

## Practice Paper

### Class – XI

### PHYSICS

1. A light body and heavy body have equal kinetic energy, which one have greater Momentum?
2. State and prove conservation of linear momentum
3. If a nucleus at rest disintegrates into two smaller nuclei, the products must be emitted in opposite directions. Explain?
4. (a) A projectile is fired in air making an angle  $\theta$  with horizontal. Show that its path is parabolic in nature.  
(b) A body is projected with speed  $u$  at an angle  $\theta$  to the horizontal to have maximum range. What is the velocity at the highest point?  
(c) What is the angle of projection of a projectile motion whose range  $R$  is  $n$  times the maximum height.
5. Prove that second law is the real law of motion.
6. (a) Explain why it is easier to pull a roller than to push it.  
(b) Suggest some ways to minimize friction.
7. Derive expression for maximum safe velocity with which a vehicle can travel on banked road.
8. Derive minimum angle of banking to travel without wear and tear?
9. (a) What is a projectile? Derive the expressions for the time of flight, and maximum height for the projectile thrown upwards at an angle  $\theta$  with the horizontal direction.  
(b) The ceiling of a long hall is 25 m high. What is the maximum horizontal distance that a ball thrown with a speed of 40 m/s can go without hitting the ceiling of the hall?
10. A body is projected at an angle  $\theta$  with the horizontal. Derive an expression for its horizontal range. Show that there are two angles  $\theta_1$  and  $\theta_2$  projections for the same horizontal range. such that  $\theta_1 + \theta_2 = 90^\circ$ .
11. Derive expression for maximum safe speed with which a vehicle can travel on banked road.
12. What is impulse? Write its S.I. unit. Show that impulse is equal to the product of average force and the time interval for which the force acts.
13. How the impulse of a force can be measured graphically?
14. Define angle of friction and angle of repose .Show that they are numerically equal.

15. (a) Find an expression for the work done against friction when a body is made to slide up an inclined plane.  
(b) Find an expression for the work done against friction when a body is made to slide down an inclined plane.  
(c) Find an expression for the work done against friction when a body is made to slide over a rough horizontal surface.
16. Derive an expression for the acceleration of a body sliding down a rough inclined plane.
17. State Parallelogram law of vector addition. Find the magnitude and direction of the resultant of two vectors in terms of their magnitudes and angle between them.
18. State triangle law of vector addition. Find the magnitude and direction of the resultant of two vectors in terms of their magnitudes and angle between them.
19. What do you understand by friction? Explain static, limiting and kinetic friction. Which of them self adjusting in nature? Draw a graph to show the variation of frictional force and applied force.
20. Consider a body of mass  $m$  moving in a vertical circle of radius  $r$ . Find the tension and velocity at any point over the circle. Show that the difference in tensions in the string at the highest and lowest point of the circle is six times the weight of the body.
21. Consider a body of mass  $m$  moving in a vertical circle of radius  $r$ . Show that the minimum velocities at the top and bottom points of the loop are  $\sqrt{rg}$  and  $\sqrt{5rg}$  respectively.
22. Derive the equations of motion by calculus methods.
23. Define centripetal acceleration and centripetal force. Derive expressions for them.
24. Why does a cyclist lean inwards while taking a turn?

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