

11 - STD FIRST MID TERM TEST - 2023

PHYSICS

MARKS : 35

TIME : 1.30 HRS

I (I) Answer all the questions. II) Choose the most suitable answer from the given alternatives and write the option code and the corresponding answer. $10 \times 1 = 10$

- The dimension of $(\mu_0 \epsilon_0)^{-1/2}$ is a) Length b) Time c) Velocity d) Force
- The dimension formula for gravitation constant G is a) $[ML^3T^{-2}]$ b) $[M^{-1}L^3T^{-2}]$ c) $[M^{-1}L^{-3}T^{-2}]$ d) $[ML^{-3}T^2]$
- If $p = 3.14$, then the value of p^2 is a) 9.8596 b) 9.860 c) 9.86 d) 9.9
- The smallest practical unit of time is a) Shake b) Second c) Microsecond d) Minute
- Planck's constant (h), speed of light of 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) $\sqrt{\frac{Gc}{h^3}}$
- 1 radian = (degree) a) 57.39° b) 59.27° c) 57.27° d) 54.27°
- 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
- Consider two trains A and B moving along parallel tracks with the same velocity in the same direction. Let the velocity of each train be 50 Km h^{-1} due east. Calculate the relative velocities of the trains a) 50 Km h^{-1} b) 0 Km h^{-1} c) 100 Km h^{-1} d) 25 Km h^{-1}
- An object is dropped in an unknown planet from height 50m, it reaches the ground in 2 S. The acceleration due to gravity in this unknown planet is a) $g = 20 \text{ m s}^{-2}$ b) $g = 24 \text{ m s}^{-2}$ c) $g = 15 \text{ m s}^{-2}$ d) $g = 30 \text{ m s}^{-2}$
- 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) $\frac{\hat{i} + \hat{j}}{\sqrt{2}}$

II Answer any three questions. Question Number 15 is compulsory.

- Mention the uses of Dimensional analysis. $3 \times 2 = 6$
- Check the correctness of the equation $s = ut + \frac{1}{2}at^2$ using dimensional analysis method.
- How do you deduce that two vectors are perpendicular?
- What is projectile? Give an example.
- From a point on the ground, the top of a tree is seen to have an angle of elevation 60° . The distance between the tree and a point is 50m. Calculate the height of the tree?

III Answer any three questions. Question Number 19 is compulsory.

- Write a note on radar method to measure larger distances. $3 \times 3 = 9$
- Explain the propagation of errors in multiplication.
- Explain any three types of Motion.
- An iron ball and a feather are both falling from a height of 10m. a) What are the time taken by the iron ball and feather to reach the ground? b) What are the velocities of iron ball and feather when they reach the ground? (Ignore air resistance and taken $g = 10 \text{ m s}^{-2}$.)
- Prove that the path followed by the projectile is a parabola.

IV Answer all the questions.

- a) What is an error. Explain in detail various types of errors. (OR)
- b) What are significant figures? State the rules of significant figures. (OR)
- a) Explain Triangular Law of addition of two vectors.
- b) State the properties of vector product.

 $2 \times 5 = 10$