

Name of the Student: \_\_\_\_\_

**Question No. 1 Encircle the correct option****(20)**

- i. The horizontal range of projectile at  $60^\circ$  with horizontal is same at an angle  
 a.  $30^\circ$                       b.  $60^\circ$                       c.  $90^\circ$                       d.  $120^\circ$
- ii. Which of the following quantity can be calculated from the velocity time graph:  
 a. Acceleration              b. Velocity                      c. Distance covered              d. Change of time
- iii. As rocket moves upward, its acceleration  
 a. increases                      b. decreases                      c. remains constant              d. can't be calculated
- iv. Change in momentum is also called  
 a. force                      b. acceleration                      c. torque                      d. impulse
- v. The property of a body due to which it oppose the change in its state is called  
 a. momentum                      b. torque                      c. weight                      d. inertia
- vi. When velocity time graph is a straight line, then  
 a. Velocity is constant      b. acceleration is uniform      c. velocity is variable              d. acceleration is zero
- vii. Acceleration is always produced in the direction of  
 a. velocity                      b. torque                      c. angular momentum              d. force
- viii. The distance covered by a freely falling body is 2 s will be  
 a. 4.9 m                      b. 19.6 m                      c. 9.8 m                      d. 39.2 s
- ix. Laws of motion are not valid in a frame of reference which is  
 a. inertial                      b. non-inertial                      c. at rest                      d. both inertial & non inertial
- xii. In projectile motion, vertical component of the velocity  
 a. remains constant      b. decreases                      c. increases                      d. changes
- x. Rate of change of momentum is equal to  
 a. mass                      b. impulse                      c. force                      d. none of these
- xi. The range of projectile is maximum at an angle of  
 a. zero degree                      b.  $30^\circ$                       c.  $45^\circ$                       d.  $60^\circ$
- xii. The horizontal range and height of projectile are equal at an angle of  
 a.  $75^\circ$                       b.  $76^\circ$                       c.  $77^\circ$                       d.  $78^\circ$
- xiii. The dimension of force are  
 a.  $MLT^{-2}$                       b.  $M^2LT^{-2}$                       c.  $MT^{-2}$                       d.  $ML^2T$
- xiv. The acceleration of projectile at the highest point is  
 a. zero                      b.  $9.8\text{ ms}^{-2}$                       c.  $19.6\text{ ms}^{-2}$                       d.  $32.2\text{ ms}^{-2}$
- xv. Newton's first law defines  
 a. force                      b. speed                      c. acceleration                      d. displacement
- xvi. A 10 N force is applied on a body which produces acceleration of  $1\text{ ms}^{-2}$  in it, mass of the body is  
 a. 10 kg                      b. 1 kg                      c. 5 kg                      d. 20 kg
- xvii. An object have mass 10 kg moving with acceleration  $5\text{ ms}^{-2}$ . The force applied on it is  
 a. 1 N                      b. 10 N                      c. 15 N                      d. 50 N
- xviii. When a bullet is fired by a gun, recoil is produced in  
 a. gun                      b. bullet                      c. both gun and bullet              d. no recoil is produced
- xix. A 5 kg object is falling freely, the weight of the object is  
 a. 5 N                      b. 9.8 N                      c. 19.6 N                      d. zero
- xx. From which law of motion force is calculated?  
 a. first law                      b. second law                      c. third law                      d. none of these

**Q. No. 2 Write the short answers of any six of the following****2x6=12**

- i. An object is thrown vertically upward. Discuss the sign of accel. due to gravity, relative to velocity, while object in air.
- ii. Can velocity of the object reverse the direction when acceleration is constant? If so give an example.
- iii. Define impulse and show that how it is related to linear momentum?
- iv. Motion with constant velocity is a special case of motion with constant acceleration. Is this statement true? Explain.
- v. What is the difference between uniform and variable velocity? Give their S.I units.
- vi. Find the change in momentum for an object subjected to a given forces for a given time and state law of motion in terms of momentum.
- vii. Describe the two uses of ballistic missiles.
- viii. Find out the velocity of a heavy body when it collides elastically with a light stationary body.

**Q. No. 3 (a)** Define elastic collision in one dimension. Also calculate the velocities of the two bodies after they collide elastically in one dimension. **(5)**

**(b)** A ball is thrown with a speed of 30 m/s in a direction  $30^\circ$  above the horizontal direction. Determine the height to which it rises, the time of flight and horizontal range. **(3) OR**

**Q.No. 4. (a)** Define projectile motion with two examples. Also calculate expression for i) range and ii) maximum height. **(5)**

**(b).** Two masses  $m_1$  and  $m_2$  are initially at rest with a spring compressed b/w them. What is ratio of their velocities after the spring has been released? **(3)**