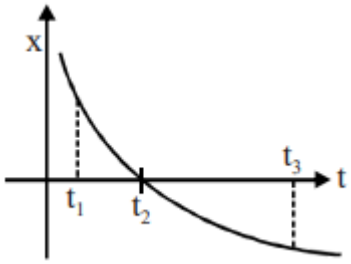
Chapter 03

Kinematics

JEE-RANKER'S STUFF

SINGLE CORRECT QUESTIONS

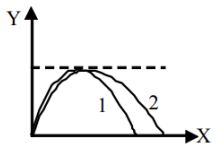
Q.1 The position time graph for a particle moving on x-axis is shown here. Choose correct statement.



(1) At $t = t_2$ particle is at origin.
(2) At $t = t_2$ particle is at rest.
(3) At $t = t_3$ particle is moving in positive x-direction.
(4) at $t = t_1$ particle is moving in positive x-direction.

Q.2 The average velocity for a trip on a straight line has a positive value. We can conclude that
(1) The instantaneous velocity at any point during trip cannot be negative
(2) The instantaneous velocity at any point during trip cannot be zero.
(3) The instantaneous velocity at any point during trip cannot be positive.
(4) None of these

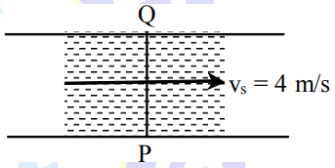
Q.3 Trajectories of two projectiles are shown in the figure. Let T_1 and T_2 be the time period and u_1 and u_2 be their speeds of projection. Then –



(1) $T_2 > T_1$ (2) $u_1 < u_2$
(3) $T_1 > T_2$ (4) $u_1 > u_2$

Q.4 A ball is thrown vertically upwards with a velocity of 30 m/s. If the acceleration due to gravity is 10 m/s^2, what will be the distance travelled by it in the last second of motion before again come to his hand :
(1) 5 m (2) 10 m (3) 25 m (4) 30 m

Q.5 A boat man could row his boat with a speed 10 m/sec. He wants to take his boat from P to a point Q just opposite on the other bank of the river flowing at a speed 4 m/sec. He should row his boat–



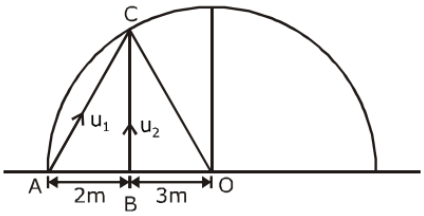
(1) at right angle to the stream
(2) at an angle of $\sin^{-1}$ (2/5) with PQ down the stream
(3) at an angle $\cos^{-1}$ (2/5) with PQ down the stream
(4) at an angle of $\sin^{-1}$ (2/5) with PQ up the stream

Q.6 A man in a balloon, throws a stone downwards with a speed of 5 m/s with respect to balloon. The balloon is moving upwards with a constant acceleration of 5 m/s^2. Then velocity of the stone relative to the man after 2 second is:

(1) 10 m/s (2) 30 m/s (3) 35 m/s (4) 15 m/s

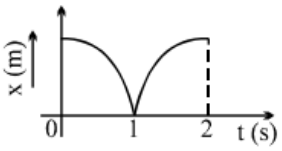
Q.7 A semicircle of radius R = 5m with diameter AD is shown in figure. Two particles 1 and 2 at points A and B on shown diameter at t = 0 and move along segments AC and BC with constant speeds u_1, and u_2 respectively. Then the value of

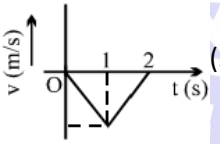
$\frac{u_1}{u_2}$ for both particles to reach point C simultaneously will be :

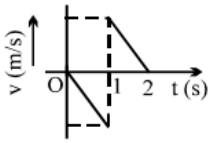


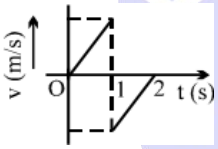
(1) $\frac{5\sqrt{2}}{4}$ (2) $\frac{2\sqrt{2}}{5}$ (3) $\sqrt{\frac{5}{4}}$ (4) $2\sqrt{2}$

