

No. of Printed Pages: 2

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SRI RAMANA MAHARSHI MATRICULATION HIGHER SECONDARY SCHOOL
KAVERIYAMPOONDI, TIRUVANNAMALAI – 606603.

FIRST MID-TERM TEST – JULY 2023

Std. : **11** Maximum Marks : 50
Subject : **PHYSICS** Time Allowed : 01.30 Hours

- Instructions:**
- (1) Check the question paper for fairness of printing. If there is any lack of fairness, inform the Hall Supervisor immediately.
 - (2) Use **Blue** or **Black ink** to write and underline and pencil to draw diagrams.

PART – I

Note : (i) Answer **all** the questions. 10x1=10
(ii) Choose the most appropriate answer from the given **four alternatives** and write the **option code** and the corresponding answer.

- The physical quantity having the dimensions $[MLT^{-1}]$ is
(a) Impulse (b) Force (c) Work (d) Energy
- If a particle executes uniform circular motion in the xy plane in clock wise direction, then the angular velocity is in
(a) +y direction (b) +z direction (c) -z direction (d) -x direction
- If $\pi = 3.14$, then the value of π^2 is
(a) 9.8596 (b) 9.860 (c) 9.86 (d) 9.9
- Momentum is a
(a) Vector Quantity (b) Fundamental Quantity
(c) Scalar Quantity (d) Physical Quantity
- The dimension of $(\mu_0 \epsilon_0)^{\frac{1}{2}}$ is
(a) length (b) time (c) velocity (d) force
- An object is dropped in an unknown planet from height 50 m, 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) $g = 25 \text{ m s}^{-2}$ (c) $g = 15 \text{ m s}^{-2}$ (d) $g = 30 \text{ m s}^{-2}$
- Which of the following has the highest number of significant figures?
(a) 0.007 m^2 (b) $2.64 \times 10^{24} \text{ kg}$
(c) 0.0006032 m^2 (d) 6.3200 J
- If one object is dropped vertically downward and another object is thrown horizontally from the same height, then the ratio of vertical distance covered by both objects at any instant t is
(a) 1 (b) 2 (c) 4 (d) 0.5
- Write the dimensional formula for the equation $v^2 = u^2 + 2as$, using dimensional analysis method.
(a) $M^0L^2T^{-2}$ (b) $M^0L^2T^2$ (c) $M^0L^{-2}T^{-2}$ (d) $M^0L^2T^{-1}$
- If a particle has negative velocity and negative acceleration, its speed
(a) increases (b) decreases
(c) remains same (d) zero

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PART – II

Note : Answer **any five** questions. Question No. **18** is compulsory. 5x2=10

11. Define scalar. Give examples.
12. Write principle of homogeneity of dimensions.
13. Write any two examples of motion in two dimensions.
14. Write the any two rules for determining significant figures with examples.
15. What is the difference between velocity and average velocity?
16. What are the uses of dimensional analysis?
17. What is parallax?
18. What are the resultants of the vector product of two vectors given by $\vec{A} = 4\hat{i} - 2\hat{j} + \hat{k}$ and $\vec{B} = 5\hat{i} + 3\hat{j} - 4\hat{k}$?

PART – III

Note : Answer **any five** questions. Question No. **26** is compulsory. 5x3=15

19. What is Gross Error? State the reasons for it and how to minimize the errors.
20. Write the any three properties of vector product of two vectors.
21. Determine the height of an accessible object using Triangulation method.
22. Find horizontal range of projectile in horizontal projection.
23. Write the any three rules for rounding off with examples.
24. A man moving in rain holds an umbrella inclined to the vertical though the rain drops are falling vertically. Why?
25. How will you measure the diameter of the Moon using parallax method?
26. A particle moves along the x-axis in such a way that its coordinates x varies with time 't' according to equation $X = 2 - 5t + 6t^2$?. What is the initial velocity of the particle?

PART – IV

Note : Answer **all** the questions. 3x5=15

27. (a) Obtain an expression for the time period T of a simple pendulum. The time period depends on:
 - (i) mass 'm' of the bob
 - (ii) length 'l' of the pendulum and
 - (iii) acceleration due to gravity 'g' at the place where the pendulum is suspended. (Constant $k = 2\pi$)

(OR)

- (b) Explain in detail the Triangle Law of Vector Addition.
28. (a) (i) What are the limitations of dimensional analysis?
 (ii) Check the correctness of the equation $E = mc^2$ using dimensional analysis method.

(OR)

- (b) Derive the kinematic equations of motion for constant acceleration.

29. (a) What is an error? Explain the systematic errors.

(OR)

- (b) Derive the equations of motion for a particle (a) falling vertically
 (b) projected vertically.

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