Motion in a Straight Line

I)

1. What do you understand by one dimensional, two dimensional and three dimensional motion.
2. Define : Displacement, distance, speed, velocity, acceleration. for uniformly accelerated motion.
3. Define : Average velocity, Instantaneous velocity.
4. Derive the equations for one dimensional uniformly accelerated motion;
5. Discuss the equations of motion for a freely falling body.
6. Derive the expression for the distance traveld in n^{th} second by an object which is uniformly accelerated.
7. Distinguish between
   a) Distance and displacement
   b) Speed and velocity.

1. An arrow shot vertically upwards from ground looses its initial speed to 50% after rising for 3 sec. find its max. height, duration of the flight

2. A car accelerates uniformly from rest to 117 km/h in 60 sec. find its accln, distance traveled in 16 sec & its speed at $t = 17$ sec.

Circular Motion

I>

1. Define : Angular displacement, Angular Velocity and Angular acceleration.

2. How will you give the direction of angular displacement ? OR

   State right hand rule for the direction of angular displacement.

3. Derive the relations between
   i) Angular displacement and linear disp.
   ii) Angular velocity and linear velocity
   iii) Angular acceleration and linear acceleration

4. State equations of motion for uniform circular motion on the basis of analogy between linear motion and circular motion.

5. Explain the concept of banking of roads.

6. Derive the expressions for the safety speed
   a) when a vehicle is traveling on horizontal road
   b) when a vehicle is traveling on banked road.

7. Define : Centripetal force , Centrifugal force.

8. Distinguish between centripetal force and centrifugal force.

9.

Projectile Motion

1. Define : Projectile, Angle of projection, Velocity of projection, Trajectory of projectile.
2. Define : Time of flight, Horizontal Range and Max. Height for a projectile.
3. Prove that the trajectory of a projectile is a parabola. or

   Derive the equation of motion for a projectile
4. Obtain the expressions for
   a) Time of flight
   b) Horizontal Range
   c) Max. Height
5.