

FML

FIRST MID TERM TEST - 2024**11** - Std**PHYSICS**

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Time : 1.30

Marks : 40

I Answer all the questions :-

10 X 1 = 10

- Which of the following pair of Physical quantities have same dimensions?
 - Force and power
 - Torque and energy
 - Torque and power
 - Force and torque
- The smallest practical unit of time is
 - Minute
 - Second
 - Milli second
 - Shake
- If the force is proportional to square of velocity, then the dimension of proportionality constant is
 - [MLT⁰]
 - [MLT⁻¹]
 - [ML⁻²T]
 - [ML⁻¹T⁰]
- Which one of the following Physical quantities cannot be represented by Scalar?
 - Mass
 - Length
 - Momentum
 - Magnitude of acceleration
- The self - cross product of two vectors gives
 - Zero value
 - Maximum value
 - Minimum value
 - Negative value
- An object is dropped in an unknown planet E from height 50m, it reaches the ground in 2s the acceleration due to gravity in this in known planet is
 - $g = 20\text{mS}^{-2}$
 - $g = 25\text{mS}^{-2}$
 - $g = 15\text{mS}^{-2}$
 - $g = 30\text{mS}^{-2}$
- The relation between linear velocity and angular velocity
 - $\vec{V} = \vec{\omega} \times \vec{r}$
 - $\vec{V} = \frac{\vec{r}}{\omega}$
 - $a = \frac{-V^2}{r}$
 - $a = r\alpha$
- A stone of mass 0.25 kg tied to a string executes uniform circular motion with a speed of 2mS^{-1} of radius 3m. The magnitude of tensional force acting on the stone is
 - 0.333N
 - 1.5N
 - 1.333N
 - 0.555N
- When a Car takes a Sudden left turn in the curved road, passengers are pushed towards the right due to
 - inertia of direction
 - inertia of motion
 - inertia of rest
 - absence of inertia



10. An object of mass m begins to move on the plane inclined at an angle θ . The coefficient of static friction experienced by the mass is

a) mg

b) $\mu_s mg$

c) $\mu_s mg \sin \theta$

d) $\mu_s mg \cos \theta$

II Answer any three of the following.

3 x 2 = 6

Question No. 15 is compulsory :-

11. What are Dimensionless Variables? Give examples.
12. Define a Vector. Give example.
13. Write down the Kinematic equation for angular motion.
14. What are inertial frames?
15. How long will a boy sitting near the window of a train travelling at 36 kmh^{-1} see a train passing by in the opposite direction with a speed of 18 kmh^{-1} . The length of the slow moving train is 90m.

III Answer any three of the following.

3 x 3 = 9

Question No. 20 is compulsory :-

16. Write a note on "Radar Method" to measure large distances.
17. Discuss the properties of vector products.
18. What are the kinds of motion. Give examples.
19. What is meant by 'Free Body Diagram' and write the systematic steps to be followed for developing the free body diagram.
20. Calculate the centrifugal force experienced by a man of 60 kg standing at Chennai? (Give : Latitude of Chennai is 13°)

IV Answer all the questions :-

3 X 5 = 15

21. a) Explain in detail the various types of errors. **(OR)**
b) Explain the principle of homogeneity of dimensions. Give Example.
22. A) Derive the equation of maximum height, Time of Flight and Horizontal Range of a particle thrown at oblique angle θ with respect to the horizontal direction.
(OR) B) Derive the Kinematic equations of motion for constant Acceleration.
23. A) Explain the motion of blocks connected by a string in Vertical Motion. **(OR)**
B) Using free body diagram. Show that it is easy to pull an object than to push it.