

of assertion

ONE MARK TYPE QUESTIONS

6. The speed of a particle is constant. Will it have acceleration? Justify with an example

Ans:- *If speed of particle is constant then the particle may have acceleration or not. If direction of the particle changes with constant speed then there is acceleration, and if direction doesn't change there is no acceleration.*

7. A particle moves in a circle of diameter 10m. The distance covered by it in 2 complete revolutions is

Ans:- $2 \times 2\pi r = 20\pi$

TWO MARKS TYPE QUESTIONS

8. A cyclist goes around a circular track once every 2 minutes. If the radius of the circular track is 105 metre, calculate his speed. (Given $\pi=22/7$)

ANS:-Given :-

Radius , $r = 105 \text{ m}$

time, $t = 2 \text{ min} = 120 \text{ second}$

Circumference or distance of circle = $2\pi r \Rightarrow 2 \times 22/7 \times 105 \Rightarrow 660 \text{ m}$

$\therefore \text{speed} = \text{distance} / \text{time} \Rightarrow 660 \text{ m} / 120 \Rightarrow 5.5 \text{ m/s}$

9. A body is thrown vertically upwards with a velocity u , the greatest height h to which it will rise is:

Ans:- *The body that is thrown vertically upward with velocity u will have final velocity $v=0$ at the greatest height h .*

Substituting the given values in the third equation of motion,

$$v^2 = u^2 + 2as$$

we have $0 = u^2 - 2gh$. (taking g in the upward direction)

or $h = u^2 / 2g$.

THREE MARKS TYPE QUESTIONS

10. i. Name a physical quantity which (a) varies (b) remains constant, when a body moves in a uniform circular motion.

ii. Is a satellite moving around the earth in a circular orbit accelerated? Explain

Ans:- *i. (a) Velocity (b) Speed*

ii. Yes, because the direction of velocity of satellite is changing.

11. Write equations of motion for a body starting from rest and moving with constant acceleration.

Ans:- 1. $v = at$

2. $s = \frac{1}{2}at^2$

3. $v^2 = 2as$

12. A body is projected in vertically upwards direction with a speed u . Find the (a) time taken (b) distance travelled by the body in reaching its topmost point

Ans:- (a) Applying $v = u + at$

$$0 = u - gt$$

$$t = u/g$$

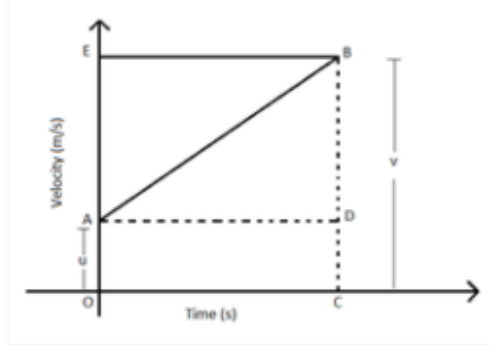
(b) $v^2 - u^2 = 2as$

$$0^2 - u^2 = 2(-g)s$$

$$s = u^2/2g$$

FIVE MARKS TYPE QUESTIONS

13. Derive second equation of motion by graphical method



Velocity – Time Graph

A body starts with some initial non-zero velocity at A and goes to B with constant acceleration a

Area under the graph gives Displacement = A(ΔABD)+A(□OADC)=($\frac{1}{2}$ AD×BD)+OA×OC(eq 1)

OA = u , OC = t and BD = at

Substituting in (eq 1) we get $s = ut + \frac{1}{2}at^2$

PREVIOUS YEAR BOARD QUESTIONS

14. An artificial satellite is moving in a circular orbit of radius 36,000km. Calculate its speed if it takes 24 hours to revolve around the earth (CBSE 2012)

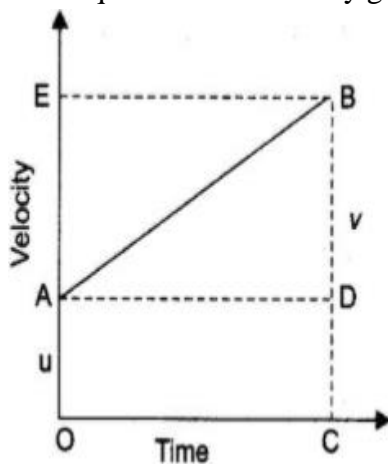
Ans:-

$r = 36,000 \text{ km}$

$t = 24 \text{ hr}$

Here $v = 2\pi r/t = 2 \times 3.14 \times 36,000/24 = 9420 \text{ km/hr}$

15. Derive third equation of motion by graphical method (CBSE 2010)



$$\therefore s = \frac{(OA + BC) \times OC}{2}$$

$$\therefore OA = u, BC = v \text{ and } OC = t.$$

$$\therefore s = \frac{(u + v)t}{2} \quad \dots(1)$$

Slope $t = \frac{v - u}{a}$ from the graph $\dots(2)$

Substitute value of 't' in (1)

$$\therefore s = \frac{u + v}{2} \times \frac{(v - u)}{a}$$

$$s = \frac{v^2 - u^2}{2a}$$

$$\therefore v^2 - u^2 = 2as$$