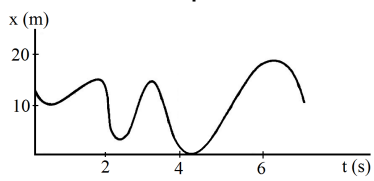

of P w.r.t. Q is:

(A) Is zero.

(B) Is non-zero but constant

(C) Continuously decreases

(D) Continuously increases

41. An object is moving with an initial velocity of $30 \text{ms}^{-1}$ with uniform acceleration. The velocity of object increases to $40 \text{ms}^{-1}$ in next 5s. The v-t graph which least represents this situation is:



(A)



(B)



(C)
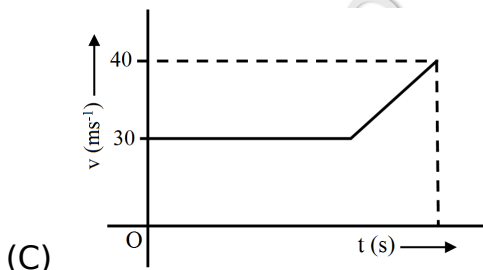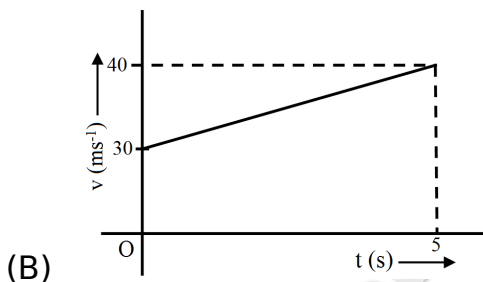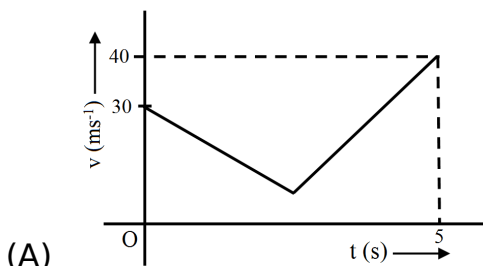
(D) None of the above.

42. A gun is fired at a target. At the moment of firing, the target is released and allowed to fall freely under gravity. Then the bullet: (Assume zero air resistance)

(A) Misses the target by passing above it

(B) Hits the target

(C) Misses the target by passing below it

(D) May or may not hit

43. A stone falls from a balloon that is descending at a uniform rate of 12m/ s. the displacement of the stone from the point of release 10sec is:

(A) 490m      (B) 510m      (C) 610m      (D) 725m

44. A body released from the top of alls through a height of 5m during the first second of its fall and 35m during the last second of its fall. The height of the tower is:

(A) 80m      (B) 60m      (C) 40m      (D) 20m

45. A car moves for 60s covering a distance of 3600m with zero initial velocity. What is the acceleration in m/ $s^2$?

(A) 2      (B) 2.5      (C) 3      (D) 4.5

46. An iron sphere of mass 10kg has the same diameter as an aluminium sphere of mass is 3.5kg. Both spheres are dropped simultaneously from a tower. When they are 10m above the ground, the have the same:

(A) Acceleration

(B) Momenta

(C) Potential energy

(D) Kinetic energy

47. A ball dropped from some height coves half of its total during the last second of its free fall. Find:

(A) Time of flight

(B) Height of its fall

(C) Speed with which it strikes the ground.

(D) None of these

48. A balloon is going upwards with velocity 12m/sec. It releases a packet when it is at a height 65m from the ground. How much time the packet will take to reach the ground? (g = 10m/$s^2$):

(A) 5 sec      (B) 6 sec      (C) 7 sec      (D) 8 sec

49. A stone is dropped into well in which the level of water is at a distance h below the top of well. If y is the velocity of sound, the time T after which the splash is heard is given by:

(A) $T = \frac{2h}{v}$

(B) $T = \sqrt{\frac{2h}{g}} + \frac{h}{v}$

(C) $T = \sqrt{\frac{2h}{v}} + \frac{h}{g}$

(D) $T = \sqrt{\frac{h}{2g}} + \frac{2h}{v}$

50. The velocity of a truck changes form 3m/s to 5m/s in 5s. What is the acceleration in m/s$^2$?

   (A) 0.4          (B) 0.5          (C) 4.0          (D) 5.0

51. In case of a freely falling body, the ratio of kinetic energy at the end of the third second increase in kinetic energy in the next three seconds is:

   (A) 1 : 1          (B) 1 : 2          (C) 1 : 3          (D) 1 : 9

52. In a uniformly accelerated motion, the speed varies from 0 to 20m/s in 4s. What is the average speed during the motion?

