Girls' High School & College, Prayagraj

Worksheet No. - 4

Session 2020-2021

Class - IX A B C D E F

Subject- Physics

Chapter- LAWS OF MOTION

Instructions:- Parents are expected to ensure that the student spends two days to read and understand the chapter according to the books and websites referred and thereafter answer the given questions.   Student should refer to books of class 6, 7, 8 and also the following books/ websites:

1. Concise Physics, for class- IX, By R. P. Goyal and S. P. Tripathi (Selina Publisher)

2. A New Approach to I.C.S.E. Physics by V. K. Sally and D. Chauhan (Goyal Brothers Prakashan)

Website - http://quiznext.in/study-material/learning_material/ICSE-9-Physics/Laws-of-Motion/contact-and-non-contact-forces/, https://youtu.be/erghLWXDScI,

Topics :-

1.   Contact and Non – Contact Forces

2.   Newton's First Law of Motion and Inertia

3.   Linear Momentum and Newton's Second Law of Motion

1) Questions based on Contact and Non – Contact Forces :

Answer the following questions briefly :

Q1.a) Define force.

   b)State two effects which a force can bring about. Give two examples in each case.

 Q2. Define contact and non – contact forces. Give an example for each.

Q3. How many types of contact forces are there. List them with one example each.

Q4. Classify the following amongst contact and non – contact forces :

a) frictional force,	**b)** normal reaction force,
c) force of tension in a string,	**d)** gravitational force,
e) electrostatic force,	**f)** magnetic force.

 Q5.   a)A ball is hanging by a string from the ceiling of the roof. Draw a neat labelled diagram showing the forces acting on the ball and the string.

   b)A spring is compressed against a rigid wall. Draw a neat and labelled diagram showing the forces acting on the spring.

Q6 . A wooden block is placed on a palm. Name the forces acting on the block and draw a neat and labelled diagram to show the point of application and direction of these forces.

Q7. List the general characters of non – contact forces.

Q8. By the help of diagram show the force exerted during collision.

Q9. Mark with directions the forces acting on the book and table in the diagram given below.
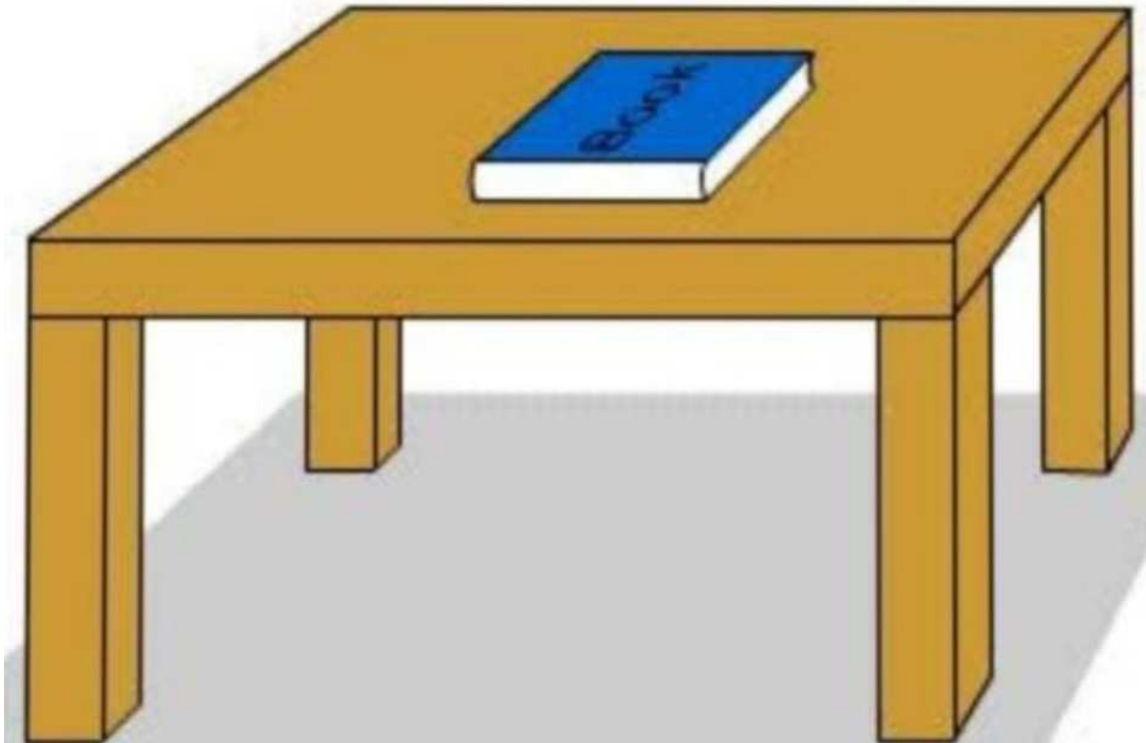
Q10. Give one example in each case where:

i)   the force is of contact, and

ii)   force is at a distance .

