**Time Allowed: 1hour.**                                                     **M. M 20**
**Date: 20/5/2020**

1. The angle of projection at which the horizontal range and maximum height are equal is.     (1)
   a) $45^0$
   b) $60^0$
   c) $Tan^{-1}4$
   d) $Tan^{-1}\, 0.25$

2. Five balls A, B,C,D,E are projected with the same speed making angles of $10^0$, $20^0$, $45^0$, $60^0$, $80^0$ respectively with the horizontal. Which ball will strike the ground at the farthest point?     (1)
   a) B
   b) A
   c) C
   d) D
   e) E

3. During projectile motion the quantities that remain unchanged are.     (1)
   a) Force and vertical velocity
   b) Acceleration and horizontal velocity
   c) Kinetic energy and acceleration
   d) Acceleration and momentum

4. A particle is projected at an angle of $45^0$ with a velocity of 9.8 m/s. What will be the horizontal range?     (2)

5. At which point of projectile motion (a) potential energy is maximum (b) kinetic energy is maximum.     (2)

6. Two bombs of 2 kg and 4 kg are thrown from a cannon with the same velocity in the same direction. Which bomb will reach the ground first? Give reason.     (2)

7. A body of mass m is thrown with velocity v at an angle $30^0$ to the horizontal and another body B of the same mass is thrown with velocity v at an angle of $60^0$ to the horizontal. Find the ratio of the horizontal range and maximum height of A and B. (3)

8. Prove that there are two angles of projection for the same horizontal range. (3)

9. What is a projectile? Prove that the path of a projectile projected at an angle Q to the horizontal is a parabolic path. Also derive an expression for time of flight and maximum height attained by a projectile.     (5)