| Class: IX | Department: SCIENCE 2020-2021 SUBJECT-PHYSICS |  | Date of submission: $02.11 .2020$ |
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| Worksheet <br> No:4 | Topic: MOTION-PART2 |  | Note: <br> A4 FILE FORMAT [PORTFOLIO] |
| NAME OF THE STUDENT |  | CLASS \& SEC: | ROLL NO. |

## OBJECTIVE TYPE QUESTIONS

1. Suppose a boy is enjoying a ride on a merry-go-round which is moving with a constant speed of $10 \mathrm{~ms}^{-1}$ It implies that the boy is
(a) at rest
(b) moving with no acceleration
(c) in accelerated motion
(d) moving with uniform velocity

Ans:- (c) in accelerated motion
2. According to the given velocity-time graph, the object

(a) is moving with uniform velocity
(b) has some initial velocity
(c) is moving uniformly with some initial velocity
(d) is at rest

Ans:- (b) has some initial velocity
3. When a car driver travelling at a speed of $10 \mathrm{~m} / \mathrm{s}$ applies brakes and brings the car to rest in 20 s , then the retardation will be:
(a) $+2 \mathrm{~m} / \mathrm{s}^{2}$
(b) $-2 \mathrm{~m} / \mathrm{s}^{2}$
(c) $-0.5 \mathrm{~m} / \mathrm{s}^{2}$
(d) $+0.5 \mathrm{~m} / \mathrm{s}^{2}$

## Ans:- (c) $-0.5 \mathrm{~m} / \mathrm{s}^{2}$

## ASSERTION AND REASONING

4. Assertion: Uniform circular motion is accelerated motion

Reason: The accelerated motion of an object may be due to change in magnitude of velocity or direction or both of them.
Ans: (a) Both assertion and reason are true and reason is the correct explanation of assertion
5. Assertion : An object may acquire acceleration even if it is moving at a constant speed.
Reason : With change in the direction of motion, an object can acquire acceleration.
Ans: (a) Both assertion and reason are true and reason is the correct explanation

## 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 changes there is no acceleration.
7. A particle moves in a circle of diameter 10 m . 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, $r=105 \mathrm{~m}$
time, $t=2$ min $=120$ second
Circumference or distance of circle $=2 \pi r \Rightarrow 2 \times 22 / 7 \times 105 \Rightarrow 660 \mathrm{~m}$ $\therefore$ speed $=$ distance $/$ time $\Rightarrow 660 \mathrm{~m} / 120 \Rightarrow 5.5 \mathrm{~m} / \mathrm{s}$
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 $\boldsymbol{h}$.
Substituting the given values in the third equation of motion,
$v^{2}=u^{2}+2 a s$
we have $0=u^{2}-2 g h$. (taking $g$ in the upward direction)
or $h=u^{2} / 2 g$.

## 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. $v=a t$
2. $s=\frac{1}{2} a t^{2}$
$3 v^{2}=2 a s$
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

$$
\begin{aligned}
\text { Ans:- (a) Applying } \begin{aligned}
v & =u+a t \\
0 & =u-g t \\
t & =u / g
\end{aligned}, ~
\end{aligned}
$$

$$
\text { (b) } v^{2}-u^{2}=2 a s
$$

$$
\begin{aligned}
& 0^{2}-u^{2}=2(-g) s \\
& s=u^{2} / 2 g
\end{aligned}
$$

## 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 $=A(\triangle A B D)+A(\square O A D C)=\left(\frac{1}{2} A D \times B D\right)+O A \times O C$ $\qquad$ (eq 1)
$\mathrm{OA}=\mathrm{u}, \mathrm{OC}=\mathrm{t}$ and $\mathrm{BD}=\mathrm{at}$
Substituting in (eq 1) we get $\mathrm{s}=u t+\frac{1}{2} a t^{2}$

## PREVIOUS YEAR BOARD QUESTIONS

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

$$
\begin{aligned}
& \text { Ans:- } \\
& r=36,000 \mathrm{~km} \\
& t=24 \mathrm{hr} \\
& \text { Here } v=2 \pi r / t=2 \times 3.14 \times 36,000 / 24=9420 \mathrm{~km} / \mathrm{hr}
\end{aligned}
$$

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

