

## Class-XI PHYSICS

### Assertion – Reason Type Question:

Questions are “Assertion- Reason Type” question carrying 1 mark each.

Direction: In each of the following questions, a statement of Assertion is followed by a statement of Reason. While answering a question, choose the correct one and mark it as

- (A) If both Assertion and Reason are true and reason is the correct explanation of the assertion.
- (B) If both Assertion and Reason are true but reason is not the correct explanation of the assertion.
- (C) If Assertion is true and Reason is false.
- (D) If both Assertion and Reason are false.

Q1. Assertion : The molecules of a monoatomic gas has three degrees of freedom.  
Reason : The molecules of diatomic gas has five degrees of freedom. 1

Q2. Assertion : An undamped spring mass system is the simplest free vibration system.  
Reason : It has three degrees of freedom. 1

Questions are “Short Answer Type- I” question carrying 3 marks each.

#### Friction:

Friction is an opposing force acting tangentially along the surfaces in contact whenever there is a tendency to have a relative motion between the surfaces. Static friction exactly counter balance the applied force during the stationary state of a body. The maximum value of static friction called limiting friction ( $F_s$ ) is given by  $F_s = \mu_s R$ , where  $\mu_s$  is the co-efficient of statics friction and  $R$  is the normal reaction. Kinetic friction ( $F_k$ ) is slightly less than the limiting friction and given by  $F_k = \mu_k R$ , where  $\mu_k$  is the co-efficient of kinetic friction.

- (a) A block of mass 2 kg resting freely on a rough horizontal floor, is acted by a force of 8 N horizontally. Will the block move due to the applied force and what will be the frictional force acting on the block ? [Take,  $g=10 \text{ m/s}^2$ ,  $\mu_s = 0.5$  and  $\mu_k = 0.4$ ] 2
- (b) When a heavy block slides down the surface of a rough vertical wall freely, will the acceleration of the block be less than, equal to or greater than the acceleration due to gravity ‘g’? 1

Or

#### Conservation of linear momentum:

The momentum of a body is measured by the product of mass and its velocity, i.e.  $\vec{p} = m\vec{v}$ . For an isolated system, i.e. if no external force acts on the system, total momentum of the system remains constant.

i.e. Total initial momentum = Total final momentum

- (a) When a gun of mass  $M$  fires a bullet of mass  $m$  the recoil velocity of the gun is  $v$ . If the mass the gun is reduced to half, what will be its new recoil velocity? 2
- (b) If a bomb of mass 2 kg explodes into two equal fragments, determine the angle at which these fragments will fly apart 1