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Questions:

5 Marks

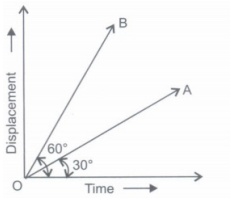
1. Obtain equations of motion for constant acceleration using method of calculus.

3 Marks

2. A man walks on a straight road from his home to a market 2.5 km away with a speed of 5 km h^{-1}. Finding the market closed, he instantly turns and walks back home with a speed of 7.5 km h^{-1}. What is the
   (a) magnitude of average velocity, and
   (b) average speed of the man over the interval of time (i) 0 to 30 min, (ii) 0 to 50 min, (iii) 0 to 40 min ? [Note: You will appreciate from this exercise why it is better to define average speed as total path length divided by time, and not as magnitude of average velocity. You would not like to tell the tired man on his return home that his average speed was zero !]
3. The minute hand of a wall clock is 10 em long. Find its displacement and the distance covered from 12.00 noon to 12.30 p.m.
4. Give three important characteristics of displacement.

2 Marks

5. A bus starting from rest moves with a uniform acceleration of 0.1 m / s^2 for 2 min. Find the
   (i) the speed acquired
   (ii) the distance travelled.
6. A drunkard walking in a narrow lane takes 5 steps forward and 3 steps backward, followed again by 5 steps forward and 3 steps backward, and so on. Each step is 1 m long and requires 1 s. Plot the x-t graph of his motion. Determine graphically and otherwise how long the drunkard takes to fall in a pit 13 m away from the start.
7. Define displacement of a particle.
8. A ball dropped from height h reaches the ground in t s. After what time the ball was passing through a point at a height h/2?
9. Is it possible to have negative value in speed and displacement?
10. 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.



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

Multiple Choice Question

11. A car moves towards for 2 seconds at a speed of 4 m/s and then towards West at a speed of 1 m/s for 6 seconds. Its average speed is:
    (a) 7/4 m/s (b) 4/7 m/s (c) 7/2 m/s (d) 5/2 m/s
12. Distance moved by a freely falling body in the 6th second is
    (a) 6m (b) 60m (c) 65m (d) None
13. A body is dropped from a height of 10m above the ground. The velocity gained by the body on reaching the ground
    (a) 14m/s (b) 10m/s (c) 5 m/s (d) 20 m/s
14. Area under velocity time graph is
    (a) Displacement (b) Velocity (c) Acceleration (d) None
15. Velocity - time graph of a body moving with uniform acceleration is
    (a) Parabola (b) Straight line parallel to time axis (c) Straight line inclined to both the axis (d) None
16. A car travels from A to B at a speed 'v' and comes back to A at a speed 60 kmph. If the average speed of the car is 48 kmph. 'v' is:
    (a) 40 kmph (b) 50 kmph (c) 45 kmph (d) None
17. The distance travelled by a body is directly proportional to the sq uare of the time taken. Its acceleration
    (a) increases (b) decreases (c) becomes zero (d) remains constant
18. A stone is thrown with an initial speed of 4.9 m/s from a bridge in vertically upward direction. It falls down in water after 2 seconds. The height of the bridge is
    (a) 4.9 m (b) 9.8 m (c) 19.8 m (d) 24.7 m
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'.