SEMESTER-ONE

PHYSICS

Grade–11

WORKSHEET — 2

Student Name: ..... **Date: .....**

Period–I : Topic 1

MOTION IN TWO DIMENSIONS

I. Multiple Choice Questions

Select and write one most appropriate option out of the four options given for each of the questions 1–5.

1. A body of mass 0.5 kg is projected under gravity with a speed of 98 m/s at an angle of 30° with the horizontal. The change in momentum (in magnitude) of the body is

(*a*) 24.5 N–s (*b*) 49.0 N–s

(*c*) 98.0 N–s (*d*) 50.0 N–s

2. Two equal masses (m) are projected at the same angle (θ) from two points separated by their range with equal velocities (v). The momentum at the point of their collision is

(*a*) Zero (*b*) $2\ mv\ \cos\ \theta$

(*c*) $-2\ mv\ \cos\ \theta$ (*d*) None of these

3. A body is projected from the ground with some angle to the horizontal. What happens to the angular momentum about the initial position in this motion

(*a*) Decreases

(*b*) Increases

(*c*) Remains same

(*d*) First increases and then decreases

4. A body is thrown with a velocity of 9.8 m/s making an angle of 30° with the horizontal. It will hit the ground after a time

(*a*) 1.5 s (*b*) 1 s

(*c*) 3 s (*d*) 2s

5. A ball is projected upwards from the top of tower with a velocity 50 ms^{-1} making angle 30° with the horizontal. The height of the tower is 70 m. After how many seconds from the instant of throwing will the ball reach the ground

(*a*) 2.33 sec (*b*) 5.33 sec

(*c*) 6.33 sec (*d*) 9.33 sec

II. Fill in the Blanks Type Questions

Fill in the blanks with a suitable word for each of the questions 6–10.

6. A particle of mass 100 g is fired with a velocity 20 m sec^{-1} making an angle of 30° with the horizontal. When it rises to the highest point of its path then the change in its momentum is _____ .

7. A particle of mass *m* is projected with velocity *v* making an angle of 45° with the horizontal. The magnitude of the angular momentum of the particle about the point of projection when the particle is at its maximum height is _____ .

8. In case of a projectile, where is the angular momentum minimum _____ .

9. A particle is projected from a point *O* with a velocity u in a direction making an angle α upward with the horizontal. After some time at point *P* it is moving at right angle with its initial direction of projection. The time of flight from *O* to *P* is _____ .

10. If for a given angle of projection, the horizontal range is doubled, the time of flight becomes _____ .

III. True or False

State whether the following statements are true or false for each of the questions 11–15.

11. A vector which gives the position of a point with reference to the origin of the co-ordinate system is called position vector.

12. Two vectors are said to be equal if they have the same magnitude and same direction.

13. Zero vector or null vector is a vector which has zero magnitude and an arbitrary direction. It is represented by $\vec{0}$.

14. The process of adding two or more than two vectors is called 'addition or composition of vectors'.

15. According to distributive law of vector addition is $\lambda(\vec{a} + \vec{b}) = \lambda\vec{a} + \lambda\vec{b}$.

IV. Very Short Answer Type Questions

Answer each of the questions 16–20.

16. The path followed by a body projected along y-axis is given as by $y = \sqrt{3}x - (1/2)x^2$, if g = 10 m/s, then find the initial velocity of projectile.

17. A body is thrown at angle 30° to the horizontal with the velocity of 30 m/s. After 1 sec, what will be the velocity of the body?

18. The equation of projectile is $y = 16x - \frac{5x^2}{4}$. Find the horizontal range.

19. A body of mass 2 kg has an initial velocity of 3 m/s along *OE* and it is subjected to a force of 4 Newton's in *OF* direction perpendicular to *OE*. Find the distance of the body from *O* after 4 seconds.

20. A projectile is fired with velocity u making angle θ with the horizontal. What is the change in velocity when it is at the highest point?

V. Short Answer Type Questions

Answer each of the questions 21–25.

21. A particle of mass 100 g is fired with a velocity 20 m sec^{-1} making an angle of 30° with the horizontal. When it rises to the highest point of its path then what is the momentum?

22. In case of a projectile, where is the angular momentum minimum.

23. Two vectors acting in opposite directions have a resultant of 10 units. If they act at right angles to each other, the resultant is 50 units. Calculate the magnitudes of the two vectors.

24. The friction of the air causes vertical retardation equal to one tenth of the acceleration due to gravity (Take g = 10 ms^{-2}). How much time of flight will be decreased?

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25. Which sector of sets of factors will affect the horizontal distance covered by an athlete in a long-jump event?

Teacher's Signature .....