Class IX – Physics Worksheet

Section A: Multiple Choice Questions (MCQs)

(1 × 5 = 5 marks)

1. The slope of a distance–time graph represents:
   a) Acceleration
   b) Speed
   c) Velocity
   d) Displacement

2. The SI unit of force is:
   a) Dyne
   b) Newton
   c) Joule
   d) Watt

3. The value of acceleration due to gravity on Earth is approximately:
   a) 8.9 m/s²
   b) 9.8 m/s²
   c) 10.8 m/s²
   d) 12 m/s²

4. Which form of energy is possessed by a moving object?
   a) Potential energy
   b) Chemical energy
   c) Kinetic energy
   d) Heat energy

5. The unit of frequency is:
   a) Decibel
   b) Hertz
   c) Joule
   d) Metre

Section B: Assertion and Reason Questions

(1 × 2 = 2 marks)
(Choose the correct option)

A. Both Assertion and Reason are true, and Reason is the correct explanation of Assertion
B. Both Assertion and Reason are true, but Reason is not the correct explanation
C. Assertion is true, Reason is false
D. Assertion is false, Reason is true

1. **Assertion:** An object moving with uniform velocity has zero acceleration.
   Reason: Acceleration is the rate of change of velocity.

2. **Assertion:** The weight of an object changes with change in location.
   Reason: The mass of an object depends on gravity.

Section C: Very Short Answer Questions

(1 × 4 = 4 marks)

1. Define speed.
2. What is inertia?
3. Write the SI unit of work.
4. What is the audible range of sound for human beings?

Section D: Short Answer Questions

(2 × 4 = 8 marks)

1. Differentiate between distance and displacement.
2. State Newton's first law of motion.
3. Write the formula for gravitational force between two objects.
4. Define kinetic energy and write its mathematical expression.

Section E: Long Answer Questions

(5 × 2 = 10 marks)

1. Explain the three laws of motion given by Newton.

OR

Derive the three equations of motion for uniformly accelerated motion.

2. What is sound? Explain how sound is produced and propagated.

Section F: Case Study Based Question

(5 marks)

A student observes that when a ball is dropped from a height, it falls faster as it moves downward. He also notices that the sound produced by striking a metal plate is louder than that produced by striking a rubber sheet.

Answer the following questions:

a) Which force causes the ball to fall towards the Earth? (1 mark)
b) What happens to the velocity of the ball as it falls? (1 mark)
c) Which form of energy does the ball possess just before touching the ground? (1 mark)
d) Why is the sound from the metal plate louder? (1 mark)
e) Name one factor on which loudness of sound depends.

Numerical questions

Chapter 8: Motion

A car moves with a uniform velocity of 20 m/s for 5 minutes. Calculate the distance covered.

A train starts from rest and attains a velocity of 15 m/s in 30 seconds. Find its acceleration.

A body moves with an initial velocity of 5 m/s and acceleration of 2 m/s². Find the distance covered in 10 s.

A bus slows down from 18 m/s to 6 m/s in 6 seconds. Calculate its retardation.

A car covers the first half of the distance at 40 km/h and the second half at 60 km/h. Find the average speed.

Chapter 9: Force and Laws of Motion

Calculate the force required to accelerate a mass of 10 kg at 2 m/s².

A bullet of mass 20 g is fired with a velocity of 300 m/s. Calculate its momentum.

A force of 50 N acts on a body of mass 25 kg. Find the acceleration.

A ball of mass 200 g moving with a velocity of 10 m/s is stopped in 5 s. Calculate the force applied.

Two objects of masses 5 kg and 10 kg move with the same velocity. Which has more momentum and by how much?

Chapter 10: Gravitation

Find the gravitational force between two masses of 5 kg and 10 kg kept 2 m apart.

($G = 6.67 \times 10^{-11}$ Nm^2/kg^2)

Calculate the weight of a body of mass 60 kg on Earth. ($g = 9.8$ m/s^2)

A stone is dropped from a height of 20 m. Calculate the time taken to reach the ground.

Find the mass of an object whose weight is 98 N.

A body weighs 500 N on Earth. What will be its weight on the Moon? (g on Moon = g/6)

Chapter 11: Work and Energy

A force of 20 N displaces an object by 5 m in the direction of force. Calculate work done.

Calculate the kinetic energy of a body of mass 4 kg moving with a velocity of 5 m/s.

A stone of mass 2 kg is lifted to a height of 10 m. Find its potential energy.

Find the work done if a body is moved through a distance of 10 m by a force of 0 N.

A machine produces 500 J of work in 10 s. Calculate its power.

Chapter 12: Sound

Sound travels at a speed of 340 m/s. Calculate the wavelength if frequency is 170 Hz.

Find the frequency of a sound wave whose wavelength is 0.5 m and speed is 340 m/s.

A sound wave has a time period of 0.002 s. Find its frequency.

Calculate the speed of sound if wavelength is 1.2 m and frequency is 300 Hz.

How far will sound travel in 3 seconds if its speed is 340 m/s?