

Class : 11

Register Number					
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FIRST REVISION EXAMINATION - JANUARY - 2025

Time Allowed : 3.00 Hours]

PHYSICS

[Max. Marks : 70

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PART-I

I. Note: (i) Answer all the questions

15x1=15

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

1. Identify the unit vector in the following

(a) $\hat{i} + \hat{j}$

(b) $\frac{\hat{i}}{\sqrt{2}}$

(c) $\hat{k} - \frac{\hat{j}}{\sqrt{2}}$

(d) $\frac{\hat{i} + \hat{j}}{\sqrt{2}}$

2. If length of Simple pendulum is increased by 2% the time period will

(a) increases by 2%

(b) decreases by 1%

(c) increases by 1%

(d) decreases by 1%

3. Which of the following differential equations represents a damped harmonic oscillator?

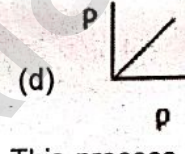
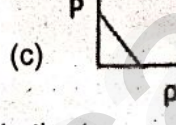
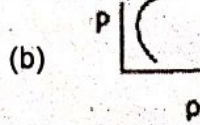
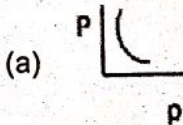
(a) $\frac{d^2y}{dt^2} + y = 0$

(b) $\frac{d^2y}{dt^2} + \gamma \frac{dy}{dt} + y = 0$

(c) $\frac{d^2y}{dt^2} + k^2y = 0$

(d) $\frac{dy}{dt} + y = 0$

4. Which of the following shows the correct relationship between the pressure and density of an ideal gas at constant temperature?



5. When a cycle tyre suddenly bursts, the air inside the tyre expands. This process is

(a) isothermal

(b) adiabatic

(c) isobaric

(d) isochoric

6. Temperature of source and sink in a carnot engine is 250°C and 100°C respectively calculate its efficiency?

(a) 38%

(b) 28%

(c) 18%

(d) 48%

7. For a given material, the rigidity modulus is $(\frac{1}{3})$ of Young's modulus. Its Poisson's ratio is

(a) 0

(b) 0.25

(c) 0.3

(d) 0.5

8. Bernoulli's theorem is based on the principle of

(a) Law of conservation of momentum

(b) Law of conservation of energy

(c) Law of conservation of mass

(d) none of these

9. If a person moves from Chennai to Trichy, his weight

(a) increases

(b) decreases

(c) remains same

(d) increases and then decreases

10. The dimensional formula for gravitational constant G is

(a) $[ML^3T^{-2}]$

(b) $[M^{-1}L^3T^{-2}]$

(c) $[M^{-1}L^{-3}T^{-2}]$

(d) $[ML^{-3}T^2]$

11. Equation of displacement for any particle is $s = 3t^3 + 7t^2 + 14t + 8$ m. its acceleration at time $t=1$ sec is

(a) 10 m/s^2

(b) 16 m/s^2

(c) 25 m/s^2

(d) 32 m/s^2

12. Force acting on the particle moving with constant speed is

(a) always zero

(b) need not be zero

(c) always non zero

(d) cannot be concluded.

13. What is the minimum 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}

14. 5kg Iron ball falls from 4m height. At that height calculate the total energy

(a) 20J

(b) 200J

(c) 400J

(d) 2000J

15. Two rings have their moments of inertia in the ratio of 4:1 and their diameters are in the ratio of 4:1. Find the ratio of their masses.

- (a) 1:4 (b) 3:4 (c) 4:1 (d) 4:3

PART - II

II. Note : Answer any six questions. Question Number 24 is Compulsory. 6x2=12

16. What is resonance?
 17. State perpendicular axis theorem.
 18. The position vector of a particle is given by $\vec{r} = 3t\hat{i} + 5t^2\hat{j} + 7\hat{k}$. Find the direction M which the particle experience net force?
 19. What are transverse waves?
 20. State principle of homogeneity?
 21. Let 2.4×10^{-4} J of work is done to increase the area of a film of soap bubble from 50 cm^2 to 100 cm^2 . Calculate the value of surface tension of soap solution.
 22. Define angular displacement.
 23. What are the limitations of first law of thermodynamics?
 24. Why Moon has no Atmosphere?

PART - III

III. Note : Answer any six questions. Question Number 33 is Compulsory. 6x3=18

25. State Kepler's law of planetary motion.
 26. Derive the relation between linear momentum and Kinetic energy.
 27. In an adiabatic expansion of the air, the volume is increased by 4%, what is the percentage change in pressure?
 28. What are the limitations of Dimensional analysis?
 29. What are the applications of surface tension?
 30. A force of $(4\hat{i} - 3\hat{j} + 5\hat{k})$ N is applied at a point whose position vector is $(7\hat{i} + 4\hat{j} - 2\hat{k})$ m. Find the torque of force about the origin.
 31. Describe Newton's formula for velocity of sound waves in air.
 32. Derive an expression for the efficiency of cornot engine.
 33. If the position vector of the particle is given by $\vec{r} = 3t^2\hat{i} + 5t\hat{j} + 4\hat{k}$. Find
 i) the velocity of the particle at $t=3$ sec. and ii) the speed of the particle at $t=3$ sec.

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

34. a) Explain in detail the various types of errors.
 (OR)
 b) Derive the expression for the terminal velocity of a sphere moving in a high viscous fluid using stokes force.
 35. a) Derive Mayer's relation for an ideal gas.
 (OR)
 b) Discuss the properties of vector products.
 36. a) Prove the law of conservation of linear momentum. Use it to find the recoil velocity of a gun when a bullet is fired from it
 (OR)
 b) Derive the time period of satellite orbiting the Earth
 37. a) Discuss the simple pendulum in detail.
 (OR)
 b) Arrive at an expression for power and velocity. Give some examples for the same.
 38. a) Derive the expression for moment of inertia of a rod about its centre and perpendicular to the rod.
 (OR)
 b) Explain how the interference of waves is formed