



Standard - 11

Allowed: 3 Hours

PHYSICS

Maximum Marks: 70

PART - I

- Ques:** 1. Answer all the questions. $15 \times 1 = 15$
2. Choose the appropriate answer from the given four alternatives and write the option code and the corresponding answer.
1. The density of a material in CGS system is 4 g cm^{-3} . In a system of units in which unit of length is 10 cm and units in mass is 100 g , then the density of material will be
 a) 0.04 b) 0.4 c) 40 d) 400
2. If an object is falling from a height of 20 m , then the time taken by the object to reach the ground (ignore air resistance and take $g = 10\text{ ms}^{-2}$) is.
 a) 2 s b) 1.732 s c) 1.532 s d) 1.414 s
3. A simple pendulum is suspended from the roof of a school bus which moves in a horizontal direction with an acceleration ' a ', then the time period is.
 a) $T = \sqrt{g^2 + a^2}$ b) $T = \frac{1}{\sqrt{g^2 + a^2}}$
 c) $T = \frac{1}{\sqrt{g^2 - a^2}}$ d) $T = g^2 + a^2$
4. A body of mass 1 kg is thrown upward with velocity 20 ms^{-1} . It momentarily comes to rest after attaining a height of 12 m . How much energy is lost due to ate friction? (Take $g = 10\text{ ms}^{-2}$).
 a) 20 J b) 30 J c) 40 J d) 10 J
5. A rigid body rotates with an angular momentum L . If its kinetic energy is halved, the angular momentum becomes
 a) L b) $\frac{L}{2}$ c) $2L$ d) $\frac{L}{\sqrt{2}}$
6. The energy consumed in electrical units when a bow fan is used for 8 hours daily for one month (30 days) is.
 a) 14 units b) 8 units c) 16 units d) 20 units
7. If the acceleration due to gravity becomes four times its original value, then escape speed
 a) became halved b) remains same
 c) 4 times of original value d) 2 times of original value
8. The dimensional formula for strain is,
 a) $ML^{-1}T^{-1}$ b) $M^{-1}L^{-1}T^{-1}$ c) $ML^{-1}T^{-1}$ d) $M^{-1}L^{-1}T^{-1}$
9. Which of the P-V diagram corresponds to isobaric expansion
 a)  b) 
 c)  d) 
10. If the temperature and pressure of a gas is doubled the mean free path of the gas molecules,
 a) tripled b) remains same c) quadrupled d) doubled
11. 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
12. The first three frequencies of a closed organ pipe will be in the ratio,
 a) $1:2:3$ b) $1:3:5$ c) $1:4:9$ d) $2:4:6$
13. Human audible range of wavelength is (velocity of sound in air = 340 ms^{-1})
 a) $17\text{ m to }170\text{ m}$ b) $0.17\text{ m to }17\text{ m}$
 c) $0.017\text{ m to }17\text{ m}$ d) $1.7\text{ m to }17\text{ m}$

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14. A body is thrown with a velocity of 9.8 ms^{-1} horizontally. It will hit the ground after a time.
 a) 3.0 s b) 2.0 s c) 1.5 s d) 1 s
15. The speed of the centre of a wheel rolling on horizontal surface is V . A point on the rim is level with the centre will be moving at a speed of
 a) 0 b) V ,
 c) $\sqrt{2}V$, d) $2V$.

PART II

Answer any six question. Question number 23 is compulsory:

16. State the law of conservation of angular momentum.
17. Define: Centre of mass.
18. Why there is no atmosphere in the moon?
19. What are fundamental quantities. Give example.
20. Under what condition will a car skid on a levelled circular road?
21. State Newton's Universal law of gravitation.
22. Define: distance and displacement.
23. During a cyclic process, a heat engine absorbs 500J of heat from a hot reservoir and rejects 300J into the surroundings (reservoir). Calculate the efficiency of a heat engine.
24. What is simple harmonic motion.

PART III

Answer any six question. Question number 26 is compulsory:

6x1

Answer any six question. Question number 26 is compulsory:

25. Write a note on radar method to measure large distances.
26. Explain geo stationary satellites.
27. Compare elastic and inelastic collisions.
28. Using free body diagram. Show that whether it is easy to pull an object than to push it.
29. An object is thrown with initial speed 5m/s with an angle of projection 45° . Calculate the maximum height reached and the horizontal range.
30. Write any three applications of surface tension.
31. State the laws of simple pendulum.
32. Define: the degrees of freedom. Give example.
33. Write the differences between transverse and longitudinal waves.

PART - IV

5x5

Answer all the questions:

34. Derive Newton's formula for velocity of sound waves in air. Explain Laplace's correction in it.

(OR)

State and explain work-kinetic energy theorem. Discuss the inferences of kinetic energy theorem.

35. Discuss rolling on inclined plane and arrive at the expression for the acceleration.

(OR)

What are the applications and limitations of dimensional analysis.

36. Define: terminal velocity. Derive the expression for the terminal velocity of a sphere moving in a high viscous fluid using stoke's law.

(OR)

Derive the Kinematic equations of motion for constant acceleration.

37. Explain the variation of acceleration due to gravity(g) with altitude.

(OR)

Explain in detail the four different types of oscillations.

38. Derive the expression for workdone during isothermal process.

(OR)

State and explain parallel axes theorem.