Class : 11

Register Number

SECOND REVISION EXAMINATION - 2025

PHYSICS

Time Allowed : 3.00 Hours] [Max. Marks : 70

PART - I

I. Answer all the questions 15x1=15

1. The frequencies of harmonics are in the ratio of closed organ pipe is
   (a) 1:2:3:4 (b) 1:3:5:7 (c) 1:4:9:16 (d) 1:9:25:64
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. 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
4. Identify the state variables given there?
   (a) Q,T,W (b) P, T, U (c) Q, W (d) P, T, Q
5. 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
6. The workdone by the sun's gravitational force on the earth is
   (a) always zero (b) always positive
   (c) can be positive or negative (d) always negative
7. A couple produces
   (a) pure rotation (b) pure translation
   (c) rotation and translation (d) no motion
8. 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%
9. 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
10. If the particle has negative velocity and negative acceleration, its speed
    (a) increases (b) decreases (c) remain same (d) zero
11. Round of the following number 19.95 into three significant figures
    (a) 19.9 (b) 20.0 (c) 20.1 (d) 19.5
12. The unit of angular velocity is
    (a) rad s (b) rad s^{-1} (c) rad s^{2} (d) rad s^{-2}
13. The angle of repose is the same as
    (a) Rolling friction (b) angle of friction (c) both (a) and (b) (d) none of the above
14. The dimensional formula for coefficient of viscosity is
    (a) $ML^{-1}T^{-1}$ (b) MLT^{-1} (c) $M^{-1}L^{-1}T^{-1}$ (d) $ML^{2}T^{-1}$
15. The distance between two consecutive node (or) antinodes is
    (a) λ (b) $\lambda/2$ (c) $\lambda/3$ (d) $\lambda/4$

PART - II

II. Answer any six questions in which question No.24 is compulsory **6X2=12**

16. What is the principle of homogeneity of dimensions?
17. Write down the kinematic equations for angular motion
18. A cyclist while negotiating a circular path with speed $20ms^{-1}$ is found to bend an angle by 30^{o} withvertical. What is the radius of the circular path?(given, $g = 10ms^{-2}$)
19. Define the Coefficient of restitution.
20. Define one newton
21. What is gravitational potential energy?
22. A wire 10 m long has a cross-sectional area 1.25×10^{-4} m^2. It is subjected to a load of 5 kg. If Young's modulus of the material is 4×10^{10} Nm^{-2}, calculate the elongation produced in the wire. Take $g=10$ ms^{-2}.
23. What is the difference between transverse waves and longitudinal waves?
24. A refrigerator has COP of 3. How much work must be supplied to the refrigeratorin order to remove 200 J of heat from its interion?

PART - III

III. Answer any six questions in which question No. 33 is compulsory **6X3=18**

25. Explain the loss of kinetic energy in inelastic collision
26. If the value of universal gravitational constant in SI is 6.6×10^{-11} $Nm^2 kg^{-2}$, then find its value in CGS System?
27. Explain various types of friction. Suggest a few methods to reduce friction
28. Derive the expression for centripetal acceleration
29. A object is thrown with initial speed $5ms^{-1}$ with an angle of projection 30°. What is the height and range reached by the particle?
30. Explain in detail the geostationary and polar satellites
31. How is surface tension related to surface energy?
32. Describe the total degrees of freedom for monoatomic molecule, diatomic molecule and triatomic molecule.
33. Consider two springs with force constants 1 N m^{-1} and 2 N m^{-1} connected in parallel. Calculate the effective spring constant (k_p) and comment on k_p.

PART - IV

IV. Note : Answer all the questions. **5x5=25**

34. (a) State and prove parallel axes theorem. **(OR)**
    (b) Explain how overtones are produced in a closed organ pipe.
35. (a) Derive the expression for the terminal velocity of a sphere moving in a high viscous fluid using stoke's force. **(OR)**
    (b) State and prove work - energy theorem.
36. (a) Explain the need for banking of tracks. **(OR)**
    (b) Derive the expression for energy in simple harmonic motion.
37. (a) Obtain on expression for the time period (T) of a simple pendulum. The time period(T) depends i) mass of the bob (m) ii) length (l) of the pendulum iii) acceleration due to gravity (g) at a place where the pendulum is suspended ($K = 2\pi$) **(OR)**
    (b) Derive Meyer's relation for ideal gas.
38. (a) Derive the equations for (i) range (R) and (ii) maximum height (H) reached by the projectile, thrown at an angle 'θ' with respect to the ground. **(OR)**
    (b) Derive an expression for escape speed.