

11

Second Revision Examination- 2025

Register No.

Time : 3.00 Hrs.

PHYSICS
PART - I

Marks : 70

15 x 1 = 15

Choose the best answer.

- The dimension of $(\mu_0 \epsilon_0)^{-1/2}$ is
a) length b) time c) velocity d) force
- If an object is dropped vertically downward and another object is thrown horizontally from the same height, then the ratio of vertical distance covered by both objects at any instant 't' is.....
a) 1 b) 2 c) 4 d) 0.5
- When a car takes a sudden left turn in the curved road, passengers are pushed towards the right due to
a) inertia of direction b) inertia of motion c) inertia of rest d) absence of inertia
- What is the maximum velocity with which a body of mass m must enter a vertical loop of radius R so that it can complete the loop?
a) $\sqrt{2gR}$ b) $\sqrt{3gR}$ c) $\sqrt{5gR}$ d) \sqrt{gR}
- The ratio of the acceleration for a solid sphere of mass m and radius R rolling down an incline of angle θ without slipping and slipping down the incline without rolling is
a) 5 : 7 b) 2 : 3 c) 2 : 5 d) 7 : 5
- A planet moving along an elliptical orbit is closest to the sun at distance r_1 and farthest away at a distance of r_2 . If v_1 and v_2 are linear speeds at these points respectively, then the ratio $\frac{v_1}{v_2}$ is
a) $\left(\frac{r_2}{r_1}\right)$ b) $\left(\frac{r_2}{r_1}\right)^2$ c) $\left(\frac{r_1}{r_2}\right)$ d) $\left(\frac{r_1}{r_2}\right)^2$
- 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
- If a wire is stretched to double of its original length, then the strain in the wire is
a) 1 b) 2 c) 3 d) 4
- An ideal transformer has a freezer at temperature -12°C . The co-efficient of performance of the engine is 5. The temperature of air to which the heat is ejected is.....
a) 50°C b) 45.2°C c) 40.2°C d) 37.5°C
- The ratio $\gamma = \frac{C_p}{C_v}$ for a gas mixture consisting of 8g of helium and 16g of oxygen is
a) 23/15 b) 15/23 c) 27/17 d) 17/27
- Let the total energy of a particle executing simple harmonic motion with angular frequency is 1 rad s^{-1} is 0.256 J. If the displacement of the particle at time $t = \frac{\pi}{2}$ s is $8\sqrt{2}$ cm then the amplitude of motion is
a) 8 cm b) 16 cm c) 32 cm d) 64 cm
- A transverse wave moves from a medium A to a medium B. In medium A, the velocity of transverse wave is 500 ms^{-1} and the wave length is 5m. The frequency and the wavelength of the wave in medium B when its velocity is 600 ms^{-1} , respectively are.
a) 120 Hz & 5m b) 100 Hz & 5m c) 120 Hz & 6m d) 100 Hz & 6m

13. A body is executing simple harmonic motion with frequency 'n', the frequency of its potential energy is
a) n b) 2n c) 3n d) 4n
14. The escape velocity of earth is ϑ . The escape velocity of another planet having a radius four times that of earth and same mass density
a) ϑ b) 2ϑ c) 3ϑ d) 4ϑ
15. If force [F], acceleration [A] and time [T] are chosen as fundamental physical quantities find the dimension of energy. a) [F] [A] [T] b) [F] [A] [T²] c) [F] [A] [T⁻¹] d) [F] [A⁻¹] [T]

PART - II

Answer any six of the following. Q.No.23 is compulsory.

6 x 2 = 12

16. Define angular velocity.
17. State Wien's law.
18. Check the correctness of the equation $\vartheta = u + at$ using dimensional analysis method.
19. Give any two examples of torque in day-to-day life.
20. Define frequency of simple harmonic motion.
21. Compute the distance between antinode and neighbouring node.
22. Why the energy of a satellite or any other planet is negative?
23. A particle is in circular motion with an angular acceleration $\alpha = 0.2 \text{ rad s}^{-2}$. What is the angular displacement made by the particle after 5 seconds?
24. Define power.

PART - III

Answer any six of the following. Q.No.33 is compulsory.

6 x 3 = 18

25. What is Gross error? State the reason for it and how to minimize the errors.
26. Write the properties of scalar product of two vectors.
27. State the difference between centripetal and centrifugal forces.
28. State the various types of potential energy. Explain its formulae.
29. Explain Geostationary satellites.
30. Write the practical applications of capillarity.
31. State the laws of simple pendulum.
32. Write down the postulates of kinetic theory of gases.
33. During a cyclic process, a heat engine absorbs 600J of heat from hot reservoir, does work and ejects an amount of heat 200 J into the surroundings. Calculate the efficiency of the heat engine.

PART - IV

Answer all questions.

5 x 5 = 25

34. a) Derive an expression for moment of inertia of a rod about its center and perpendicular to the axis of the rod. (OR) b) What is a sonometer? Give its construction and working. Explain how to determine the frequency of tuning fork using sonometer.
35. a) What is inelastic collision? Derive an expression for loss of kinetic energy in perfect inelastic collision. (OR) b) Explain in detail the kinetic interpretation of temperature.
36. a) Explain in detail about the Newton's law of cooling. (OR) b) Describe the method of measuring angle of repose.
37. a) Explain in detail the triangle law of vector addition. (OR) b) Derive Poiseuille's formula for the volume of a liquid flowing per second through a pipe under steamlined flow.
38. Write a note on Triangulation method and radar method to measure larger distances. (OR) b) Explain the variation of 'g' with depth from the Earth's surface.