

**SENIOR SECTION
DEPARTMENT OF PHYSICS
CLASS IX (2016-17)
FORCE AND LAWS OF MOTION**

WORKSHEET-1

SECTION-A

CONCEPTUAL QUESTIONS

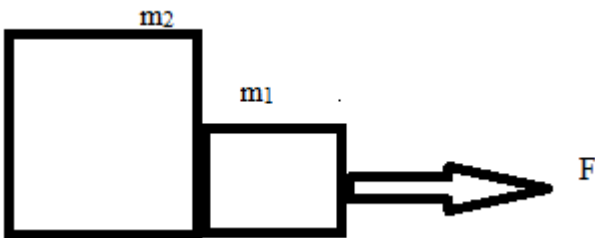
1	Why do passengers tend to fall sideways when the bus takes a sharp turn?	1
2	Why are road accidents at high speed very much worse than accidents at low speed?	1
3	Name the action and reaction forces acting during rocket propulsion?	1
4	Why do we have to run in the direction of the moving bus while getting down from the bus?	1
5	Why does an electric fan continue to rotate for sometime after the current is switched off?	1
6	A person hit harder when he falls on a concrete floor than when he falls on a heap of sand from the same height. Why?	1
7	Two identical bullets are fired one by a light rifle and another by a heavy vehicle with same force. Which rifle will hurt more and why?	2
8	Define impulse. Show that impulse of a force is equal to the change in momentum?	2
9	It is difficult to balance our body when we accidentally step on a peel of banana. Explain based on Newton's third law of motion?	2
10	A bullet fired against a glass window pane make a clear hole in it, but a stone smashes the glass pane. Why?	2
11	Define inertia. How does it depend on mass of the object? Explain (a)Dusting of a carpet by beating it with a stick. (b)Removal of water from wet cloth?	3
12	A ball is suspended by a cord from the ceiling of a car. What will be the effect on the position of the ball if (i) The car is moving with constant velocity? (ii) The car is in accelerated motion? (iii) The car is turning towards right?	3
13	Give reason and give the law related to these statements (a) It is easier to push an empty box than a box full of books. (b) It is difficult for a fireman to hold a hose which ejects large amount of water with high velocity.	3 SA1- 2012

14	State and prove the law of conservation of momentum?	3
15	In the diagram below, a 1 kg mass on a rough horizontal surface is joined to a 2 kg mass by a light, inextensible string running over a frictionless pulley. Will the 1 kg mass move at a lower, higher or zero acceleration? Explain based on Newton's laws of motion and state the law. 	3

SECTION-B

NUMERICAL PROBLEMS

16	A bullet leaves a rifle with a velocity of 100m/s and the rifle of mass 2.5 kg recoils with a velocity of 1m/s. Find the mass of the bullet?	1
17	A cricket ball of mass 0.15kg is moving with a velocity of 1.2m/s. Find the impulse on the ball and force applied by the player if he is able to stop the ball in 0.18s?	1
18	Two bodies of mass 1kg and 2kg moving in the direction opposite to each other collide with a speed of 5m/s. Calculate the total momentum of the system before collision.	1
19	A speedboat has a mass of 500kg. It starts from rest and travels 200m in 12seconds. The boat undergoes constant acceleration during 12seconds. Find the magnitude of unbalanced force acting on the boat?	1
20	A motor car of mass 200kg is moving with a certain velocity. It is brought to rest by the application of brakes, within a distance of 20m when the average resistance being offered to it is 500N. What was the velocity of the motor car?	2
21	A man throws a ball weighing 500g vertically upwards with the speed of 10m/s, find (a) Initial momentum. (b) Its momentum at the highest point.	2
22	A cricket ball of mass 0.15 kg is moving with a velocity of 1.2m/s . Find the impulse on the ball and average force applied by the player if he is able to stop the ball in 0.18s?	2
23	The velocity of a body of mass 10kg increases from 4m/s to 8m/s when a force acts on it for 5s. Find (a) the momentum before the action of force (b) the momentum after the action of force (c) the magnitude of force.	3

24	Two blocks of mass $m_1 = 1\text{kg}$ and $m_2 = 2\text{kg}$ are placed in contact on a frictionless horizontal surface. A force of 10N is acting on m_1. What is the acceleration of m_1 and m_2. What is the magnitude of action and reaction forces?  The diagram shows two rectangular blocks, labeled m_2 and m_1, placed side-by-side on a horizontal surface. Block m_2 is on the left and is taller than block m_1 on the right. A horizontal arrow labeled F points to the right, originating from the right side of block m_1, indicating an applied force.	3
25	A force 40N acting on a body of mass 10 kg changes its velocity from 5 m/s to 25 m/s. Determine : (i) Acceleration (ii) Time for which force acts (iii) Distance covered.	3 SA1- 2014