| 11 - STD | HALF YEARLY EXAMINATION - 2025 | |
|---|---|---|
| TIME :3.00 Hrs | PHYSICS | MARKS : 70 |

PART - I

**Choose the best answers** 15 × 1 = 15

1. Round off the following number 19.95 into three significant figures.
   (a) 19.9 (b) 20.0 (c) 20.1 (d) 19.5
2. If the error in the measurement of the side is 2%, then the error in the determination of the area of the square is
   (a) 8% (b) 2% (c) 4% (d) 6%
3. An object is thrown vertically downward. What is the acceleration experienced by the object?
   (a) $-g\hat{j}$ (b) $g\hat{j}$ (c) $g\hat{k}$ (d) zero
4. If a particle has negative velocity and negative acceleration, its speed
   (a) increases (b) decreases (c) remains same (d) zero
5. Two masses $m_1$ and $m_2$ are experiencing the same force where $m_1 < m_2$. The ratio of their acceleration $\frac{a_1}{a_2}$ is
   (a) 1 (b) less than 1 (c) greater than 1 (d) all the three cases
6. A spring of force constant k is cut into two pieces such that one piece is double the length of the other. Then, the long piece will have a force constant of
   $(a)\frac{2}{3}k \quad (b)\frac{3}{2}k \quad (c)3k \quad (d)6k$
7. A couple produces
   (a) pure rotation (b) pure translation
   (c) rotation and translation (d) no motion
8. The speed of a solid sphere after rolling down from rest without sliding on an inclined plane of vertical height h is
   (a) $\sqrt{\frac{4}{3}gh}$ (b) $\sqrt{\frac{10}{7}gh}$ © $\sqrt{2gh}$ (d) $\sqrt{\frac{1}{2}gh}$
9. If the distance between the Earth and Sun were to be doubled from its present value, the number of days in a year would be
   (a) 64.5 (b) 1032 (c) 182.5 (d) 730
10. Which of the following is not a Scalar?
    (a) viscosity (b) surface tension (c) pressure (d) stress
11. The graph between volume and temperature in Charles' Law is
    (a) an ellipse (b) a circle (c) a straight line (d) a parabola
12. The efficiency of a heat engine working between the freezing point and boiling point of water is
    (a) 6.25% (b) 20% (c) 26.8% (d) 12.5%
13. 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 probale speed
14. The damping force on an oscillator is directly proportional to the velocity. The units of the constant of proportionality are
    (a) kg m $s^{-1}$ (b) kg m $s^{-2}$ (c) kg $s^{-1}$ (d) kg s

15. A sound wave of frequency 5000 Hz travels in air and then hits the water surface. The ratio of its wavelengths in water and air is

(a) 4.30 (b) 0.23 (c) 5.30 (d) 1.23

## PART - II

**Answer any six questions. Q.No.24 is Compulsory.** **6 × 2 = 12**

16. Define a vector. Give examples.
17. What is a PV diagram?
18. Write the rules for determining significant figures.
19. Why moon has no atmosphere?
20. Write the differences between Conservative and Non-Conservative forces.
21. Give any two examples of torque in day-to-day life.
22. What is meant by maintained oscillation?
23. State Newton's Universal law of gravitation.
24. Calculate the energy consumed in electrical units when a 75 W fan is used for 8 hours daily for one month (30 days).

## PART - III

**Answer any six questions. Q.No.33 is Compulsory.** **6 × 3 = 18**

25. Write about the properties of scalar product.
26. What are the factors affecting the surface tension of a liquid?
27. Using a free body diagram, show that it is easy to pull an object than to push it.
28. State Stefan-Boltzmann law.
29. What is the relation between torque and angular momentum?
30. Write down the difference between transverse and longitudinal waves.
31. What are geostationary and polar satellites?
32. Define the term degrees of freedom. Give one example.
33. The temperatures of two bodies measured by a thermometer are $t_1 = (20 \pm 0.5)^\circ C$ and $t_2 = (50 \pm 0.5)^\circ C$. Calculate the temperature difference and the error therein.

## PART - IV

**Answer all the questions** **5 × 5 = 25**

34. a) i) Explain the principle of homogeneity of dimension.
ii) What are the limitations of dimensional analysis?

**(OR)**

b) Explain the horizontal oscillations of a spring.

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

**(OR)**

b) Derive the expression for moment of inertia of a rod about its centre and perpendicular to the rod.

36. a) Explain in detail the triangle law of vector addition.

**(OR)**

b) State Newton's three laws and discuss their significance.

37. a) Describe Newton's formula for velocity of sound waves in air and also discuss the Laplace's correction.

**(OR)**

b) State and explain work energy principle. Mention any three examples for it.

38. a) Derive Mayer's relation for an ideal gas.

**(OR)**

b) Explain the variation of g with latitude.