2) Questions based on Newton's First Law of Motion and Inertia :

(A)Answer the following questions briefly:

Q1. Name the different types of inertia.

Q2. State Galileo's law of inertia.

Q3. Give qualitative definition of force on the basis of Newton's first law of motion.

Q4.   Name the factor on which inertia of a body depends and state how it depends on the factor stated by you.

Q5. Give two examples to show that greater the mass, greater is the inertia of the body.

Q6. Two equal and opposite forces act on a stationary body. Will the body move? Give reason to your answer.

Q7. A ball moving on a table top eventually stops. Explain the reason.

(B)   Explain the following :

1.   People often shake branches of a tree for getting down its fruits.

2.   After alighting from a moving bus, one has to run for some distance in the direction of bus in order to avoid falling.

3.   It is advantageous to run before taking a long jump.

4.   Dust particles are removed from a carpet by beating it.

5.   When a train starts or stops suddenly, sliding doors of some compartments may open or shut.

(C)   Multiple Choice Questions :

1.The tendency of an objects to resist a change in motion is called:

a)   friction

b)   velocity

c)   inertia

d)   gravity.

2.A force is needed to:

a) Change the state of motion or state of rest of the body

b)Keep the body in motion

c)Keep the body stationary

d) Keep the velocity of body constant.

3.The property of inertia is more in:

a)   a car

b)   a truck

c)   a horse cart

d)   a toy car.

4. S.I. unit of force is :

a)   kgm/s

b)   newton

c)   dyne

d)   torr.

(3)Questions based on Linear Momentum and Newton's Second Law of Motion :

(A) Answer the following questions briefly:

Q1. State Newton's second law of motion. What information do you get from it?

Q2. Write the mathematical form of Newton's second law of motion. State condition if any.

Q3. Explain that Newton's first law of motion is contained in second law of motion.

Q4. How does the acceleration produced by a given force depend on mass of the body?

Draw a graph to show it.

**Q5.** What is the ratio of S.I. to C.G.S. unit of linear momentum?

(B)Numerical Problem :-

Q1 . Calculate the magnitude of force which when applied on a body of mass 0.5kg produces an accleration of 5m/s².

Q2. How much force is required to produce an accleration of 2m/s² in a body of mass 0.8kg?

Q3. Figure shows the velocity – time graph of a particle of mass 100g moving in a straight line.

Calculate the force acting on the particle.
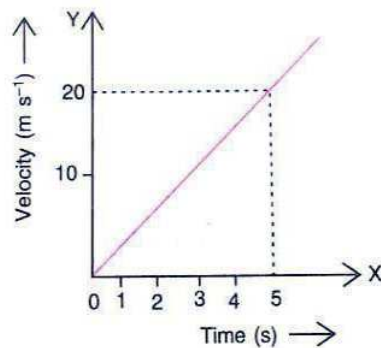
Q4. A force of 10N acts on a body of mass 2kg for 3s,initially at rest, find:

       i)   Velocity acquired by the body,

       ii)   Change in momentum of the body.

Q5. A force of 10N acts on a body of mass 2kg for 3s, initially at rest. Calculate: (i) the velocity acquired by the body, and (ii) change in momentum of the body.

Q6. A body of mass 500g, initially at rest, is acted upon by a force which causes it to move a distance of 4m in 2s. Calculate the force applied.

Q7. The linear momentum of a ball of mass 50g is 0.5kgm/s. Find its velocity.

Q8. Two balls A and B of masses 'm' and '2m' are moving with velocities '2v' and 'v' respectively. Compare their : (i)inertia, and (ii) momentum.

Q9. A force causes an accleration of 10m/s² in a body of mass 500g. What accleration will be caused by the same force in a body of mass 5kg?

Q10. A body of mass 5kg is moving with a velocity of 2m/s. Calculate its linear momentum.

END