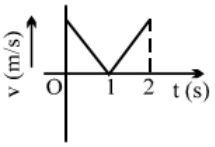
Q.8 The displacement time graph of a moving particle with constant acceleration (for $0 \le t < 1$ and $1 < t \le 2$ sec) is shown in the figure. The velocity time graph is best given by-



(1) 

(2) 

(3) 

(4) 

Q.9 A particle moves with constant speed v along a regular hexagon ABCDEF in same order (ie., A to B, B to C, C to D, D to E, E to F, F to A....) Then magnitude of average velocity for its motion from A to C

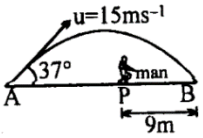
(1) V (2) V/2

(3) $\sqrt{3}V/2$ (4) None of these

Q.10 A ball is dropped from a height of 20 m and rebounds with a velocity which is 3/4th of the velocity with which it hits the ground. What is the time interval between the first and second bounces ($g = 10\ m/s^2$)

(1) 3 sec (2) 4 sec (3) 5 sec (4) 6 sec

Q.11 A ball is hit by a batsman at an angle of 37º as shown in figure. The man standing at P should run at what minimum velocity so that he catches the ball before it strikes the ground. Assume that height of man is negligible in comparison to maximum height of projectile.



(1) 3 ms^{-1} (2) 5 ms^{-1}

(3) 9 ms^{-1} (4) 12 ms^{-1}

Q.12 A car runs at constant speed on a circular track of radius 100 m taking 62.8 s on each lap. What is the average speed and average velocity on each complete lap?

(1) velocity 10m/s, speed 10 m/s

(2) velocity zero, speed 10 m/s

(3) velocity zero, speed zero

(4) velocity 10 m/s, speed zero

Q.13 Mark the correct statements:

(1) The magnitude of the instantaneous velocity of a particle is equal to its instantaneous speed.

(2) The magnitude of average velocity in an interval is equal to its average speed in that interval.

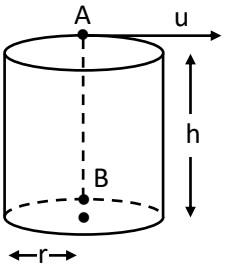
(3) It is possible to have a situation in which the speed of a particle is always zero but the average speed is not zero

(4) It is possible to have a situation in which the speed of the particle is never zero but the average speed in an interval is zero.

Q.14 A particle is thrown upwards from ground. It experiences a constant air resistance which can produce a retardation of 2 m/s^2 opposite to the direction of velocity of particle. The ratio of time of ascent to the time of descent is : [g = 10 m/s^2]

(1) 1 : 1 (2) $\sqrt{\frac{2}{3}}$ (3) $\frac{2}{3}$ (4) $\sqrt{\frac{3}{2}}$

Q.15 A hollow vertical cylinder of radius r and height h has a smooth internal surface. A small particle is placed in contact with the inner side of the upper rim, at point A, and given a horizontal speed u, tangential to the rim. It leaves the lower rim at point B, vertically below A. If n is an integer, then –



(1) $\frac{h}{2\pi r}=n$ (2) $\frac{u}{2\pi r}\sqrt{\frac{2h}{g}}=n$

(3) $\frac{2\pi r}{h}=n$ (4) $\frac{u}{\sqrt{2gh}}=n$

Q.16 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?
(1) 1 cm (2) 2 cm (3) 3 cm (4) 4 cm

Q.17 From a building two balls A and B are thrown such that A is thrown upwards and B downwards (both vertically with same speed). If V_A and V_B are their respective velocities on reaching the ground, then
(1) $v_B > v_A$
(2) $v_A = v_B$
(3) $v_A > v_B$
(4) their velocities depends on their masses

Q.18 The coordinates of a moving particle at any time t are given by $x = \alpha t^3$ and $y = \beta t^3$. The speed of the particle at time t is given by :
(1) $\sqrt{\alpha^2+\beta^2}$ (2) $3t^2\sqrt{\alpha^2+\beta^2}$
(3) $t^2\sqrt{\alpha^2+\beta^2}$ (4) $\sqrt{\alpha^2+\beta^2}$

Q.19 The relation between time t and distance x is $t = ax^2 + bx$, where a and b are constants. The acceleration is :
(1) $-2abv^2$ (2) $2bv^2$ (3) $-2av^3$ (4) $2av^3$