   (A) 10m/s          (B) 20m/s          (C) 0m/s          (D) 15m/s

53. How does the displacement v/s time graph of a uniformly accelerated motion look like?

   (A) A straight line

   (B) A parabola

   (C) A hyperbola

   (D) An ellipse

54. A driver takes 0.20s to apply the brakes after he sees a need for it. This is called the reaction time of the driver. If he is driving a car at a speed of 54km/h and the brakes causes a deceleration of 6.0 m/s$^2$, find the distance traveled by the car after he sees the need to put the brakes on.

   (A) 18.63m          (B) 20m          (C) 26.85m          (D) 27.67m

55. Figure shows the position of a particle moving on the X-axis as a function of



   time.

   (A) The particle has come to rest 6 times.

   (B) The maximum speed is at t = 6s.

   (C) The velocity remains positive for t = 0 to t = 6s.

   (D) The average velocity for the total period shown is negative.

56. Acceleration of a particle which is at rest at x = 0 is $\vec{a} = (4 - 2x)\hat{i}$. Select the correct alternative(s):

   (A) Maximum speed of the particle is 4 units.

   (B) Particle further comes to rest at x = 4.

   (C) Particle oscillates about x = 2.

   (D) Particle will continuously accelerate along the x-axis.

57. A body thrown vertically up with a velocity 'u' reaches the maximum height 'h' after 'T' second. The correct statement among the following is:

   (A) At a height $\frac{h}{2}$ from the ground its velocity is $\frac{u}{2}$.

   (B) At a time T its velocity is 'u'.

   (C) At a time '2T' its velocity is -u.

(D) At a time 2T its velocity is -6u.

58.  An object is sliding down on an inclined plane. The velocity changes at a constant rate from 10cm/s to 15cm/s in 2 seconds. What is its acceleration?

(A) 5cm/ $s^2$                      (B) 7.5cm/ $s^2$

(C) 2.5cm/ $s^2$                    (D) 12.5cm/ $s^2$

59.  A man of mass 60kg and a boy of mass 30kg are standing together on frictionless ice surface. If they push each other apart man moves away with a speed of 0.4m/ s relative to ice. After 5sec they will be away from each other at a distance of.

(A) 9.0m                (B) 3.0m                (C) 6.0m                (D) 30,

60.  What is the velocity for a body following the graph below at 10s?
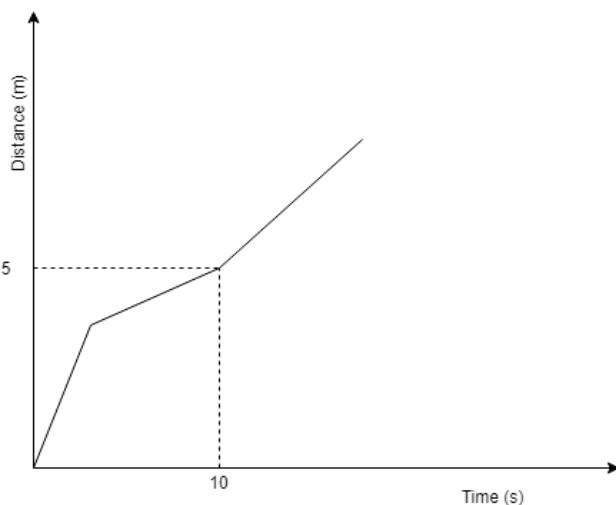


(A) 1m/ s                              (B) 2m/ s

(C) 0.5m/ s                           (D) 0.1m/ s

61.  Find the odd one out and give the reason: speed, distance, mass, velocity:

(A) Mass              (B) Speed              (C) Distance              (D) Velocity

