



XI-SCI : Physics
Motion in a Plane,

DATE:

TIME: 1 hour 30
minutes

MARKS: 25

SEAT NO:

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Note:-

1. All Questions are compulsory.
2. Numbers on the right indicate full marks.

Section A

Q.1 Select and Write the correct answer.

(4)

1. Two projectiles are fired from the same point with the same speed at angles of projection 60° and 30° respectively. Which one of the following is true?
A) their range will be same B) their maximum height will be same
C) their landing velocity will be same D) their time of flight will be same
2. An object thrown from a moving bus is an example of
A) Uniform circular motion B) Rectilinear motion
C) Projectile motion D) Motion in one dimension
3. A particle starting from rest, moves with uniform acceleration. It covers a distance x_1 during third second and x_2 in the fifth second then the ratio $\frac{x_1}{x_2}$ is
A) $\frac{3}{5}$ B) $\frac{5}{9}$
C) $\frac{9}{25}$ D) $\frac{25}{81}$
4. A projectile has a maximum range of 16km. At the highest point of its motion, it explodes into two equal masses. One mass drops vertically downward, the horizontal distance covered by the other mass from the time of explosion is
A) 8 km B) 16 km
C) 24 km D) 32 km

Q.2 Answer the following.

(3)

1. Define : Horizontal range (R).
2. Write the equation for the velocity of the projectile at any time.
3. Define : Accelerated motion.

Section B

Attempt any Four

- Q.3 Explain angular displacement and deduce an expression for the same. **(2)**
- Q.4 How does the knowledge of projectile help a player in the base ball game? **(2)**
- Q.5 What does slope represents in distance-time and velocity-time graph? **(2)**
- Q.6 What is centripetal acceleration and deduce an expression for the same? **(2)**
- Q.7 Calculate the angular speed of a fly wheel making 240 revolutions per minute. **(2)**

- Q.8 A stone is tied to the end of a string 80 cm long and whirled in a horizontal circle with constant speed. If the stone makes 14 rev. in 25 sec. What is the magnitude and direction of acceleration of the stone? **(2)**

Section C
Attempt any Two

- Q.9 Derive equations of motion for a particle moving in a plane and show that the motion can be resolved in two independent motions in mutually perpendicular directions. **(3)**
- Q.10 Show that the path of a projectile is a parabola. **(3)**
- Q.11 A motor car travelling at 30 m/s on a circular road of radius 500m. It is increasing its speed at the rate of 2m/s^2 . What is the acceleration? **(3)**

Section D
Attempt any One

- Q.12 Write the equations for, **(4)**
(a) Time of flight.
(b) Horizontal range.
(c) Maximum height reached by a projectile.
- A particle moves in a circle with constant speed of 15 m/s. The radius of the circle is 2 m. Find the centripetal acceleration of the particle.
- Q.13 Derive the formula for the range and maximum height achieved by a projectile thrown from the origin with initial velocity u at an angle θ to the horizontal. **(4)**