Q.20 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 $\frac{f}{2}$ to come to rest. If the total distance travelled is 15 S, then:
(1) S = ft (2) $S = \frac{1}{6}ft^2$
(3) $S = \frac{1}{72}ft^2$ (4) $S = \frac{1}{4}ft^2$

Q.21 A particle is moving eastwards with a velocity of 5 ms^{-1}. In 10 second the velocity changes to 5 ms^{-1} northwards. The average acceleration in this time is:
(1) $\frac{1}{\sqrt{2}}$ ms^{-2} towards north-west
(2) $\frac{1}{2}$ ms^{-2} towards north
(3) zero
(4) $\frac{1}{2}$ ms^{-2} towards north-west.

Q.22 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
(1) $t^{1/2}$ (2) t^3 (3) t^2 (4) t

Q.23 It takes one minute for a passenger standing on an escalator to reach the top. If the escalator does not move it takes him 3 minute to walk up. How long will it take for the passenger to arrive at the top if he walks up the moving escalator?
(1) 30 sec (2) 45 sec (3) 40 sec (4) 35 sec

Q.24 From a tower of height H, a particle is thrown vertically upwards with a speed u. The time taken by the particle, to hit the ground, is a n times that taken by it to reach the highest point of its path. The relation between H, u and n is :
(1) $2gH = n^2u^2$ (2) $gH = (n-2)^2u^2$
(3) $2gH = nu^2(n-2)$ (4) $gH = (n-2)u^2$

Q.25 A body is thrown up in a lift with a velocity u relative to the lift and the time of flight is found to be t. The acceleration with which the lift is moving up is
(1) $\frac{u-gt}{t}$ (2) $\frac{2u+gt}{t}$
(3) $\frac{u+gt}{t}$ (4) $\frac{2u-gt}{t}$

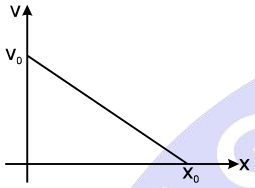
Q.26 A block is moving down a smooth inclined plane starting from rest at time t = 0. Let S^n be the

distance travelled by the block in the interval t = n – 1 to t = n. The ratio $\frac{S_n}{S_{n+1}}$ is

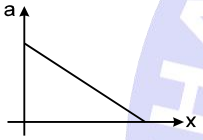
(1) $\frac{2n-1}{2n}$ (2) $\frac{2n-1}{2n+1}$

(3) $\frac{2n+1}{2n-1}$ (4) $\frac{2n}{2n-1}$

Q.27 The velocity displacement graph of a particle moving along a straight line is shown.



The most suitable acceleration-displacement graph will be

(1)


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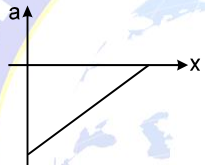

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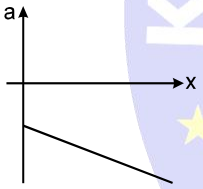

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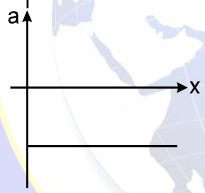


NUMERICAL VALUE TYPE QUESTIONS

Q.28 The velocity (v) of a particle is related to the time (t) elapsed as v= kt, where k = 4m/s^2. What is the distance (in m) travelled in 2 seconds?

Q.29 A Students cycles from his house to the school situated at a distance of 1.2 km. He covers first 700 m at a speed of 7 m/s and the next 500 m at a speed of 5 m/s What is his average speed (in m/s)?

Q.30 Rain is falling vertically downward with a velocity of 3km/h. A man walks in the rain with a velocity of 4 km/h. Find the velocity with which (in km/n) the rain drops will fall on the man?

Q.31 A person is swimming with a speed of 10m/s at an angle of 120° with the flow and reaches to a point directly opposite on the other side of the river. The speed of the flow is x m/s. The value of x to the nearest integer is ..... .

