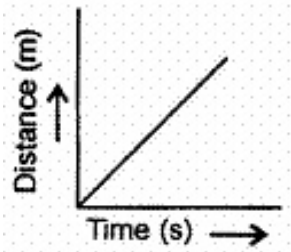
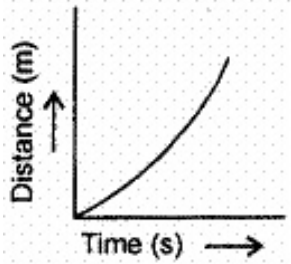
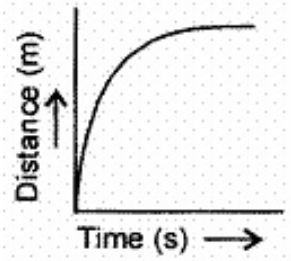
CBSE Test Paper 02

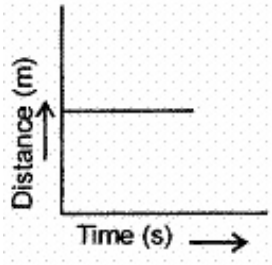
Chapter 08 Motion

1. Which of the following figures represent uniform motion of moving object correctly? **(1)**

a. 

b. 

c. 

d. 

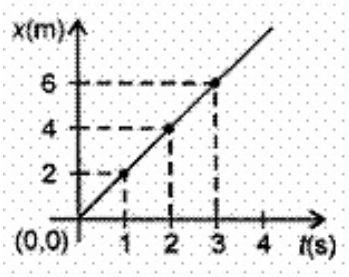
2. Which of the statement is true? **(1)**
   Statement A: A curved line in a speed-time graph means non-uniform motion.
   Statement B : A curved line in a velocity-time graph means uniform acceleration

   a. Statement A is false, B is true
   b. Both the statement A and B are true
   c. Neither statement A nor Statement B is true.
   d. Statement A is true, B is false

3. A body moving in a circle of radius r, covers $3/4^{th}$ of the circle. The ratio of the distance to displacement is **(1)**

   a. $3 : 2\sqrt{2}$
   b. $3\pi : 2\sqrt{2}$
   c. $3\sqrt{2} : 2\pi$
   d. $2\sqrt{2}: 3\pi$

4. The slope of the x-t graph is a measure of **(1)**



   a. velocity = $2ms^{-1}$
   b. acceleration = $2ms^{-2}$
   c. acceleration = $\frac{1}{2} ms^{-2}$
   d. velocity = $\frac{1}{2} ms^{-2}$

5. If a body starts from rest, what can be said about the acceleration of body? **(1)**

   a. Uniform accelerated
   b. Positively accelerated
   c. Negative accelerated
   d. Non-Uniform accelerated

6. The reference point from which the distance of a body is measured is called? **(1)**

7. How does the path of an object look graphically when it is in uniform motion? **(1)**

8. Which of the following is true for displacement? **(1)**
   a. It cannot be zero.
   b. Its magnitude is greater than the distance travelled by the object.

9. What is the quantity which is measured by the area occupied below the velocity-time

graph? **(1)**

10. Define one radian. **(1)**

11. The velocity of a body in motion is recorded every second as shown-

time (s)	0	1	2	3	4	5	6	7	8	9	10
velocity (m/s)	60	54	48	42	36	30	24	18	12	6	

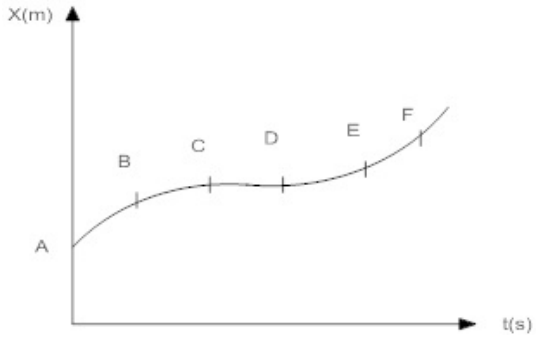
Calculate the - **(3)**

a. acceleration
b. distance travelled and draw the graph.

12. An athlete completes one round of the circular track of diameter 200 m in 40 *s*. What will be the distance covered and the displacement at the end of 2 minutes 20 s? **(3)**

13. The velocity of a car is 18 ms^{-1}. Express this velocity in kmh^{-1}. **(3)**

14. The displacement - time graph for a body is given below. State whether the velocity and acceleration of the body in the region BC, CD, DE and EF are positive, negative or zero. **(5)**



15. Two stones are thrown vertically upwards simultaneously with their initial velocities u_1 and u_2 respectively. Prove that the heights reached by them would be in the ratio of u_1^2: u_2^2 (Assume upward acceleration is -g and downward acceleration to be +g). **(5)**

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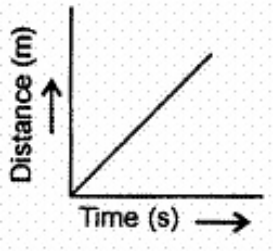
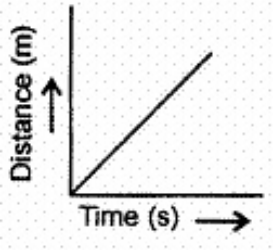
Chapter 08 Motion

Answer

1. a. 

