ICSE Board
Class VI Physics
Sample Paper – 4

Time: 2Hours   **Total Marks: 75**

General Instructions:
1. ***All*** *questions are **compulsory**.*
2. *Questions 1 to 15 carry one mark each.*
3. *Questions in 2 A and B carry one mark each.*
4. *Questions in 3 A carry one mark each and 3 B carries 5 marks.*
5. *Question 4 carries 5 marks each.*
6. *Questions in 5 A and B carry one mark each.*
7. *Questions in 6 A and B carry five mark each.*
8. *Question 7 A and 7 B carry five marks.*

Question 1

Choose the correct answer out of the four available choices given under each question. [15]

1. Mechanical advantage (M.A), load (L) and effort (E) are related as
   (a) M.A = L × E
   (b) M.A × E = L
   (c) M.A × L = E
   (d) None of the above

2. Which of the following is not a lever of class II?
   (a) Nail cutter
   (b) Scissors
   (c) A bottle opener
   (d) Wheel barrow

3. If the area of contact increases, then
   (a) Pressure decreases
   (b) Pressure increases
   (c) Pressure remains constant
   (d) None of the above

4. A force which always tends to slow down the motion of an object on a surface is
(a) Weight
(b) Inertia
(c) Gravity
(d) Friction

5. Why is it harder to slide a stationary heavy box across the floor than to keep it sliding?
(a) Sliding friction is greater than the static friction.
(b) Sliding friction is less than rolling friction.
(c) Static friction is greater than sliding friction.
(d) Sliding friction is more than rolling friction.

6. Which of the following is not a fundamental unit?
(a) Cubic metre
(b) Kilogram
(c) Metre
(d) Kelvin

7. Rubbing your palms together creates warmth due to:
(a) Air in between the two palms
(b) Gravity
(c) Friction between the two palms
(d) All of the above

8. Two like magnetic poles:
(a) Attract each other
(b) Repel each other
(c) Repel when close and attract when far from each other
(d) Attract when close and repel when far from each other

9. The length having the largest magnitude out of the following options is
(a) 5 cm
(b) 7 mm
(c) 4 km
(d) 6 m

10. The magnetism acquired by a magnetic material when it is kept near (or in contact with) a magnet, is called
(a) Temporary magnetism
(b) Induced magnetism
(c) Permanent magnetism
(d) Induction

11. Water stored at a height in a dam possesses
    (a) Chemical energy
    (b) Kinetic energy
    (c) Potential energy
    (d) Electrical energy

12. Which of the following is not a non-contact force?
    (a) Frictional force
    (b) Gravitational force
    (c) Electrostatic force
    (d) Magnetic force

13. A block of weight 400 N is kept on the floor. The area of contact is 4 m^2. The pressure exerted by the box on the floor is
    (a) 200 Pa
    (b) 400 Pa
    (c) 300 Pa
    (d) 100 Pa

14. Every object in this universe, whether small or large exerts a force on every other object. What is the name of this force?
    (a) Electrostatic force
    (b) Gravitational force
    (c) Magnetic force
    (d) Nuclear force

15. Calculate the distance between a man and a box when the work done to move the box was 100 J with a force of 15 N.
    (a) 16.6 m
    (b) 26.6 m
    (c) 6 m
    (d) 6.6 m

Question 2

(A) Name the following.   [5]
1. Fundamental unit of temperature.
2. Simplest machine.
3. A quantity which depends on other quantities.
4. Time taken by the Earth to complete one rotation about its own axis.
5. Force of friction between a rolling object and surface.

(B) Fill in the blanks.   [5]
1. Electricity produced from water is called _____.
2. The normal temperature of the body is _____.
3. To increase pressure, area of contact is _____.
4. _____ is the surest test of magnetism.
5. Force of gravity is always directed towards the _____ of the Earth.

Question 3

(A) Match the following.   [5]

Column A	Column B
1. Volume	a. Electrical to heat
2. Heater	b. Class I lever
3. Claw hammer	c. m/s
4. Speed	d. Light to electrical
5. Photo voltaic cell	e. m^3

(B) Correct the following sentences.   [5]
1. An object can be measured with an accuracy of 0.01 mm with a vernier calliper.
2. A class II lever has fulcrum in the middle.
3. Weight of an object is the force with which an object gets attracted towards the ground.
4. Static friction is lesser than sliding friction and greater than rolling friction.
5. In a solar cell, light energy is converted to heat energy.

Question 4

(A) [5]
1. What are derived units?
2. How many base units are there in S.I. system?
3. Name the larger units of length?
4. Name the shorter units of length?
5. What is parallax?