Q.32 A swimmer can swim with velocity of 12 km/h in still water. Water flowing in a river has velocity 6 km/h. The direction with respect to the direction of flow of river water he should swim in order to reach the point on the other bank just opposite to his starting point is ..... ° (in degree).
(Round off to the nearest integer)

Q.33 An elevator is moving upward with a constant speed of 10 m/s. A man standing in the elevator drops a coin from a height of 2.5 m, if the coin reaches the floor of the elevator after $t=\frac{1}{\sqrt{n}}$ sec then the value of n is [g = 10 m/s^2]

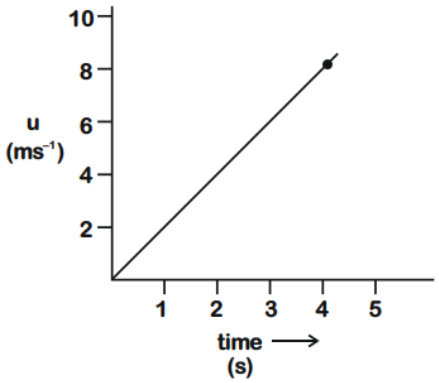
Q.34 A pendulum of length 2 m consists of a wooden bob of mass 50g. A bullet of mass 75 g is fired towards the stationary bob with a speed v. The bullet emerges out of the bob with a speed $\frac{v}{3}$ and the bob just completes the vertical circle. The value of v is .....ms^{-1}. (If g = 10m/s^2)

Q.35 A ball is dropped from the top of a 100 m high tower on a planet. In the last $\frac{1}{2}$ s before hitting the ground, it covers a distance of 19 m. Acceleration due to gravity (in ms^{-2}) near the surface on that planet is _____.

Q.36 The distance x covered by a particle in one dimensional motion varies with time t as $x^2 = at^2 + 2bt + c$. If the acceleration of the particle depends on x as x^{-n}, where n is an integer, the value of n is .....

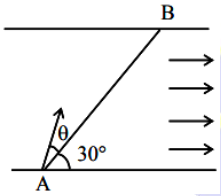
Q.37 If the velocity of a body related to displacement x is given by $v=\sqrt{5000+24x}$ m/s, then the acceleration of the body is ..... m/s^2.

Q.38 The speed versus time graph for a particle is shown in the figure. The distance travelled (in meter) by the particle during the time interval t = 0 s to t = 5 s will be .....



Q.39 A particle is moving along the x-axis with its coordinate with time 't' given by $x(t) = 10 + 8t - 3t^2$. Another particle is moving along the y-axis with its coordinate as a function of time given by $y(t) = 5 - 8t^3$. At t = 1 s, the speed of the second particle as measured in the frame of the first particle is given as $\sqrt{v}$. Then v (in m/s^{-1}) is_____.

Q.40 A swimmer wants to cross a river from point A to point B. Line AB makes an angle of 30° with the flow of river. Magnitude of velocity of the swimmer is same as that of the river. The angle θ with the line AB should be .....°, so that the swimmer reaches point (b)



STATEMENT TYPE QUESTIONS

Each of the following contains two statements. Read the statements and choose any one of the following four responses:

(1) Statement-1 is true, statement-2 is true and statement-2 is correct explanation for statement-1.

(2) Statement-1 is true, statement-2 is true and statement-2 is NOT the correct explanation for statement-1.

(3) Statement-1 is true, statement-2 is false.

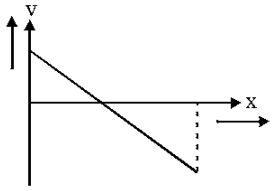
(4) Statement-1 is false, statement-2 is true.

Q.41 **Statement-1:** The magnitude of relative velocity of A with respect to B will be always less than V_A.
Statement-2: The relative velocity of A with respect to B is given by $\vec{V}_{AB} = \vec{V}_A - \vec{V}_B$
(1) A (2) B (3) C (4) D

Q.42 **Statement-1**: A particle having zero acceleration must have constant speed.
Statement-2: A particle having constant speed must have zero acceleration.
(1) A (2) B (3) C (4) D

Q.43 **Statement-1:** Three projectiles are moving in different paths in the air. Vertical component of relative velocity between any of the pair does not change with time as long as they are in air. Neglect the effect of air friction.
Statement-2: Relative acceleration between any of the pair of projectiles is zero.
(1) A (2) B (3) C (4) D

Q.44 **Statement-1:** A student performed an experiment by moving a certain block in a straight line. The velocity position graph cannot be as shown.
Statement-2: When a particle is at its maximum position in rectilinear motion its velocity must be zero.



