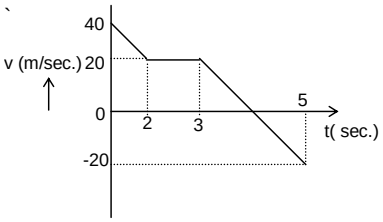
QUIZ - (Kinematics I)

Instruction: Correct answer +2 wrong -1

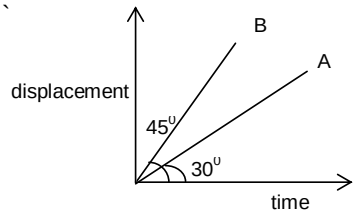
Time: 30 minutes **Marks: 40**

1. Initial velocity of a particle moving along a straight line is 10 m/s and retardation is $2m/s^2$. The distance covered by it in 5^{th} second of the motion is
(A) 1 m (B) 50 m (C) 19 m (D) 85 m

2. For the v-t graph, distance travelled by body in 5 sec. is
(A) 20 m (B) 40 m
(C) 80 m (D) 100 m



3. The graph represents displacement of two particles with time. Ratio of velocity of A to velocity of B is
(A) $\sqrt{3}$: 1 (B) 1 : 1
(C) 1 : 2 (D) 1 : $\sqrt{3}$



4. A particle is projected with v_0 at angle of 30^0 with vertical. Its average velocity for its time of flight is
(A) v_0 sin 30 (B) v_0 cos 30 (C) v_0 tan 30 (D) none of the above

5. Two vectors having magnitudes 8, 10 can have maximum & minimum value of magnitude of their resultant as
(A) 12, 6 (B) 10, 3 (C) 18, 2 (D) none of these

6. At what angle should the two forces 2P and $\sqrt{2}$ P act so that the resultant force is P $\sqrt{10}$
(A) 45° (B) 60° (C) 90° (D) 120°

7. Two billiard balls are rolling on a flat table. One has velocity component v_x = 1 m/sec, v_y = $\sqrt{3}$ m/s and the other has components v_x' = 2 m/s, v_y' = 2 m/s along two perpendicular direction. If both the balls start moving form same point, then angle between their path is
(A) 60° (B) 45° (C) 22.5° (D) 15°

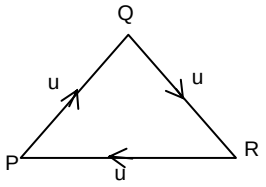
8. A particle undergoes three successive displacements given by $\vec{s}_1$ = $\sqrt{2}$ m North-East $\vec{s}_2$ = 2m due south and $\vec{s}_3$ = 4m, 30^0 north of west, then magnitude of net displacement.
(A) $\sqrt{14+4\sqrt{3}}$ (B) $\sqrt{14-4\sqrt{3}}$ (C) $\sqrt{14}$ (D) none of these

9. A particle is projected horizontally in air at a height of 25 m from the ground with a speed of 10 m/s. The speed of the particle after 2 seconds will be
(A) 10 m/s (B) 22.4 m/s (C) 25 m/s (D) 28.4 m/s

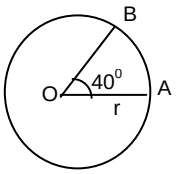
10. A ball is projected from ground with a speed of 20 m/s at an angle of 45^o with horizontal. There is a wall of 25 m height at a distance of 10 m from the projection point. The ball will hit the wall at a height of
(A) 5 m (B) 7.5 m (C) 10 m (D) 12.5 m

11. A river 500 m wide is flowing with 5 m/s. A swimmer, whose velocity in still water 4 m/s swims at an angle of 60^0 with normal to the river. The time taken by the swimmer to reach the opposite bank is
(A) 125 sec. (B) $\frac{500}{3}$ sec.
(C) 250 sec. (D) 100 sec.

12. Three persons P, Q and R of same mass travel with same speed u along an equilateral triangle of side 'd' such that each one faces the other always. After how much time will they meet each other :
(A) d/ u seconds (B) 2d/3u seconds
(C) 2d / $\sqrt{3}$ u seconds (D) d/ $\sqrt{3}$ u seconds



13. A person is moving in a circle of radius r with constant speed v. The change in velocity in moving from A to B is
(A) 2v cos 40^0 (B) 2v sin 40^0
(C) 2v cos 20^0 (D) 2v sin 20^0



14. Two particles of same mass are projected from same place with same velocity u, such that their ranges are same. If h_1 and h_2 are the maximum heights attained by them, then the relation between h_1, h_2 and R is
(A) $R = h_1h_2$ (B) $R^2 = 16\ h_1h_2$ (C) $R^2 = h_1 / h_2$ (d) $R^2 = h_1^2 / h_2^2$

15. A body is projected with velocity v_0 at an angle of projection θ. The radius of curvature of trajectory at the point of projection is
(A) $\frac{v_0^2 \sin^2\theta}{g}$ (B) $\frac{v_0^2 \cos^2\theta}{g}$ (C) $\frac{v_0^2}{g\sin\theta}$ (D) $\frac{v_0^2}{g\cos\theta}$

16. The distance travelled by a body and the time 't' are related by $x = 4 - 3t + 2t^2$. The average velocity in a time interval of 1 to 4 sec is
(A) 7 m/s (B) 10 m/s (C) 15 m/s (D) none of these

17. In the last second of its free ball a body covers ¾ of its total path. The ball falls from a height of
(A) 200 m (B) 100 m (C) 10 m (D) 20 m

18. A stone is dropped from a balloon ascending with velocity 2 m/s from a height of 20 m. The time of flight of the stone is
(A) 1 sec. (B) 2 sec. (C) 4 sec. (D) data insufficient

19. A body moving with a uniform acceleration has velocities of u and v when passing through points A and B in its path. The velocity of the body midway between A and B is
(A) $\frac{u+v}{2}$ (B) $\sqrt{\frac{u^2+v^2}{2}}$ (C) $\sqrt{uv}$ (D) None of these

20. The relative velocity of a car 'A' with respect to car B is $30\sqrt{2}$ m/s due North-East. The velocity of car 'B' is 20 m/s due south. The relative velocity of car 'C' with respect to car 'A' is $10\sqrt{2}$ m/s due North-West. The speed of car C and the direction (in terms of angle it makes with the east).
(A) $20\sqrt{2}$ m/s, 45° (B) $20\sqrt{2}$ m/s, 135° (C) $10\sqrt{2}$ m/s, 45° (D) $10\sqrt{2}$ m/s, 135°

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