(B) A girl of mass 50 kg is standing on pencil heels each of area of cross-section 1 cm² and an elephant of mass 5000 kg and foot area 250 cm² each, are standing on a floor. Which one will exert more pressure and what is the difference between the pressure exerted by the girl and the elephant? [5]

Question 5

(A) Answer in one sentence: [5]
1. Why do all machines require proper care and maintenance?
2. Define 1 Joule of work.
3. When do we say that work is done?
4. What is volume? What is its unit?
5. Name the force in action when a potter turns his wheel.

(B) Find the odd one out. [5]
1. Iron, nickel, cobalt, aluminium
2. Length, mass, area, time
3. kelvin, volta, celsius, Fahrenheit
4. Magnetic force, gravitational force, electrostatic force, frictional force
5. Making pores, using lubricants, polishing, using ball bearings

Question 6

(A) What is magnetic induction? Explain with the help of a diagram. [5]

(B) Define the following. [5]
1. One kilogram
2. Muscular force
3. Pressure
4. Length of a magnet
5. Efficiency

Question 7

(A) Answer the following.

   1. Define Kinetic energy and Potential energy?   [2]

   2.   What are the effects of force?   [3]

(B) Answer the following.

   1. What is friction? Write any two advantages of friction?   [2]

   2. What is a screw? Give three uses of screws.   [3]

Solution

Question 1

1. (b) M.A × E = L. Mechanical advantage is the ratio of load to effort. Hence, we get

$$M.A = \frac{L}{E}$$

$$\therefore M.A \times E = L$$

2. (b) Scissors. Scissors is a class I lever, whereas other three are class II levers.

3. (a) Pressure decreases. Pressure is inversely proportional to area. Hence, pressure decreases when area of contact increases.

4. (d) Friction. Force of friction always tends to slow down the motion of an object on a surface.

5. (c) Static friction is greater than sliding friction. Static friction is greater than sliding friction so, it becomes harder to slide a stationary box than to keep it from sliding.

6. (a) Cubic metre. Cubic metre is a derived unit and others are fundamental units.

7. (c) Friction between the two palms. When we rub our palms together, we feel them warmer due to the force of friction that comes into play when two surfaces are rubbing against each other.

8. (b) Repel each other. When two like poles of a magnet are brought close to each other, they repel each other.

9. (c) 4 km. By converting all the numbers in same unit of 'mm', we have
   5 cm = 50 mm
   7 mm = 7 mm
   4 km = 4000000 mm
   6 m = 6000 mm
   So, the largest magnitude is 4 km.

10. (b) Induced magnetism. The magnetism acquired by a magnetic material when it is kept near (or in contact with) a magnet, is called induced magnetism.

11. (c) Potential energy. Water stored at a height in a dam possesses potential energy.

12. (a) Frictional force. Frictional force is a contact force which comes into play only when two surfaces are in contact.

13. (d) 100 Pa.

Given: F = 400 N

$A = 4 \text{ m}^2$

We know that

$$P = \frac{F}{A}$$

$$\therefore P = \frac{400}{4} = 100 \text{ Pa}$$

14. (b) Gravitational force. All objects in the universe exert a gravitational force on all other objects.

15. (d) 6.6 m.

Given: W = 100 J

F = 15 N

We know that

W = Fs

$$\therefore s = \frac{W}{F} = \frac{100}{15} = 6.6 \text{ m}$$

Question 2

(A)

1. kelvin
2. Lever
3. Derived quantity
4. Mean solar day
5. Rolling friction

(B)

1. Hydro-electricity
2. 37 °C
3. Decreased
4. Repulsion
5. Centre

Question 3

(A)

Column A	Column B
1. Volume	a. m^3
2. Heater	b. Electrical to heat
3. Claw hammer	c. Class I lever
4. Speed	d. m/s
5. Photo voltaic cell	e. Light to electrical

(B)

1. An object can be measured with an accuracy of 0.1 mm with a vernier calliper.
2. A class II lever has load in the middle.
3. Weight of an object is the force with which the object gets attracted towards the centre of the earth.
4. Static friction is greater than sliding friction and rolling friction.
5. In a solar cell, light energy is converted to electric energy.

Question 4

(A)

1. The units of derived quantities which can be expressed as a combination of basic units are called derived units.
2. There are seven base units in S.I. system.
3. Astronomical unit and light year.
4. Angstrom and nanometre.
5. The apparent change in position of object with respect to a point when viewed with left and right eye is known as parallax.