(1) A (2) B (3) C (4) D

Q.45 **Statement-1:** The speed of a projectile is minimum at the highest point.
Statement-2: The acceleration of projectile is constant during the entire motion.
(1) A (2) B (3) C (4) D

Q.46 **Statement-1**: Positive acceleration in rectilinear motion of a body does not imply that the body is speeding up.
Statement-2: Both the acceleration and velocity are vectors.
(1) A (2) B (3) C (4) D

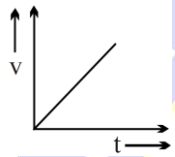
Q.47 **Statement-1:** Two stones are simultaneously projected from level ground from same point with same speeds but different angles with horizontal. Both stones move in same vertical plane. Then the two stones may collide in mi- air.

Statement-2: For two stones projected simultaneously from same point with same speed at different angles with horizontal, their trajectories may intersect at some point.

(1) A (2) B (3) C (4) D

Q.48 **Statement-1:** If the velocity time graph of a body moving in a straight line is as shown here, the

acceleration of the body must be constant



Statement-2: The rate of change of quantity which is constant is always zero.

(1) A (2) B (3) C (4) D

Q.49 **Statement-1:** If separation between two particles does not change then their relative velocity will be zero.

Statement-2: Relative velocity is the rate of change of position of one particle with respect to another.

(1) A (2) B (3) C (4) D

MORE THAN ONE CORRECT TYPE QUESTIONS

Q.50 A particle moves with constant speed v along a regular hexagon ABCDEF in the same order. Then the magnitude of the average velocity for its motion from A to C is?

(1) F is v/5 (2) D is v/3

(3) C is $\frac{v\sqrt{3}}{2}$ (4) B is v

Q.51 A particle moving with a speed v changes direction by an angle θ, without change in speed.

(1) The change in the magnitude of its velocity is zero.

(2) The change in the magnitude of its velocity is $2v \sin(\theta/2)$.

(3) The magnitude of the change in velocity is $2v \sin(\theta/2)$

(4) The magnitude of the change in its velocity is $v(1 - \cos\theta)$.

Q.52 A particle has initial velocity10m/s. It moves due to constant retarding force along the line of velocity which produces a retardation of $5m/s^2$. Then

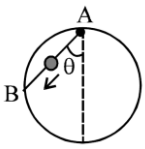
(1) the maximum displacement in the direction of initial velocity is 10m

(2) the distance travelled in first 3 seconds is 7.5 m

(3) the distance travelled in first 3 seconds is 12.5 m

(4) the distance travelled in first 3 seconds is 17.5 m.

Q.53 A bead is free to slide down a smooth wire tightly stretched between points A and B on a vertical circle. If the bead starts from rest at A, the highest point on the circle



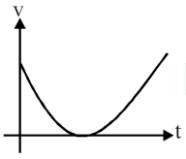
(1) its velocity v on arriving at B is proportional to $\cos\theta$

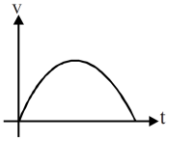
(2) its velocity v on arriving at B is proportional to $\tan\theta$

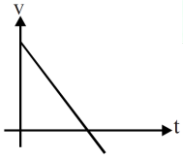
(3) time to arrive at B is proportional to $\cos\theta$

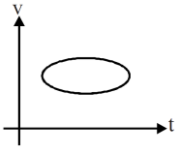
(4) time to arrive at B is independent of θ

Q.54 Which of the following speed-time graphs is not possible :

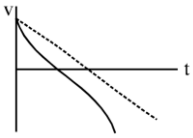
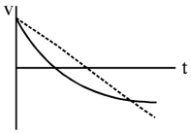
(1) 

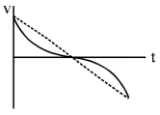
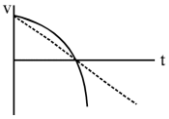
(2) 

(3) 

(4) 

Q.55 Which graph shows best the velocity-time graph for an object launched vertically into the air when air resistance is given by $|D| = bv$? The dashed line shows the velocity graph if there were no air resistance.

(1)  (2) 

(3)  (4) 

Q.56 Choose the correct alternative (s)

(1) If the greatest height to which a man can throw a stone is h, then the greatest horizontal distance up to which he can throw the stone is 2h.