62.  A bomb is released from a horizontal flying aeroplane. The trajectory of bomb as observed from ground is:

(A) A parabola                        (B) A straight line

(C) A circle                          (D) A hyperbola

63.  Which of the following types of motion cannot describe the motion of a clock's hands?

(A) Rectilinear                       (B) Circular

(C) Periodic                          (D) Harmonic

64. Which of the following statements regarding motion of particle is true?
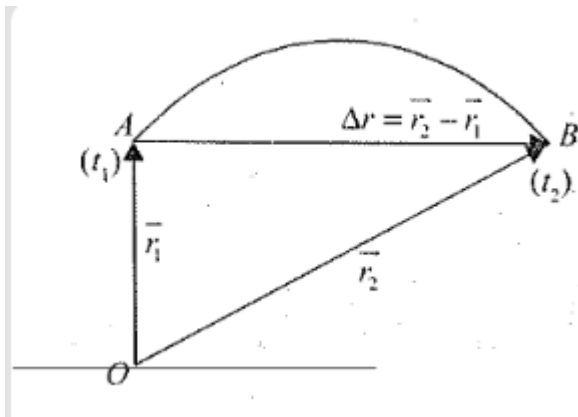


(A) The motion between A and B is known.

(B) The motion between A and B is erratic.

(C) The motion between A and B may have been steady or erratic.

(D) The motion between A and B is steady.

65. A vehicle travels half the distance L with speed $V_1$ and the other half with speed $V_2$, then its average speed is:

   a. $\frac{V_1+V_2}{2}$

   b. $\frac{2V_1+V_2}{V_1+V_2}$

   c. $\frac{2V_1V_2}{V_1+V_2}$

   d. $\frac{L(V_1+V_2)}{V_1V_2}$

66. The variation of quantity A with quantity B, plotted in Fig. describes the
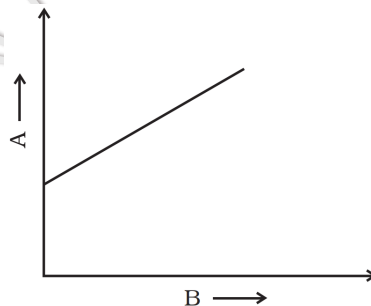


motion of a particle in a straight line.

   a. Quantity B may represent time.

   b. Quantity A is velocity if motion is uniform.

   c. Quantity A is displacement if motion is uniform.

   d. Quantity A is velocity if motion is uniformly accelerated.

67. The displacement of a particle is given by $x = (t - 2)^2$ where x is in metres and t in seconds. The distance covered by the particle in first 4 seconds is:

   a. 4m.

   b. 8m.

   c. 12m.

   d. 16m.

68. A ball is bouncing elastically with a speed 1m/s between walls of a railway compartment of size 10m in a direction perpendicular to walls. The train is

moving at a constant velocity of 10m/s parallel to the direction of motion of the ball. As seen from the ground,

    a. The direction of motion of the ball changes every 10 seconds.

    b. Speed of ball changes every 10 seconds.

    c. Average speed of ball over any 20 second interval is fixed.

    d. The acceleration of ball is the same as from the train.

69. Which of the sets given below may represent the magnitudes of three vectors adding to zero?

    a. 2, 4, 8

    b. 4, 8, 16

    c. 1, 2, 1

    d. 0.5, 1, 2

70. The radius of a circle is stated as 2.12cm. Its area should be written as:

    a. $14cm^2$.

    b. $14.1cm^2$.

    c. $14.11cm^2$.

    d. $14.1124cm^2$.

71. Let the angle between two nonzero vectors $\vec{A}$ and $\vec{B}$ be 120° and its resultant be $\vec{c}$ :

    a. C must be equal to $|A - B|$

    b. C must be less than $|A - B|$

    c. C must be greater than $|A - B|$

    d. C may be equal to $|A - B|$

**\*** **Given Section consists of questions of 2 marks each.** **[26]**

72. What are uses of a velocity-time graph?

73. Find the area bounded by the curve $y = e^{-x}$, the X-axis and the Y-axis.

74. A monkey climbs up a slippery pole for 3 seconds and subsequently slips for 3 seconds. Its velocity at time t is given by v(t) = 2t(3 - t); 0 < t < 3 and v(t) = -(t - 3)(6 - t) for 3 < t < 6s in m/s. It repeats this cycle till it reaches the height of 20m. At what time is its velocity maximum?

75. The velocity of a particle is v = 5 + 2 ($a_1$ + $a_2$t) where $a_1$ and $_{a2}$ are constants and t is the time. What is the acceleration of the particle?

76. A body is travelling in a straight line with a uniformly increasing speed. Plot a graph which represents the change in distance (s) travelled with time (t).

