COMMON HALF YEARLY EXAMINATION – 2025

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Standard XI

Reg.No. | | | | | | |

PHYSICS

Time: 3.00 hrs. **Marks: 70**

Part – I

I. Choose the correct answer: **15 x 1 = 15**

1. 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%
2. If the velocity is $\vec{v} = 2\hat{i} + t^2\hat{j} - 9\hat{k}$, then the magnitude of acceleration at t = 0.5s is
   a) 1 ms^{-2} b) 2 ms^{-2} c) Zero d) –1 ms^{-2}
3. 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
4. The workdone by the conservative force for a closed path is
   a) always negative b) zero c) always positive d) not defined
5. 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
6. If the masses of the Earth and Sun suddenly double, the gravitational force between them will
   a) remain the same b) increase 2 times
   c) increase 4 times d) decrease 2 times
7. For a given material the rigidity modules is $(1/3)^{rd}$ of Young's modulus. Its Poisson's ratio is a) 0 b) 0.25 c) 0.3 d) 0.5
8. When a uniform rod is heated which of the following quantity of the rod will increase
   a) mass b) weight c) centre of mass d) moment of inertia
9. The average translational kinetic energy of gas molecules depends on
   a) number of moles and T b) only on T c) P and T d) P only
10. The damping force on an oscillator is directly proportional to the velocity. The units of the constant of proportionality are
    a) $kgms^{-1}$ b) $kgms^{-2}$ c) kgs^{-1} d) kgs
11. A sound wave whose frequency is 5000 Hz travels in air and then hits water surface. The ratio of its wavelength in water and air is
    a) 4.30 b) 0.23 c) 5.30 d) 1.23
12. In a simple harmonic oscillation, the acceleration against displacement for one complete ascillation will be
    a) an ellipse b) a circle c) a parabola d) a straight line
13. A 0.5 mole of gas at temperature 300 K expands isothermally from an initial volume of 2L to 6L, the workdone by the gas is
    a) 1.693 KJ b) 1.369 J c) 3.169 J d) 0.1369 J
14. The frequency for the simple harmonic oscillation $y = 0.4 \sin(60\pi t + 1.5)$ is
    a) 20 Hz b) 30 Hz c) 40 Hz d) 60 Hz

15. The distance between two successive nodes is

a) λ b) $\lambda/4$ c) $\lambda/2$ d) $3\lambda/2$

Part - II

II. Answer any 6 questions. (Q.No.24 is compulsory) **6 x 2 = 12**

16. Define precision and accuracy.
17. Explain what is meant by cartesian coordinate system?
18. If a stone of mass 0.25 kg tied to a string executes uniform circular motion with a speed of 2 ms^{-1} of radius 3m. What is the magnitude of tensional force acting on the stone.
19. State Law of Conservation of energy.
20. Define Centre of mass.
21. Why is there no lunar eclipse and solar eclips every month?
22. State Hooke's law of elasticity.
23. Define specific heat capacity and give its unit.
24. A mobile phone tower transmit a wave signal of frequency 900 MHz. Calculate the length of the waves transmitted from the mobile phone tower.

Part - III

III. Answer any 6 questions. (Q.No.33 is compulsory) **6 x 3 = 18**

25. Write the rules for determining significant figures.
26. Define displacement and distance.
27. Show that impulse is the change of momentum.
28. Write the various types of potential energy. Explain the formulae.
29. A cyclist while negotiating a circular path with speed 20 ms^{-1} is found to bend an angle by 30° with vertical. What is the radius of the circular path; (given g = 10ms^{-1})
30. State Kepler's three laws.
31. Distinguish between streamlined flow and turbulent flow.
32. Write down the postulates of kinetic theory of gases.
33. Consider two springs with force constants 1 Nm^{-1} and 2 Nm^{-1} connected in parallel. Calculate the effective spring constant Kp and comment on Kp.

Part - IV

IV. Answer all the questions. **5 x 5 = 25**

34. a) Write a note on triangulation method and radar method to measure larger distance

(OR)

b) Explain the variation of g with depth from the Earth's surface.

35. a) Explain in detail the triangle law of addition. *(OR)*

b) State and prove Bernoulli's theorem for a flow of incompressible non-viscous and streemlined flow of fluid.

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

b) Derive the expression for Carnot engine efficiency.

37. a) State and explain work energy principle. *(OR)*

b) Derive the expressions of pressure exerted by the gas on the walls of the container.

38. a) Derive the expression for moment of inertia of a uniform ring about an axis passing through the centre and perpendicular to the plane.

(OR)

b) How will you determine the velocity of sound using resonance air column apparatus

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