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Time : 1.30 Hrs.

First Mid-Term Test - 2024**PHYSICS****PART - A**Register No.

Marks : 50

Choose the correct answer**10 x 1 = 10**

- The dimension of $(\mu_0 \epsilon_0)^{1/2}$ is.....
a) length b) time c) velocity d) force
- One of the combinations from the fundamental physical constants is $\frac{hc}{G}$. The unit of this expression is
a) kg^2 b) m^3 c) s^{-1} d) m
- Planck's constant (h), speed of light in vacuum (c) and Newton's gravitational constant (G) are taken as three fundamental constants. Which of the following combinations of these has the dimension of length?
a) $\frac{\sqrt{hG}}{c^2}$ b) $\frac{\sqrt{hG}}{c^2}$ c) $\sqrt{\frac{hc}{G}}$ d) $\sqrt{\frac{Gc}{h^2}}$
- The length of a body is measured as 3.51 m, if the accuracy is 0.01m, then the percentage error in the measurement is
a) 351% b) 1% c) 0.28% d) 0.035%
- Identify the unit vector in the following.....
a) $\hat{i} + \hat{j}$ b) $\frac{\hat{i}}{\sqrt{2}}$ c) $\hat{k} - \frac{\hat{i}}{\sqrt{2}}$ d) $\frac{\hat{i} + \hat{j}}{\sqrt{2}}$ $\vec{B} + \vec{A}$
- If the velocity $\vec{v} = 2\hat{i} + t^2\hat{j} - g\hat{k}$, then the magnitude of acceleration at $t = 0.5\text{s}$ is.....
a) 1 ms^{-2} b) 2 ms^{-2} c) zero d) -1 ms^{-2}
- An object is dropped in an unknown planet from a height of 50m, it reaches the ground in 2s. The acceleration due to gravity in this unknown planet is.....
a) $g = 20\text{ms}^{-2}$ b) $g = 25\text{ms}^{-2}$ c) $g = 15\text{ms}^{-2}$ d) $g = 30\text{ms}^{-2}$
- If a particle executes uniform circular motion, choose the correct statement.....
a) The velocity and speed are constant b) The acceleration and speed are constant
c) The velocity and acceleration are constant d) The speed and magnitude of acceleration are constant.
- One Parsec =
a) 3.62 Light Year b) 3.26 Light Year c) 3.06 Light Year d) 3.02 Light Year
- Which of the following is not vector product?
a) Linear Velocity b) Torque c) Angular Momentum d) Linear Momentum

PART - B**Answer any five questions. Question No.18 is compulsory.****5 x 2 = 10**

- What is Light Year? Give its value.
- Define Steradian.
- What is Dimensionless Variables? Give Example.

14. Differentiate Precision and Accuracy.
15. What is Projectile? Give two examples.
16. Distinguish between Vector and Scalar.
17. Define Angular velocity. Give its unit.
18. Two vectors \vec{A} and \vec{B} are given in the component form as $\vec{A} = 5\hat{i} + 7\hat{j} + 4\hat{k}$ and $\vec{B} = 6\hat{i} + 3\hat{j} + 2\hat{k}$.
Find $\vec{A} \cdot \vec{B}$ and $|\vec{B} \cdot \vec{A}|$.

PART - C

Answer any five questions. Question No.22 is compulsory

5 x 3 = 15

19. What are the advantages of SI system?
20. Give the dimensional formula for Surface tension, Planck's constant and Density.
21. Write any three rules of determining significant figures with example.
22. Two resistances $R_1 = (100 \pm 3) \Omega$, $R_2 = (150 \pm 2) \Omega$, are connected in series. What is their equivalent resistance.
23. Distinguish between Distance and Displacement.
24. Discuss any six properties of scalar product.
25. Write down the kinetic equations for angular motion.
26. Define unit vector and parallel vector.

PART - D

Answer all the questions.

3 x 5 = 15

27. Write a note on triangulation method and radar method to measure larger distance.
(OR)
Explain in detail the various types of errors.
28. What are the advantages and limitations of Dimensional Analysis.
(OR)
Derive the equations of uniformly accelerated motion by calculus method.
29. Explain triangular law of addition method.
(OR)
Explain the projectile in horizontal projection and prove that the path followed by the projectile is a parabola.