77. The graph between total path length and time for a particle moving along a straight line as shown in figure is not possible. Explain why?
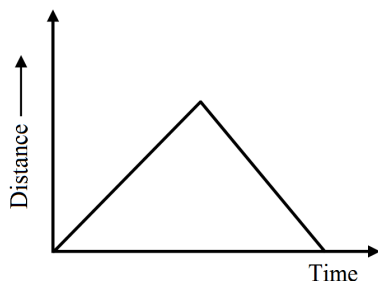
78. Acceleration is called as rate of change of velocity. Suppose we call rate of change of acceleration SLAP, what is the unit of SLAP?

79. A body goes from A to B with a velocity of 40m/s and comes back from B to A with a velocity of 60m/s. What is the (i) average velocity during the whole journey and (ii) average speed during the whole journey?

80. An object moving on a straight line covers first half of the distance at speed v and second half of the distance at speed 2v. Find:
    i.   Aaverage speed.
    ii.  Mean speed.

81. For the motion shown in the figure, find the displacement of car between the
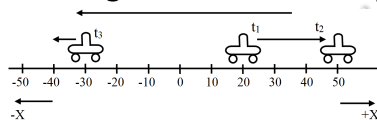


time intervals $t_1$ and $t_3$.

82. The two straight rays OA and OB on the same displacement - time graph make angle 30° and 60° with time axis respectively as shown in figure.
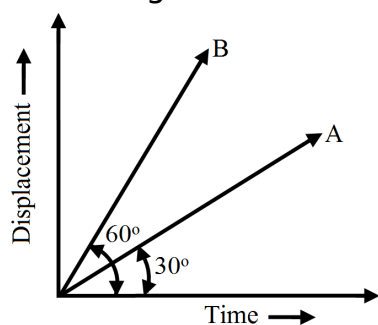


    i.   Which ray represents greater velocity?
    ii.  What is the ratio of two velocities represented by OA and OB?

83. The position of an object is given by $x = 2t^2 + 3t$. Find out that its motion is uniform and non-uniform.

84. From the given example, find if the motion is one or two or three-dimensional.
    i.    A kite flying in the sky.
    ii.   A cricket ball hit by a player.
    iii.  Moon revolving around the earth.
    iv.   The motion of a stone in a circle.

* **Given Section consists of questions of 3 marks each.**                    **[6]**

85. A particle executes the motion described by $x(t) = x_0(1 - e^{-\gamma t}); t \geq 0, x_0 > 0$. Where does the particle start and with what velocity?

86. A uniformly moving cricket ball is turned back by hitting it with a bat for a very short time interval. Show the variation of its acceleration with time. (Take acceleration in the backward direction as positive).

* **Given Section consists of questions of 5 marks each.** [20]

87. A motor car moving at a speed of 72km/h can not come to a stop in less than 3.0s while for a truck this time interval is 5.0s. On a higway the car is behind the truck both moving at 72km/h. The truck gives a signal that it is going to stop at emergency. At what distance the car should be from the truck so that it does not bump onto (collide with) the truck. Human response time is 0.5s.

88. A man runs across the roof-top of a tall building and jumps horizontally with the hope of landing on the roof of the next building which is of a lower height than the first. If his speed is 9m/s, the (horizontal) distance between the two buildings is 10m and the height difference is 9m, will he be able to land on the next building? (take $g = 10m/s^2$).

89. Add vectors $\vec{A}, \vec{B}$ and $\vec{C}$ each having magnitude of 100 unit and inclined to the X-axis at angles 45°, 135° and 315° respectively.

90. Refer to figure. Find
   a. The magnitude.
   b. x and y components
   c. The angle with the X-axis of the resultant of $\overrightarrow{OA}, \overrightarrow{BC}$ and $\overrightarrow{DE}$.
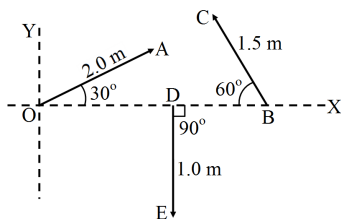


----- नजर को बदलो तो नजारे बदल जाते हैं , सोच को बदलो तो सितारे बदल जाते हैं !!कश्तियां बदलने की जरुरत नहीं दिशाओं को बदलो तो किनारे खुद ब खुद बदल जाते हैं! -----