Explanation: Uniform motion of a moving object



2. d. Statement A is true, B is false

Explanation: When the speed of a body changes in an irregular manner, the speed-time graph of the body is a curved line. The distance traveled by the body is given by the area between the speed-time curve and the time axis. For uniform speed graph is straight line. For non-uniform speed graph is curved line. For Increasing speed graph Straight line sloping upwards. For decreasing speed graph Straight line sloping downwards.

When velocity – time graph is plotted for an object moving with uniform acceleration, the slope of the graph is a straight line.

So, statement A is true and B is false.

3. b. $3\pi : 2\sqrt{2}$

Explanation: r' = $r\sqrt{2}$ displacement

distance = $\frac{3\pi r}{2}$

ratio = $\frac{\frac{3\pi r}{2}}{r\sqrt{2}}$

ratio = 3π : 2√2

4. a. velocity = $2ms^{-1}$

   Explanation: The position-time graph is used in physics to describe the motion of an object over a period of time. Time, in seconds, is conventionally plotted on the x-axis and the position of the object, measured in meters, is plotted along the y-axis. The slope of the position-time graph reveals important information about the velocity of the object.

5. b. Positively accelerated

   Explanation: If a body starts from rest, it starts moving. that means the change in velocity is positive. That means there is a POSITIVE acceleration.

6. The reference point from which the distance of a body is measured is called origin.

7. Ans. Graphically the path of an object will be linear i.e. look like a straight line when it is in uniform motion.

8. Both (a) and (b) are false with respect to concept of displacement.

9. The area occupied below the velocity-time graph measures the distance covered by any object.

10. It is the angle which is subtended at the centre by an arc having a length equal to the radius of the circle.

11. a. Acceleration =slope of the velocity time graph

    a = $\frac{V_2 - V_1}{t_2 - t_1}$

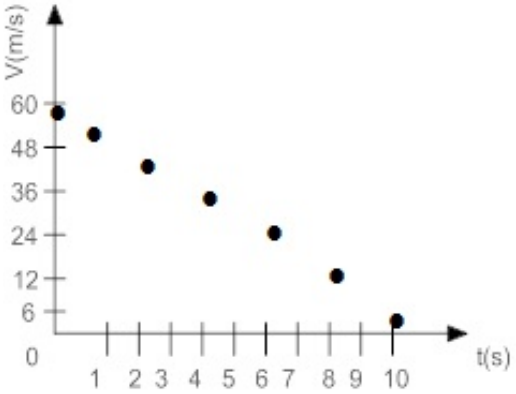
    $a = \frac{54-24}{1-6} = \frac{30}{-5} = -6m/s^2$

    b. Distance = $S = ut + \frac{1}{2}at^2$

    $= 60 \times 10 + \frac{1}{2}(-6) \times (10)^2$

    = 600-300 = 300m

    c.



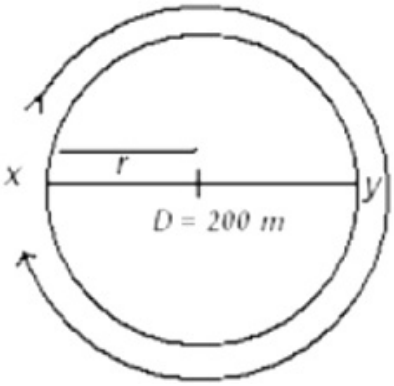
12. circumference of circular track = $2\pi r$

    = 2 × 22 / 7 × diameter / 2

    = 2 × 22 × 7 × 200 / 2 = 4400/7 m

    rounds completed by athlete in 2min20sec = s= 140/40 = 3.5

    therefore, total distance covered = 400 / 7 × 3.5 = 2200 m



    Since one complete round of circular track needs 40s so he will complete 3 rounds in 2mins and in next 20s he can complete half round therefore displacement = diameter = 200m.

13. Velocity = $\frac{\frac{18}{1000}}{\frac{1}{3600}} = 64.8\ kmh^{-1}$

14. i. For AB, the curve is upward i.e. slope is increasing, therefore velocity is positive and remains same. So, V = +ve but a=0
    ii. For BC, curve still has +ve slope so, V = +ve but velocity is decreasing wrt time, therefore, a = negative
    iii. For CD, both velocity and acceleration are zero because there is no slope.
    iv. For DE, velocity v is increasing wrt time, so acceleration is +ve.
    v. For EF, velocity is +ve (positive slope of x-t graph) but acceleration is zero because velocity remains same with time.

	AB	BC	CD	DE	EF
V	+ ve	+ ve	0	+ ve	+ ve
a	0	- ve	0	+ ve	0

15. By using velocity- distance equation, $v^2 - u^2 = 2aS$.

For upward motion, acceleration due to gravity, a= -g m/s^2.

Let the height attained by object ='h'

Therefore, We have, $v^2 = u^2 - 2gh$ or $h = \frac{u^2 - v^2}{2g}$ ..... (1)

But at highest point v = 0

Therefore, equation (1) become; $h = \frac{u^2}{2g}$

Now, For first ball,Height attained, $h_1 = \frac{u_1^2}{2g}$ .....(2)

Similarly, For second ball, Height attained, $h_2 = \frac{u_2^2}{2g}$ ..... (3)

Dividing equation, (2) by (3), we get.

$\frac{h_1}{h_2} = \frac{u_1^2/2g}{u_2^2/2g} = \frac{u_1^2}{u_2^2}$ or $h_1 : h_2 = u_1^2 : u_2^2$; Hence proved.