SECTION A : MULTIPLE CHOICE QUESTION (TOTAL 05 QUESTIONS)

1. The dot product of two vectors is zero when

 a) vectors are parallel to each other
b) vectors are perpendicular to each other
c) vectors are anti-parallel to each other
d) None of these

2. In the Projectile Motion which of these is true

   a) Horizontal component of the velocity changes
   b) Vertical component of the velocity remains same
   c) Horizontal component of the velocity remains same
   d) None of these

3. The Horizontal Range of the Projectile is maximum when angle of projection in degree is
   a) 90
   b) 45
   c) 60
   d) 30

4. For two vectors to be collinear the angle between then
   a) The Cross Product to be zero
   b) The Dot Product to be zero
   c) The Cross Product to be non zero
   d) The Dot Product to be non zero

5. The greatest height to which a man can throw a stone is H. What will be the greatest distance upto which he can throw the stone?

   a) H

   b) 2H

   c) 3H

   d) 4H

SECTION B : SHORT ANSWERS QUESTIONS (TOTAL 05 QUESTIONS)

6. State and illustrate Triangle Law of Vector Addition.

7. State with the help of two vectors that their dot product is Commutative and cross product is Anti Commutative.

8. A man in rain holds his umbrella inclined to the vertical even though the rain drops are falling vertically downwards. Why?

9. A Projectile is fired horizontally with a velocity u . Show that its trajectory is a parabola. Also obtain expressions for its Time of Flight, Horizontal Range and Velocity at any time.

10. Obtain an expression for instantaneous acceleration in terms of its rectangular components.

SECTION C : LONG ANSWER QUESTIONS (TOTAL 05 QUESTIONS)

11. What is Projectile? A Projectile is fired with a velocity u making an angle Q with the horizontal. Show that its trajectory is parabola.

12. Derive an expression for the centripetal acceleration of a particle moving with a uniform speed v along a circular path of radius r. Explain how it acts along the radius towards the centre of circular path.

13. State Parallelogram Law of Vector Addition. Show that the resultant of two vectors A and B inclined at an angle Q is $(A^2 + B^2 + 2ABCosQ)^{\frac{1}{2}}$

14. Two tall buildings face each other and are at a distance of 180 m from each other. With what velocity must a ball be thrown horizontally from a window 55 m above the ground in one building so that it enters a window 10.9m above the ground in second building?

15. A motorboat is racing towards north at 25 km/h and the water current in that region is 10 km/h in the direction 60 degree east of south. Find the resultant velocity.