

Bhavan's Tripura Vidyamandir
1st Quarterly Test: (2025-2026)

Class:- 11

Time:- 1 Hour

Roll:

Name of the student:

Subject:- Physics

Total :- 25 Marks

Sec:

General instructions:

- 1) There are 16 questions in all. All questions are compulsory
- 2) This question paper has three sections: Section A, Section B, Section C. All the sections are compulsory.
- 3) Section A contains 11 MCQ of 1 mark each, Section B contains three questions of two marks each, Section C contains only 1 question of three marks. Section D contains only 1 question of five marks.
- 4) There is no overall choice. However, an internal choice has been provided in section C, D. You have to attempt only one of the choices in such questions.
- 5) Use of calculators is not allowed.

SECTION-A

[1X11=11]

Each of the following carries 1 mark:

1. Force (F) and density (d) are related as $F = \frac{\alpha}{\beta + \sqrt{d}}$
a) $[M L^2 T^{-2}]$ b) $[L^{-1/2} T^2]$ c) $[L^{-1/2} T^{-1}]$ d) $[L T^{-2}]$
2. For an object thrown at 45° to horizontal, the maximum height (H) and horizontal range (R) are related as
a) $R = 16 H$ b) $R = 8 H$ c) $R = 4 H$ d) $R = 2H$
3. If force (F), velocity (V) and time (T) are taken as fundamental units, then the dimensions of mass are:
a) $[F V T^{-2}]$ b) $[F V^{-1} T^{-1}]$ c) $[F V^{-1} T]$ d) $[F V T^{-1}]$
4. The velocity of a particle is $V = V_0 + gt + ft^2$. If its position is $x = 0$ at $t = 0$, then its displacement after time ($t=1$) is-
a) $V_0 + \frac{g}{2} + f$ b) $V_0 + 2g + 3f$ c) $V_0 + \frac{g}{2} + \frac{f}{3}$ d) $V_0 + g + f$
5. A bullet fired into a fixed target loses half of its velocity after penetrating 3 cm. How much further it will penetrate before coming to rest assuming that it faces constant resistance to motion?
a) 1.5 cm b) 1 cm c) 3 cm d) 2 cm
6. If a unit vector is represented by $0.5\hat{i} + 0.8\hat{j} + c\hat{k}$, then the value of 'c' is -
a) 1 b) $\sqrt{0.8}$ c) $\sqrt{0.11}$ d) $\sqrt{0.01}$
7. The ratio of μ_k (coefficient of kinetic friction) and μ_s (coefficient of static friction) is-
a) Greater than 1 b) Less than 1
c) Equal to 1 d) Depends on condition.
8. A body of mass M hits normally a rigid wall with velocity V and bounces back with the same velocity. The impulse experienced by the same body is-
a) MV b) 1.5 MV c) 2 MV d) zero

9. A projectile is thrown with velocity u at angle θ . The time to reach the maximum height is t . If the angle changed to $(90^\circ - \theta)$, what happens to the time of flight?

- a) Remains same b) Doubles c) Becomes Half d) Increases

10. A particle moves in a straight line with uniform acceleration. The ratio of distances covered in the 3rd and 4th seconds is:

- a) 7:9 b) 5:7 c) 11:15 d) 13:17

11) The scalar product of two vectors is maximum when:

- a) Angle between them is 90° b) Angle is 0°
c) Angle is 180° d) Vectors are perpendicular

SECTION-B

[2X3=6]

12. The displacement of a particle is given by $x=2t^2-6t+9$ m. What will be the initial instantaneous velocity? When the velocity will become zero? [1+1]

13. Determine the maximum acceleration of the train in which a box lying on its floor will remain stationary, given that the coefficient of static friction between box and floor of the train is 0.25. Take, $g=9.8\text{m/s}^2$

14. A projectile is fired with velocity ' u ' at an angle θ with horizontal. Show that the trajectory of projectile motion is parabola.

SECTION-C

[3X1=3]

15. What is centripetal acceleration? Derive an expression for centripetal acceleration.

OR

Find out the component of $2\hat{i}+3\hat{j}$ along the direction of $\hat{i}-\hat{j}$ and $\hat{i}+\hat{j}$ [1+2]

SECTION-D

[5X1=5]

16. Derive the expression of time period of simple pendulum by using the method of dimensions of physical quantity. Take, L = length of the pendulum.

Write three physical quantities having the dimension $[ML^{-1}T^{-2}]$. [3+2=5]

OR

A block of mass 10 kg is placed on a 30° inclined plane. It is connected to another block of mass 5 kg hanging vertically by a light, inextensible string passing over a frictionless pulley. The coefficient of kinetic friction between the 10 kg block and the plane is 0.2.

- a) Draw free-body diagrams of both blocks.
b) Find the acceleration of the system.
c) Find the tension in the string.
d) State the condition under which a body remains in translational equilibrium.

[1+2+1+1=5]