

**Section:1**

- Q.1 Can the motion of the body be in two dimensions and acceleration of the body in one dimension?
- Q.2 Under what conditions average velocity is equal to instantaneous velocity?
- Q.3 A bullet is dropped from certain height and at the same time another bullet is fired horizontally from the same height. Which bullet will reach the ground first?

**Section:2**

- Q.4 A particle is thrown over a triangle from one end of horizontal base falls on the other end of the base after grazing the vertex. if  $\alpha$  and  $\beta$  are base angles and  $\theta$  is the angle of projection, then show that  $\tan\theta = \tan\alpha + \tan\beta$
- Q.5 If instead of M,L and T as fundamental units choose force velocity and acceleration as the fundamental units, express linear momentum, angular momentum and Young's modulus [modulus of elasticity] in terms of V, A and F.
- Q.6 A point moving with constant acceleration from A to B in the straight line AB has velocities  $v_0$  and  $v$  at A and B respectively. Find its velocity at C which is mid point of AB. Also show that if time taken to move from A to C is twice the time taken to move from C to B, then  $v=7v_0$ .

**Section:3**

- Q.7 Derive the relation for centripetal acceleration of the body moving in circular path of radius  $r$  with speed  $v$ . How can we relate centripetal, tangential and total acceleration of the body in circular motion.
- Q.8 Explain "oleic acid" to measure the size of molecule
- Q.9 Derive the relation for equation of trajectory for a body which is thrown with velocity  $u$  at an angle  $\beta$  with vertical. Show that path followed is parabolic.