SIR CV RAMAN COACHING CENTRE – IDAPPADI,SALEM

XL PHYSICS – UNIT – 2 – IMPORTANT PROBLEM QUESTIONS -2025

PREPARED BY ,Dr,G.THIRUMOORTHI,M.Sc,B.Ed,Ph.D ,PHYSICS

thiruphysics1994 @gmail.com ,

8610560810,8883610465

XI

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1. An object of mass m has angular acceleration $\alpha = 0\ 2$ *rad s*-2 What is the angular displacement covered by the object after 3 second? (Assume that the object started with angle zero with zero angular velocity).

2. The Moon is orbiting the Earth approximately once in 27 days, what is the angle trans versed by the Moon per day?

3. If an object is thrown horizontally with an initial speed 10 m /s from the top

4. of a building of height 100 m. what is the horizontal distance covered by the particle?

5. A foot-ball player hits the ball with speed 20 m s-1 with angle 30° with respect to horizontal direction as shown in the figure. The goal post is at distance of 40 m from him. Find out whether ball reaches the goal post?


6.
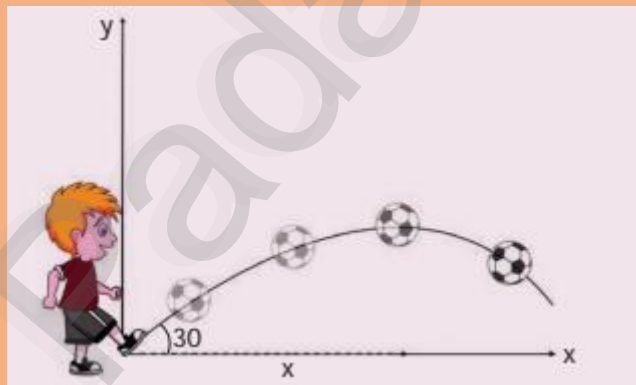
7. A object is thrown with initial speed 5 m s-1 with an angle of projection 30°. What is the height and range reached by the particle?

8. If Earth completes one revolution in 24 hours, what is the angular displacement made by Earth in one hour. Express your answer in both radian and degree.

9. Calculate the area of the triangle for which two of its sides are given by the vectors $\vec{A} = 5\hat{i} - 3\hat{j}, \vec{B} = 4\hat{i} + 6\hat{j}$

10. Compare the components for the following vector equations

a) $T\hat{j} - mg\hat{j} = ma\hat{j}$ b) $\vec{T} + \vec{F} = \vec{A} + \vec{B}$

c) $\vec{T} - \vec{F} = \vec{A} - \vec{B}$ d) $T\hat{j} + mg\hat{j} = ma\hat{j}$

11.

12. A water fountain on the ground sprinkles water all around it. If the speed of the water coming out of the fountain is v. Calculate the total area around the fountain that gets wet.

13. The following graphs represent velocity – time graph. Identify what kind of motion a particle undergoes in each graph

(a)   (b)   (c)   (d)
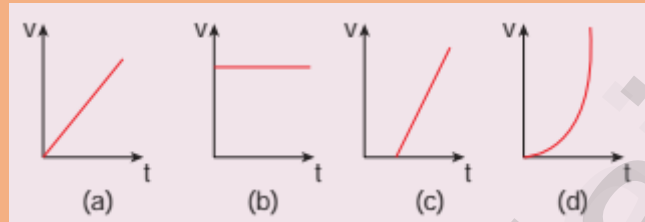
14.

15. The position vectors particle has length 1m and makes 30o with the x-axis. What are the lengths of the x and y components of the position vector

16. What are the resultants of the vector product of two given vectors given by

$\vec{A} = 4\hat{i} - 2\hat{j} + \hat{k}$ and $\vec{B} = 5\hat{i} + 3\hat{j} - 4\hat{k}$?

17.