(2) The angle of projection for a projectile motion whose range R is n times the maximum height is $\tan^{-1}(4/n)$

(3) The time of flight T and the horizontal range R of a projectile are connected by the equation $gT^2 = 2R\tan\theta$ where θ is the angle of projection.

(4) A ball is thrown vertically up. Another ball is thrown at an angle θ with the vertical. Both of them remain in air for the same period of time. Then the ratio of heights attained by the two balls 1 : 1.

Q.57 If T is the total time of flight, h is the maximum height & R is the range for horizontal motion, the x & y co-ordinates of projectile motion and time t are related as :

(1) $y = 4h\left(\frac{t}{T}\right)\left(1-\frac{t}{T}\right)$

(2) $y = 4h\left(\frac{X}{R}\right)\left(1-\frac{X}{R}\right)$

(3) $y = 4h\left(\frac{T}{t}\right)\left(1-\frac{T}{t}\right)$

(4) $y = 4h\left(\frac{R}{X}\right)\left(1-\frac{R}{X}\right)$

Q.58 A particle moves in the xy plane with a constant acceleration 'g' in the negative y-direction. Its equation of motion is $y = ax - bx^2$, where a and b are constants. Which of the following are correct?

(1) The x-component of its velocity is constant.

(2) At the origin, the y-component of its velocity is a $\sqrt{\frac{g}{2b}}$.

(3) At the origin, its velocity makes an angle $\tan^{-1}$ (a) with the x-axis.

(4) The particle moves exactly like a projectile.

Q.59 A particle is projected from the ground with velocity u at angle $\theta$with horizontal. The horizontal range, maximum height and time of flight are R, H and T respectively. They are given by, $R = \frac{u^2\sin\theta}{g}$, $H = \frac{u^2\sin^2\theta}{2g}$ and $T = \frac{2u\sin\theta}{g}$

Now keeping u as fixed, θ is varied from 30° to 60°. Then,

(1) R will first increase then decrease, H will increase and T will decrease

(2) R will first increase then decrease while H and T both will increase

(3) R will decrease while H and T will increase

(4) R will increase while H and T will increase

Q.60 A ball is rolled off along the edge of a horizontal table with velocity 4m/s. It hits the ground after time 0.4 s. Which of the following are correct?

(1) The height of the table is 0.8m

(2) It hits the ground at an angle of 60° with the vertical

(3) It covers a horizontal distance 1.6m from the table

(4) It hits the ground with vertical velocity 4m/s

Q.61 An observer moves with a constant speed along the line joining two stationary objects. He will observe that the two objects

(1) have the same speed

(2) have the same velocity

(3) move in the same direction

(4) move in opposite directions

Q.62 A man on a rectilinearly moving cart, facing the direction of motion, throws a ball straight up with respect to himself

(1) The ball will always return to him

(2) The ball will never return to him

(3) The ball will return to him if the cart moves with constant velocity

(4) The ball will fall behind him if the cart moves with some positive acceleration

Q.63 A block is thrown with a velocity of $2ms^{-1}$ (relative to ground) on a belt, which is moving with velocity $4ms^{-1}$ in opposite direction of the initial velocity of block. If the block stops slipping on the belt after 4 sec of the throwing then choose the correct statements (s)

(1) Displacement with respect to ground is zero after 2.66 s and magnitude of displacement with respect to ground is 12mafter 4 sec.

(2) Magnitude of displacement with respect to ground in 4 sec is 4m.
(3) Magnitude of displacement with respect to belt in 4 sec is 12m.
(4) Displacement with respect to ground is zero in 8/3 sec.

COMPREHENSION TYPE QUESTIONS

Q.64 A stone is projectile from level ground with speed u and at an angle θ with horizontal. Somehow the acceleration due to gravity (g) becomes double (that is 2g) immediately after the stone reaches the maximum height and remains same thereafter. Assume direction of acceleration due to gravity always vertically downwards.

