**Tsi11P**

**Tenkasi District**

**Common Quarterly Examination - 2024**

21-09-2024

**Standard 11**

Time Allowed: 3.00 Hours

**PHYSICS**

Maximum Marks: 70

**PART - I**

**I. Choose the best answer:**        **15×1=15**

1) Which of the following pairs of physical quantities have same dimension?
   a) force and power      b) torque and energy
   c) torque and power      d) force and torque

2) Significant figures of 6.3200J is
   a) 3      b) 4      c) 5      d) None

3) Which one of the following Physical quantities cannot be represented by a scalar?
   a) mass      b) length
   c) momentum      d) magnitude of momentum

4) An object is droped in an unknown planet from height 50m, it reaches the ground in 2s. The acceleration due to gravity in this unknown planet is
   a) $g = 20ms^{-2}$    b) $g = 25ms^{-2}$    c) $g = 15ms^{-2}$    d) $g = 30ms^{-2}$

5) Two masses $m_1$ and $m_2$ are experiencing the same force where $m_1 > m_2$. The ratio of their acceleration $a_1/a_2$ is
   a) 1    b) less than 1    c) greater than 1    d) all the three cases

6) The centrifugal force appears to exist
   a) only in inertial frames
   b) both in inertial and not-inertial frames
   c) only in rotating frames
   d) in any accelerated frame

7) When the object is moving at constant velocity on the rough surface
   a) not force on the object is zero
   b) no force acts on the object
   c) only external force acts on the object
   d) only kinetic friction acts on the object

8) A ball of mass 1kg and another of mass 2kg are dropped from a fall building whose height is 80m. After a fall of 50m each towards earth. Their respective kinetic energies will be in the ratio of
   a) $\sqrt{2}:1$      b) $1:\sqrt{2}$      c) 2:1      d) 1:2

9) If the linear momentum of the object is increased by 0.1%, then the kinetic energy is increased by
   a) 0.1%      b) 0.2%      c) 0.4%      d) 0.01%

10) Water in a bucket tied with rope is whirled around in a vertical circle of radius 0.5m. Calculate the minimum velocity at the lowest point so that the water does not spill from it in the course of motion ($g=10ms^{-2}$)
    a) $\sqrt{5}ms^{-1}$      b) $\sqrt{10}ms^{-1}$      c) $5\ ms^{-1}$      d) $10\ ms^{-1}$

11) The centre of mass of a system of particles does not depend upon
    a) position of the particles      b) force acting on the particle
    c) masses of particle      d) relative distance between particles

12) A particle undergoes uniform circular motion. The angular momentum of the particle remain conserved about
    a) the centre point of the circle
    b) the point on the circumference of the circle
    c) any point inside the circle
    d) any point outside the circle

13) A rigid body is in mechanical equilibrium when
    a) only the net force acting on the body is zero
    b) only the net torque acting on the body is zero
    c) both net force and net torque acting on the body is zero
    d) both the net force and the net torque acting on the body is not zero

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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) 1032          b) 64.5          c) 182.5          d) 720

15) The Kinetic energy of the satellite orbiting around the Earth is

    a) equal to potential energy       b) less than potential energy

    c) greater than kinetic energy      d) zero

## PART - II

**II.** **Answer ANY SIX questions. Q.No. 22 is compulsory:**       **6×2=12**

16) Define Vector. Give examples.

17) Define coefficient of restitution (e).

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

19) Why is the cylinder used in defining kilogram made up of Platinum-Iridium alloy?

20) What are the methods to reduce friction?

21) Define centre of mass.

22) Two Vectors are given as $\hat{r} = 2\hat{i} + 3\hat{j} + 5\hat{k}$ and $\hat{f} = 3\hat{i} - 2\hat{j} + 4\hat{k}$. Find the resultant vector $\vec{j} = \vec{r} \times \vec{f}$.

23) Define gravitational potential.

24) Calculate the force of attraction between two point masses $m_1 = 1kg$ and $m_2 = 2kg$ which are seperated by a distance of 10 meter.

## PART - III

**III.** **Answer ANY SIX questions. Q.No. 32 is compulsory:**       **6×3=18**

25) List the applications of dimensional analysis.

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) Write the differences between conservative and non-conservative forces.

28) Using free body diagram, show that it is easy to pull an object that to push it.

29) A cyclist while negotiating a circular path with speed of 20ms⁻¹ is found to bend an angle by 30° with vertical. What is the radius of the circular path. (given $g = 10ms^{-2}$)

30) Discuss conservation of angular momentum.

31) Arrive at an expression for the loss of kinetic energy in inelastic collision.

32) A particle of mass 2kg experiences two forces $\vec{F_1} = 5\hat{i} + 8\hat{j} + 7\hat{k}$ and $\vec{F_2} = 3\hat{i} - 4\hat{j} + 3\hat{k}$. What is the acceleration of the particle?

33) Why is there no lunar eclipse and Solar eclipse every month?

## PART - IV

**IV.** **Answer all questions:**       **5×5=25**

34) a) State and prove parallel axis theorem.       **(OR)**

    b) i) Write a note on triangular method to measure larger distances.

        ii) Define Parsec.

35) a) Derive the kinematic equation of motion for constant acceleration. **(OR)**

    b) Explain the variation of g with altitude.

36) a) Explain the need for banking of tracks.       **(OR)**

    b) State and explain work energy principle.

37) a) Show the impulse is the change of momentum.       **(OR)**

    b) Discuss the properties of scalar products.

38) a) Obtain an expression which relates power and velocity.       **(OR)**

    b) i) Explain the propagation of errors in subtraction.

        ii) Check the correctness of the equation $\frac{1}{2}mv^2 = mgh$ using dimensional analysis method.

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