(B)

Weight of the girl $= 50 \text{ kgf} = 50 \times 10 = 500 \text{ N}$

Area of the heels $= 2 \times 1 \text{ cm}^2 = 2 \text{ cm}^2$

$\therefore$ Pressure exerted by the girl $= \dfrac{W}{A} = \dfrac{500}{2} = \dfrac{500 \times 100 \times 100}{2} = 2500000 \text{ Pa}$

Weight of the elephant $= 5000 \text{ kgf} = 5000 \times 10 = 50000 \text{ N}$

Area of the feet $= 4 \times 250 \text{ cm}^2 = \dfrac{4 \times 250}{100 \times 100} \text{ m}^2$

$\therefore$ Pressure exerted by the elephant $= \dfrac{W}{A} = \dfrac{50000 \times 100 \times 100}{4 \times 250} = 500000 \text{ Pa}$

Hence, we can see that the girl will exert more pressure than that of the elephant by $2500000 - 500000 = 2000000 \text{ Pa}$

Question 5

(A)

1. All machines require proper care and maintenance for their efficient and longer use.
2. 1 Joule is the amount of work done, when a force of 1 newton displaces a body by 1 metre along the line of action of force.
3. Work is said to be done when a force acts on an object and as a result of this force the object gets displaced from its initial position.
4. The space occupied by an object is known as its volume.
    Its S.I. unit is metre-cubed (m^3).
5. When the potter turns his wheel, he applies muscular force.

(B)

1. Aluminium. Only aluminium is a non-magnetic substance. Others are non-magnetic substances.
2. Area. Area is a derived quantity. Others are fundamental quantities.
3. volta. volta is not a unit of temperature. Others are units for measuring temperature.
4. Frictional force. Frictional force is a contact force. Others are non-contact forces.
5. Making pores. Making pores is a way to increase the friction. Others are ways to decrease friction.

Question 6

(A) The property by which an ordinary piece of iron acquires magnetic properties due to the presence of another magnet is called magnetic induction.
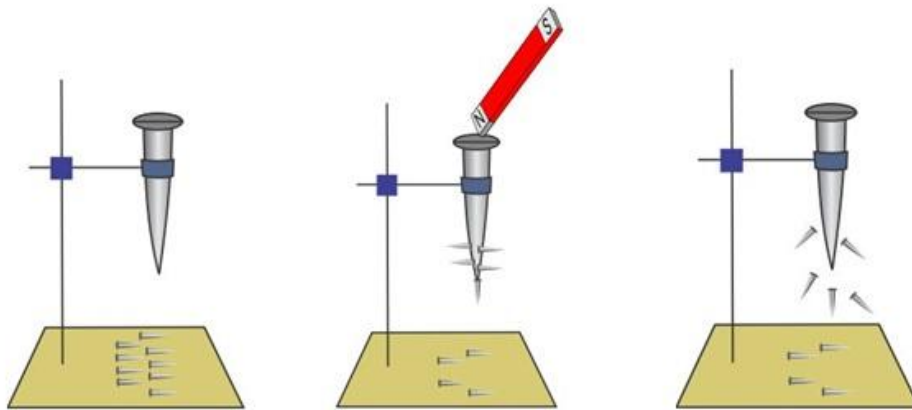
Spread some iron pins on the base of a stand. These pins are not attracted to the nail. When a magnet is touched to the head of the nail, some pins at the base of the stand cling to the nail. This is because the nail turns into a magnet, and hence, acquires the property of magnetism. This is magnetic induction.

When the magnet is removed from the head of the nail, the pins fall down showing de-magnetism. Hence, the nail acquires magnetism and pins get attracted to it by induction.

(B)

1. It is defined as the mass of a cylinder of platinum-irridum alloy kept at International Bureau of Weights and Measures in Paris.
2. Muscular force is the force produced by the muscles of living beings.
3. The force acting per unit surface area is called pressure.
4. The total distance between the North Pole to the centre and the centre to the South Pole of a magnet is called the length of a magnet.
5. Efficiency is the ratio of work done by the machine to the work done on the machine.

Question 7

(A)

1. Kinetic energy: Kinetic energy is the energy possessed by a body by virtue of its motion. It is given by the formula: $K.E = 1/2\ mv^2$
   Potential energy: Potential energy is the energy possessed by a body by virtue of its position with reference of the Earth. It is given by the formula: $P.E = mgh$
2. The effects of force are as follows:
   - A force can make a stationary object move.
   - A force can stop a moving object.
   - A force can change the direction of a moving object.
   - A force can change the speed of a moving object.
   - A force can change the shape and size of an object.

(B)

1. Friction is the resistance to motion experienced when two surfaces in contact move with respect to each other.
   The following are the advantages of friction:
   - It is due to friction that we can walk without slipping.
   - We can hold a pen or a pencil and write due to friction.
   - It is due to friction that a nail or screw remains fixed in a wall.
   - Brakes of all automobiles work due to friction.
   - A match stick is lighted due to friction of its tip with the matchbox.

2. A screw is a rotating (winding) inclined plane.
   The following are the three uses of a screw:
   - It is used to hold two pieces of wood or metal tightly.
   - Screw jack is used for lifting a car or a truck, in order to change a punctured wheel.
   - A cork screw is used for pulling out a cork from the bottles of wine or ketchup.