18. A particle moves in a circle of radius 10 m. Its linear speed is given by $v\, t = 3$ where t is in second and v is in m s-1 (a) Find the centripetal and tangential acceleration at t = 2 s. (b) Calculate the angle between the resultant acceleration and the radius vector

19. Calculate the angle q subtended by the two adjacent wooden spokes of a bullock cart wheel is shown in the figure. Express the angle in both radian and degree

20.

21. 15.A train was moving at the rate of 54 km h-1 when brakes were applied. It came to rest within a distance of 225 m. Calculate the retardation produced in the train.

22. 16. An iron ball and a feather are both falling from a height of 10 m. a) What are the time taken by the iron ball and feather to reach the ground? b) What are the velocities of iron ball and feather when they reach the ground? (Ignore air resistance and take g= 10 m s-2)

23. 17. An object is thrown vertically downward. What is the acceleration experienced by the object?

24. 18. A swimmer's speed in the direction of flow of a river is 12 km h-1. Against the direction of flow of the river the swimmer's speed is 6 km h-1. Calculate the swimmer's speed in still water and the velocity of the river flow.

25. 19.Consider two trains A and B moving along parallel tracks with the same velocity in the same direction. Let the velocity of each train be 50 km h-1 due east. Calculate the relative velocities of the trains.

26. 20.suppose two cars A and B are moving with uniform velocities with respect to ground along parallel tracks and in the same direction. Let the velocities of A and B be 35 km h-1 due east and 40 km h-1 due east respectively. What is the relative velocity of car B with respect to A?
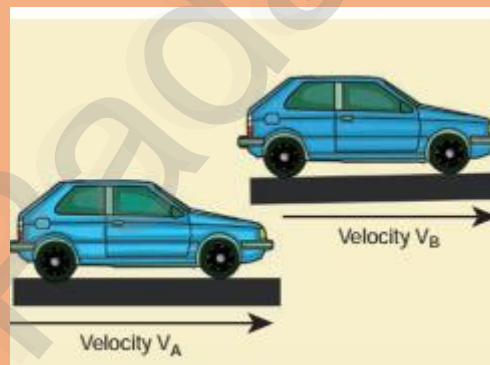
27.

28. 21. A particle moves along the *x-axis* in such a way that its coordinates *x* varies with time 't' according to the equation $x = 2 - 5t + 6t^2$. What is the initial velocity of the particle?

29. 22. Consider two masses of 10 g and 1 kg moving with the same speed 10 m/ s. Calculate the magnitude of the momentum

30. 23.The velocity of three particles A, B, C are given below. Which particle travels at the greatest speed?

31. $$\overline{v_A} = 3\hat{i} - 5\hat{j} + 2\hat{k}$$
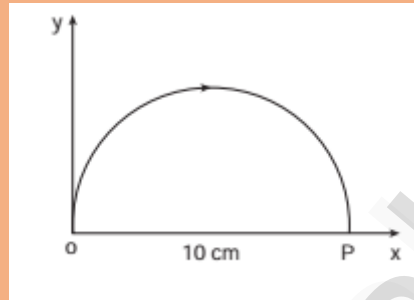$$\overline{v_B} = \hat{i} + 2\hat{j} + 3\hat{k}$$
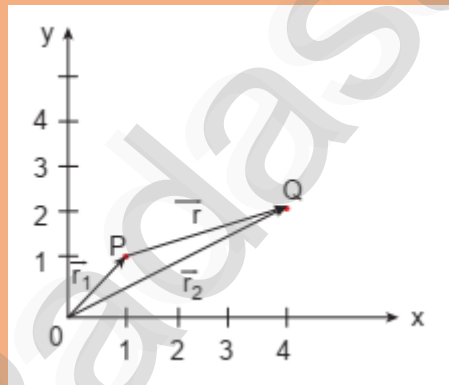$$\overline{v_C} = 5\hat{i} + 3\hat{j} + 4\hat{k}$$

32. 24.Consider an object travelling in a semicircular path from point O to point P in 5 second, as shown in the Figure given below. Calculate the average velocity

33. and average speed.

34.

35. 25.Calculate the displacement vector for a particle moving from a point P to Q as shown below. Calculate the magnitude of displacement.

36.

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