

Class : 11

Register Number

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FIRST REVISION EXAMINATION, JANUARY - 2025

Time Allowed : 3.00 Hours

PHYSICS
PART-I

[Max. Marks : 70]

15x1=15

Note: (i) Answer all the questions

(ii) Choose the most suitable answer from the given four alternatives and write the option code and the corresponding answer.

- If the length and time period of an oscillating pendulum have errors of 1% and 3% respectively then the error in measurement of acceleration due to gravity is
a) 4% b) 5% c) 6% d) 7%
- If an object is dropped from the top of a building and it reaches the ground at $t = 4$ s, then the height of the building is (ignoring air resistance) ($g = 9.8 \text{ ms}^{-2}$)
a) 77.3 m b) 78.4 m c) 80.5 m d) 79.2 m
- 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
- The work done by the conservative force for a closed path is
a) always negative b) zero c) always positive d) not defined
- The speed of the centre of a wheel rolling on a horizontal surface is v_0 . A point on the rim in level with the centre will be moving at a speed of speed of,
a) zero b) v_0 c) $\sqrt{2} v_0$ d) $2v_0$
- If a person moves from Chennai to Trichy, his weight
a) increases b) decreases c) remains same d) increases and then decreases
- For a given material, the rigidity modulus is $(1/3)^{\text{rd}}$ of Young's modulus. Its Poisson's ratio is
a) 0 b) 0.25 c) 0.3 d) 0.5
- The graph between volume and temperature in Charles' law is
a) an ellipse b) a circle c) a straight line d) a parabola
- 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) quadrupled
- 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
- A mass of 3 kg is attached at the end of a spring moves with simple harmonic motion on a horizontal friction less table with time period 2π and with amplitude of 2m, then the maximum force exerted on the spring is
a) 1.5 N b) 3 N c) 6 N d) 12 N
- A student tunes his guitar by striking a 120 Hertz with a tuning fork, and simultaneously plays the 4th string on his guitar. By keen observation, he hears the amplitude of the combined sound oscillating three times per second. Which of the following frequencies is the most likely the frequency of the 4th string on his guitar?
a) 130 b) 117 c) 110 d) 120
- If the metal bob of a simple pendulum is replaced by a wooden bob then its time period will be
a) increase b) decrease c) remain the same d) maybe increase or decrease

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14. If the density of the Earth is doubled keeping its radius constant then acceleration due to the gravity will be
 a) 2.45 ms^{-2} b) 4.9 ms^{-2} c) 9.8 ms^{-2} d) 19.6 ms^{-2}
15. The distance covered by a body is given in terms of t is represented by $S=At+Bt^2$. The dimension of A and B are
 a) LT^2, LT b) L, LT^{-1} c) LT^{-1}, LT^{-2} d) LT^{-2}, LT^{-1}

PART - II

II. Answer any six questions in which question No.24 is compulsory

16. Write the rules for determining significant figures.
17. What is non uniform circular motion?
18. If a stone of mass 0.25 kg tied to a string executes uniform circular motion with a speed of 2 m s^{-1} of radius 3 m , what is the magnitude of tensional force acting on the stone?
19. Define torque and mention its unit.
20. Define the gravitational field. Give its unit.
21. Define Poisson's ratio.
22. State Zeroth law of thermodynamics.
23. What is an epoch?
24. A variable force $F = kx^2$ acts on a particle which is initially at rest. Calculate the work done by the force during the displacement of the particle from $x = 0 \text{ m}$ to $x = 4 \text{ m}$. (Assume the constant $k = 1 \text{ N m}^{-2}$)

PART - III

III. Answer any six questions in which question No. 33 is compulsory

6x3 = 18

25. How will you measure the diameter of the Moon using parallax method?
26. Write the properties of vector products
27. Using free body diagram, show that it is easy to pull an object than to push it.
28. Explain the characteristics of elastic and inelastic collision.
29. 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, $g = 10 \text{ m s}^{-2}$)
30. State the principle and usage of Venturimeter.
31. Write the expression for rms speed, average speed and most probable speed of a gas molecule.
32. Write down the factors affecting velocity of sound in gases.
33. Calculate the energy of the Moon orbiting the Earth

PART - IV

IV. Answer all the questions.

5x5 = 25

34. a) Convert 76 cm of mercury pressure into N m^{-2} using the method of dimensions. (OR)
 b) Derive the time period of satellite orbiting the Earth.
35. a) 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. (OR)
 b) State and prove Bernoulli's theorem for a flow of incompressible, non-viscous, and streamlined flow fluid.
36. a) Explain the motion of blocks connected by a string in Horizontal motion. (OR)
 b) Derive the work done in an adiabatic process.
37. a) Arrive at an expression for power and velocity. Give some examples for the same. (OR)
 b) Describe Simple Harmonic Motion as a projection of uniform circular motion.
38. a) Discuss rolling on inclined plane and arrive at the expression for the acceleration. (OR)
 b) Explain how overtones are produced in a closed organ pipe

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