

# PM SHRI KENDRIYA VIDYALAYA NO. 1, ROORKEE

## Autumn Break Homework Assignment (Session 2026–27)

| CLASS & SUBJECT | SYLLABUS COVERED                         | MAX. MARKS | SUBMISSION DATE       |
|-----------------|------------------------------------------|------------|-----------------------|
| XI Physics      | Chapters 1 to 7<br>(as covered in class) | 50 Marks   | First Day After Break |

### General Instructions for Students:

- Complete the work over the 10 days of the autumn break; do not leave it all for the last day.
- Solve numerical problems with formula, substitution, SI units and final answer.
- Draw neat, labelled diagrams/graphs wherever required. Use a separate Physics homework notebook.
- This assignment contributes to subject enrichment and portfolio assessment.

### SECTION A: Objective Type Questions (15 Marks)

#### Q1. Multiple Choice Questions (Choose the correct option): [1 × 5 = 5 Marks]

- (i) The dimensional formula of impulse is: (a)  $[MLT^{-1}]$  (b)  $[MLT^{-3}]$  (c)  $[ML^2T^{-2}]$  (d)  $[M^2LT^{-2}]$
- (ii) The slope of a position–time graph represents: (a) acceleration (b) velocity (c) force (d) momentum
- (iii) A projectile has its maximum horizontal range when projected at: (a)  $30^\circ$  (b)  $45^\circ$  (c)  $60^\circ$  (d)  $90^\circ$
- (iv) The SI unit of coefficient of friction is: (a) Newton (b) joule (c) no unit (d) pascal
- (v) Work done by a centripetal force in uniform circular motion is: (a) positive (b) negative (c) zero (d) variable

#### Q2. Fill in the blanks: [1 × 5 = 5 Marks]

- (i) The number of significant figures in 0.00450 is \_\_\_\_\_.
- (ii) The area under a velocity–time graph gives \_\_\_\_\_.
- (iii) The horizontal and vertical motions of a projectile are \_\_\_\_\_ of each other.
- (iv) Newton's second law gives force as the rate of change of \_\_\_\_\_.
- (v) The dimensional formula of work is \_\_\_\_\_.

#### Q3. Match the following: [1 × 5 = 5 Marks]

| Column A        | Column B                                                      |
|-----------------|---------------------------------------------------------------|
| 1. Displacement | (A) $\text{kgm/s}^2$                                          |
| 2. Force        | (B) Scalar product of force and displacement                  |
| 3. Work         | (C) Shortest directed distance from initial to final position |
| 4. Acceleration | (D) Change in velocity per unit time                          |
| 5. Momentum     | (E) Product of mass and velocity                              |

## SECTION B: Short Answer & Numerical Questions (15 Marks)

- Q4. [2 marks]** State the principle of homogeneity of dimensions. Why is it useful?
- Q5. [2 marks]** Distinguish between distance and displacement with one example.
- Q6. [2 marks]** A car's velocity changes from 5 m/s to 20 m/s in 3 s. Calculate its uniform acceleration.
- Q7. [3 marks]** A ball is projected horizontally from a height. Explain why its horizontal velocity remains constant (neglect air resistance), while its vertical velocity changes.
- Q8. [3 marks]** A 4 kg object is acted upon by a net force of 12 N. Find its acceleration. If it starts from rest, find its velocity after 5 s.
- Q9. [3 marks]** Explain static friction, limiting friction and kinetic friction. Give one everyday example.

## SECTION C: Long Answer & Conceptual Questions (12 Marks)

### Q10. Answer in detail. [4 × 3 = 12 Marks]

- (a) Explain accuracy and precision. Write the dimensional formulae of force, work and power. (4 marks)
- (b) Derive expressions for the time of flight and maximum height of a projectile projected with speed  $u$  at angle  $\theta$  to the horizontal. (4 marks)
- (c) State Newton's three laws of motion and explain any one with a suitable daily-life example. (4 marks)

## SECTION D: Practical Activity & Investigative Project Work (8 Marks)

### Activity 1: Motion Graph Investigation (4 marks)

Record the motion of a toy car or a moving object over a measured straight path. Note its position at equal time intervals and prepare a position–time table. Draw a position–time graph and describe whether the motion is uniform or non-uniform. Include aim, materials, observations and conclusion.

### Activity 2: Friction Around Us (4 marks)

Choose three surfaces (for example, tile, cardboard and cloth). Slide the same small object across each surface using a spring balance if available, or compare the effort needed. Prepare a table of surface, observed friction and inference. Explain how the results relate to the nature of the surfaces. Do not use heavy or hazardous objects.

## ADDITIONAL CHAPTER PRACTICE — CLASS XI PHYSICS

### System of Particles and Rotational Motion

- Q11. (3 marks)** (a) Define centre of mass. (1)  
(b) Write the relation between torque, moment of inertia and angular acceleration. (1)  
(c) A constant torque of 6 N m acts on a body of moment of inertia  $2 \text{ kg m}^2$ . Calculate its angular acceleration. (1)

**Q12. (2 marks)** State the principle of conservation of angular momentum. Give one example from daily life or sports.

### Gravitation

- Q13. (3 marks)** (a) State Newton's universal law of gravitation. (1)  
(b) Write the relation between acceleration due to gravity  $g$  and universal gravitational constant  $G$ . (1)  
(c) A body has mass 5 kg. Calculate its weight on Earth, taking  $g = 9.8 \text{ m/s}^2$ . (1)
- Q14. (2 marks)** Differentiate between mass and weight.

Write the S.I. unit of each. **UPDATED 10-DAY STUDY PLAN**

| Day | Suggested Work                                                                  | Done |
|-----|---------------------------------------------------------------------------------|------|
| 1   | Revise units, dimensions, significant figures and measurement errors.           | ■    |
| 2   | Practise dimensional analysis and significant-figure questions.                 | ■    |
| 3   | Revise distance, displacement, velocity, acceleration and motion graphs.        | ■    |
| 4   | Revise vectors and projectile motion; practise numerical problems.              | ■    |
| 5   | Revise Newton's laws, momentum, impulse and friction.                           | ■    |
| 6   | Study centre of mass, torque, moment of inertia and angular momentum.           | ■    |
| 7   | Practise rotational-motion numericals and conservation of angular momentum.     | ■    |
| 8   | Revise universal gravitation, acceleration due to gravity, mass and weight.     | ■    |
| 9   | Attempt all assignment questions without notes; check formulae and units.       | ■    |
| 10  | Complete activities, correct mistakes and organise the notebook for submission. | ■    |

Note: Complete these additional questions along with the main assignment. Show formulae, calculations and SI units in all numerical answers.

## Departmental Submission & Approval

Certified that the assigned work is intended to reinforce the concepts covered in Class XI Physics and encourage independent practice, observation and scientific reasoning.

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| Subject Teacher | Head of Department / HOD | Principal Signature |
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