Tsi11P

Tenkasi District

Common Half Yearly Examination - December 2025

15.12.2025

Standard 11

PHYSICS

Time Allowed: 3.00 Hours

Maximum Marks: 70

PART-I

I. Answer all the questions: **15×1=15**

1) The dimension of $(\mu_0 \varepsilon_0)^{\frac{1}{2}}$ is
   a) length b) time c) velocity d) force
2) In a simple harmonic oscillation, the acceleration against displacement for one complete oscillation will be
   a) an ellipse b) a circle c) a parabola d) a straight line
3) If an object is dropped from the top of a building and it reaches the ground at t = 4s, then the height of the building
   a) 77.3 m b) 78.4 m c) 80.5 m d) 79.2 m
4) If the temperature and pressure of a gas is doubled the mean free path of the gas molecules
   a) remains same b) doubled c) tripled d) quadrapoled
5) 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
6) In an isochoric process, we have
   a) W = 0 b) Q = 0 c) $\Delta U = 0$ d) $\Delta T = 0$
7) A spring of force constant k is cut into two pieces such that one piece is double the length of the other. Then, the long piece will have a force constant of
   a) $\frac{2}{3}k$ b) $\frac{3}{2}k$ c) 3k d) 6k
8) For a given material, the rigidity modulus is $\frac{1}{3}^{rd}$ of Young's modulus. Its Poisson's ratio is
   a) 0 b) 0.25 c) 0.3 d) 0.5
9) The speed of the center of a wheel rolling on a horizontal surface is V_0. A point on the rim in level with the center will be moving at a speed of
   a) zero b) V_0 c) $\sqrt{2}V_0$ d) $2V_0$
10) The linear momentum and position vector of the planet is perpendicular to each other at
   a) perihelion and aphelion b) at all points
   c) only at perihelion d) no point
11) 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
12) The wettability of a surface by a liquid depends primarily on
   a) viscosity
   b) surface tension
   c) density
   d) angle of contact between the surface and the liquid
13) When a cycle tyre suddenly bursts, the air inside the tyre expands. This process is
   a) isothermal b) adiabatic c) isobaric d) isochoric

14) A sample of ideal gas is at equilibrium. Which of the following quantity is zero?
a) rms speed b) average speed
c) average velocity d) most probable speed

15) A pendulum is hung in a very high building oscillates to and fro motion freely like a simple harmonic oscillator. If the acceleration of the bob is $16ms^{-2}$ at a distance of 4m from the mean position, then the time period is
a) 2s b) 1s c) $2\pi s$ d) πs

PART-II

II. Answer any six questions: [Q.No:24 is compulsory] **6×2=12**

16) What are instrumental errors? How can the error be corrected?
17) 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?
18) State the law of conservation of angular momentum.
19) Define the gravitational field. Give its unit.
20) State Hooke's law of elasticity.
21) State Zeroth law of thermodynamics.
22) Define the term degrees of freedom.
23) Define Resonance.
24) 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.

PART-III

III. Answer any six questions: [Q.No:33 is compulsory] **6×3=18**

25) Write a note on triangulation method to measure larger distances.
26) State Newton's three laws.
27) Compare elastic and inelastic collisions.
28) Derive the relation between torque and angular momentum.
29) Explain the geostationary and polar satellites.
30) A metal cube of side 0.20 m is subjected to a shearing force of 4000 N. The top surface is displaced through 0.50 cm with respect to the bottom. Calculate the shear modulus of elasticity of the metal.
31) Discuss various modes of heat transfer.
32) What are the degrees of freedom for monoatomic molecule, diatomic molecule and triatomic molecule?
33) If the length of the simple pendulum is increased by 44% from its original length, Calculate the percentage increase in time period of the pendulum.

PART-IV

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

34) i) Explain the principle of homogeniety of dimensions. Give example. What are the uses of dimensional analysis. **(OR)**
ii) Derive the expression for mean free path of the gas.

35) i) Derive the kinematic equations of motion for constant acceleration. **(OR)**
ii) Explain in detail Newton's law of cooling.

36) i) Explain the need for banking of tracks. **(OR)**
ii) Derive the expression for terminal velocity of a sphere moving in a high viscous fluid.

37) i) State and prove parallel axis theorem. **(OR)**
ii) Explain the variation of g with depth from the Earth's surface.

38) i) Arrive at an expression of velocities for elastic collision in one dimension. **(OR)**
ii) Explain the horizontal oscillations of a spring.