(i) The total time of flight of particle is :

(1) $\frac{3}{2}\frac{u\sin\theta}{g}$ (2) $\frac{u\sin\theta}{g}\left(1+\frac{1}{\sqrt{2}}\right)$

(3) $\frac{2u\sin\theta}{g}$ (4) $\frac{u\sin\theta}{g}\left(2+\frac{1}{\sqrt{2}}\right)$

(ii) The horizontal range of particle is

(1) $\frac{3}{4}\frac{u^2\sin2\theta}{g}$ (2) $\frac{u^2\sin2\theta}{2g}\left(1+\frac{1}{\sqrt{2}}\right)$

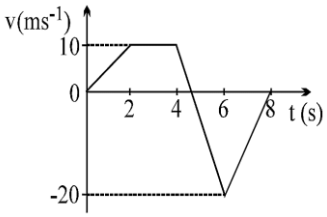
(3) $\frac{u^2}{g}\sin 2\theta$ (4) $\frac{u^2\sin2\theta}{2g}\left(2+\frac{1}{\sqrt{2}}\right)$

(iii) The angle ϕ which the velocity vector of stone makes with horizontal just before hitting the ground is given by :

(1) $\tan\phi = 2\tan\theta$ (2) $\tan\phi = 2\cot\theta$

(3) $\tan\phi = \sqrt{2}\tan\theta$ (4) $\tan\phi = \sqrt{2}\cos\theta$

Q.65 The figure shows a velocity-time graph of a particle moving along a straight line



(i) Choose the incorrect statement. The particle comes to rest at

(1) t = 0 s (2) t = 5 s
(3) t = 8 s (4) none of these

(ii) Identify the region in which the rate of change of velocity $\left|\frac{\Delta\vec{v}}{\Delta t}\right|$ of the particle is maximum

(1) 0 to 2s (2) 2 to 4s
(3) 4 to 6 s (4) 6 to 8 s

(iii) If the particle starts from the position $x_0 = -15$ m, then its position at t = 2s will be

(1) –5 m (2) 5m (3) 10 m (4) 15m

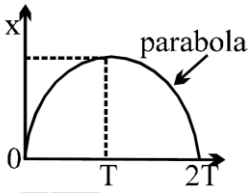
(iv) The maximum displacement of the particle is

(1) 33.3m (2) 23.3m (3) 18.3 m (4) zero

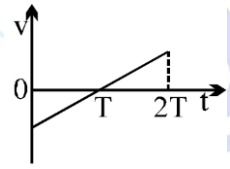
(v) The total distance travelled by the particle is

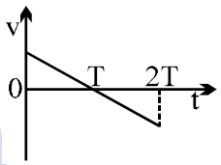
(1) 66.7m (2) 51.6m (3) zero (4) 36.6m

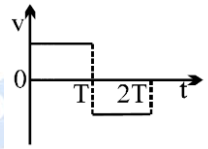
Q.66 The x-t graph of a particle moving along a straight line is shown in figure

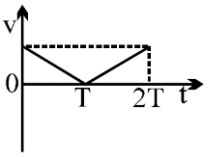


(i) The v-t graph of the particle is correctly shown by

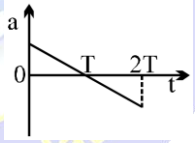
(1) 

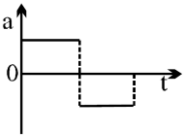
(2) 

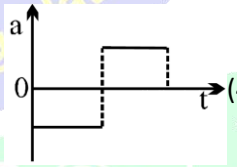
(3) 

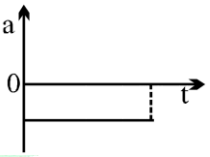
(4) 

(ii) The a-t graph of the particle is correctly shown by

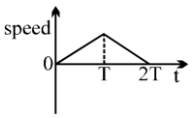
(1) 

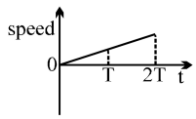
(2) 

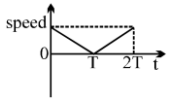
(3) 

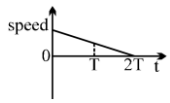
(4) 

(iii) The speed-time graph of the particle is correctly shown by

(1) 

(2) 

(3) 

(4) 

