

SRI KRISHNA MATRIC HR.SEC SCHOOL, ODDANCHATRAM

I - 50 % EXAMINATION 2023 - 2024

STD: XI
SUB: PHYSICSMARKS: 70
TIME: 3.00 HRS

PART-I

I.Choose the correct answer:

15X1=15

1. If the value of atmospheric pressure is 10^6 dyne cm^{-2} , its value in SI units is
a) 10^4 N m^{-2} b) 10^6 N m^{-2} c) 10^5 N m^{-2} d) 10^3 N m^{-2}
2. The sum of the numbers 436.32, 227.2 and 0.301 in appropriate significant figure is
a) 663.821 b) 664 c) 663.8 d) 663.82
3. The horizontal range of a projectile is maximum when the angle of projection is
a) 0° b) 30° c) 45° d) 60°
4. A particle initially at rest performs circular motion with uniform angular acceleration 0.2 rad s^{-2} . What speed will it attain in 5 seconds?
a) 2.5 rad s^{-1} b) 1 rad s^{-1} c) 2 rad s^{-1} d) 1.5 rad s^{-1}
5. Two masses 2 kg and 3 kg are attached to the end of the string passed over a pulley fixed at the top. The tension and acceleration are
a) $7g/8, g/8$ b) $21g/8, g/8$ c) $21g/8, g/5$ d) $12g/5, g/5$
6. The impulse of an object of mass 10 Kg moving with a speed of 15 m s^{-1} hits the wall and comes rest within 10 seconds.
a) 15 N s b) 1.5 N s c) 1500 N s d) 150 N s
7. The centrifugal force appears to exist
a) only in inertial frames b) only in rotating frames
c) in any accelerated frame d) both in inertial and non-inertial frames
8. How many Ergs are there in 1 Joule?
a) 10 b) 10^4 c) 10^7 d) 10^9
9. If the linear momentum of a moving object changes by two times, then its kinetic energy will change by a factor of
a) 2 b) 4 c) 6 d) 8
10. If the angle between the force and displacement is 180° , then work done by the force is
a) Negative, maximum b) Zero
c) Positive, maximum d) Positive
11. The radius of gyration of a uniform rod of length L about an axis passing through its centre of mass is
a) $L/2\sqrt{3}$ b) $L^2/12$ c) $L/\sqrt{3}$ d) $L/\sqrt{2}$
12. A dancer is spinning on a rotating table with his arms extended, if he folds his arms then

the angular velocity will:

- a) Increase b) Decrease c) Remain unchanged d) none of these

13. In case of pure rolling the velocity of point of contact with respect to the ground will be

- a) $2V_{cm}$ b) V_{cm} c) zero d) $-2V_{cm}$

14. If the distance between the Earth and Sun were to be doubled from its present value, the number of days in a year would be

- a) 64.5 b) 1032 c) 182.5 d) 730

15. If the acceleration due to gravity becomes 4 times its original value, then escape speed

- a) remains same b) 2 times of original value
c) becomes halved d) 4 times of original value

PART-II

II. Answer any six of the following questions. Qn.No.24 is compulsory:

6X2=12

16. State Newton's Universal law of gravitation.

17. Define centre of gravity.

18. Define Coefficient of restitution.

19. A box is pulled with a force of 25 N to produce a displacement of 15 m. If the angle between the force and displacement is 30° , find the work done by the force.

20. What are inertial frames?

21. An object is projected 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. Define dimensionless quantities.

23. Define Radian.

24. A force of $(4\mathbf{i} - 3\mathbf{j} + 5\mathbf{k})$ N is applied at a point whose position vector is $(7\mathbf{i} + 4\mathbf{j} - 2\mathbf{k})$ m. Find the torque of force about the origin.

PART-III

III. Answer any six of the following questions. Qn.No.33 is compulsory:

6 X 3 = 18

25. Define precision and accuracy. Explain with one example.

26. 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.

27. Explain the similarities and differences of centripetal and centrifugal forces.

28. Write the differences between conservative and Non-conservative forces. Give two examples each.

29. Water in a bucket tied with rope is whirled around in a vertical circle of radius 0.5 m.

Calculate the minimum velocity at the lowest point so that the water does not spill from it in the course of motion. ($g = 10 \text{ ms}^{-2}$)

30. State and explain work energy principle
31. Explain the types of equilibrium with suitable examples.
32. State Kepler's three laws.
33. A cyclist while negotiating a circular path with speed 20 m s^{-1} is found to bend an angle by 30° with vertical. What is the radius of the circular path? (given, $g = 10 \text{ m s}^{-2}$)

PART – IV

IV. Answer the following questions

5 X 5 = 25

34. Explain the variation of g with altitude.

(OR)

State and prove parallel axis theorem.

35. Arrive at an expression for elastic collision in one dimension

(OR)

Describe the method of measuring angle of repose.

36. Derive the equation of motion, range and maximum height reached by the particle thrown at an oblique angle with respect to the horizontal direction.

(OR)

Explain the principle of homogeneity of dimensions. What are its uses? Give example.

37. Derive the kinematic equations of motion for constant acceleration.

(OR)

Explain the motion of blocks connected by a string in Vertical motion.

38. Arrive at an expression for power and velocity. Give some examples for the same.

(OR)

Discuss rolling on inclined plane and arrive at the expression for the acceleration.

--- All the best ---