QB365 Student Learing Managemnet System
Exam Name: Kinematics - Practice
Std: 11th Standard - Physics
Chapter: Kinematics

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Questions:

5 Marks

1. Explain in detail the triangle law of addition.
2. Discuss the properties of scalar and vector products.
3. Derive the equation of motion, range and maximum height reached by the particle thrown at an oblique angle θ with respect to the horizontal direction.
4. Derive the expression for centripetal acceleration.
5. Derive the kinematic equations of motion for constant acceleration.

3 Marks

6. Define displacement and distance.
7. Define velocity and speed
8. What is the difference between velocity and average velocity
9. Define angular displacement and angular velocity.
10. Write down the kinematic equations for angular motion.
11. Convert the vector $\vec{r} = 3\hat{i} + 2\hat{j}$ into a unit vector.
12. 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.
13. The Moon is orbiting the Earth approximately once in 27 days, what is the angle traversed by the Moon per day?
14. An object of mass m has angular acceleration = 0.2 α rads^{-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 Marks

15. Explain what is meant by Cartesian coordinate system?
16. Define a vector. Give examples.
17. Define a scalar. Give examples
18. Define acceleration.
19. What is non uniform circular motion?
20. What are the resultants of the vector product of two given vectors given by $\overrightarrow{A} = 4\hat{i} - 2\hat{j} + \hat{k}\ and\ \overrightarrow{B} = 5\hat{i} + 3\hat{j} - 4\hat{k}$
21. An object at an angle such that the horizontal range is 4 times of the maximum height. What is the angle of projection of the object?
22. 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.
23. If an object is thrown horizontally with an initial speed 10ms^{-1} from the top of a building of height 100 m. What is the horizontal distance covered by the particle?
24. Two vectors are given as $\vec{r} = 2\hat{i} + 3\hat{j} + 5\hat{k}$ and $\vec{F} = 3\hat{i} - 2\hat{j} + 4\hat{k}$. Find the resultant vector $\vec{\tau} = \vec{r} \times \vec{F}$.
25. A person initially at rest starts to walk 2 m towards north, then 1 m towards east, then 5 m towards south and then 3 m towards west. What is the position vector of the person at the end of the trip?
26. Assume your school is located 2 km away from your home. In the morning you are going to school and in the evening you come back home. In this entire trip what is the distance travelled and the displacement covered?
27. An athlete covers 3 rounds on a circular track of radius 50 m. Calculate the total distance and displacement travelled by him.
28. Consider two masses of 10 g and 1 kg moving with the same speed 10 ms^{-1}. Calculate the magnitude of the momentum.
29. A object is thrown with initial speed 5 ms^{-1} with an angle of projection 30°. What is the height and range reached by the particle?