Q.67 Two projectiles are thrown simultaneously in the same plane from the same point. If their velocities are v_1 and v_2 at angles θ_1 and θ_2

respectively from the horizontal, then answer the following questions

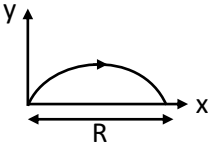
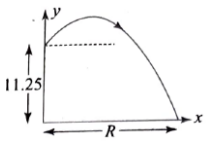
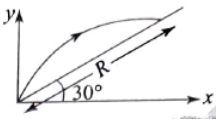
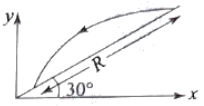
(i) The trajectory of particle 1with respect to particle 2will be
(1) a parabola
(2) a straight line
(3) a vertical straight line
(4) a horizontal straight line

(ii) If $v_1 \cos\theta_1 = v_2\cos\theta_2$, then choose the incorrect statement
(1) one particle will remain exactly below or above the other particle
(2) the trajectory of one with respect to other will be a vertical straight line
(3) both will have the same range
(4) none of these

(iii) If $v_1 \sin\theta_1 = v_2 \sin\theta_2$, then choose the incorrect statement
(1) the time of flight of both the particles will be same
(2) the maximum height attained by the particles will be same
(3) the trajectory of one with respect to another will be a horizontal straight line
(4) none of these

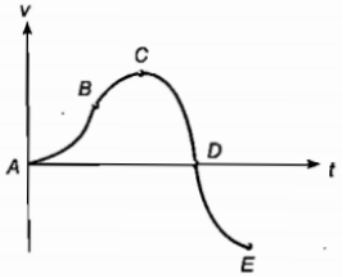
MATCH THE COLUMN TYPE QUESTIONS

Q.68 In the column –I, the path of a projectile (initial velocity 10 m/s and angle of projection with horizontal 60° in all cases) is shown in different cases. R angle 'R' is to be matched in each case from column –II. Take g = 10 m/s^2. Arrow on the trajectory indicates the direction of motion of projectile.

Column I		Column II	
(A)		(p)	$R=\frac{3\sqrt{2}}{2}m$
(B)		(q)	$R=\frac{40}{3}m$
(C)		(r)	$R=5\sqrt{3}m$
(D)		(s)	$R=\frac{20}{3}m$

(1) (A→r),(B→p), (C→s), (D→q)
(2) (A→p),(B→p), (C→q), (D→r)
(3) (A→r),(B→s), (C→q), (D→p)
(4) (A→q),(B→q), (C→r), (D→s)

Q.69 The velocity-time graph of a particle moving along X-axis is shown in figure. Match the entries of Column I with the entries of Column II.



Column - I		Column - II	
(A)	For AB, particle is	(p)	Moving in +ve X-direction with increasing speed
(B)	For BC, particle is	(q)	Moving in +ve X-direction with decreasing speed
(C)	For CD, particle is	(r)	Moving in –ve X-direction with increasing speed
(D)	For DE, particle is	(s)	Moving in –ve X-direction with decreasing speed

(1) (A→r),(B→q), (C→s), (D→p)
(2) (A→p),(B→p), (C→q), (D→r)
(3) (A→r),(B→s), (C→q), (D→p)
(4) (A→q),(B→q), (C→r), (D→s)

ANSWER KEY

JEE-RANKER'S STUFF

Que.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Ans.	1	4	2	3	4	3	3	2	3	1	2	2	1	2	2
Que.	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**
Ans.	1	2	2	3	3	1	3	2	3	4	2	2	8	6	5
Que.	**31**	**32**	**33**	**34**	**35**	**36**	**37**	**38**	**39**	**40**	**41**	**42**	**43**	**44**	**45**
Ans.	5	120	2	10	8	3	12	20	580	30	4	4	1	1	2
Que.	**46**	**47**	**48**	**49**	**50**	**51**	**52**	**53**	**54**	**55**	**56**	**57**	**58**	**59**	**60**
Ans.	1	4	2	4	1,3,4	1,3	1,3	1,4	4	2	1,2,3,4,	1,2	1,2,3,4	2	1,3
Que.	**61**	**62**	**63**	**64(i)**	**64(ii)**	**64(iii)**	**65(i)**	**65(ii)**	**65(iii)**	**65(iv)**	**65(v)**	**66(i)**	**66(ii)**	**66(iii)**	**67(i)**
Ans.	1,2,3	3	2,3,4	2	2	3	2	3	1	1	1	2	4	3	2
Que.	**67(ii)**	**67(iii)**	**68**	**69**											
Ans.	3	4	1	2											