

PHYSICS · CHAPTER 3

Motion in a Plane

A 1-page guide for parents · 90-second read.

EXPECTED MARKS

8 marks

TIME TO MASTER

10-12 hrs

HELPLINE

70330 05444

WHAT THIS CHAPTER IS, IN PLAIN ENGLISH

This chapter takes everything your child learned about straight-line motion (Chapter 2) and extends it to two dimensions — like a cricket ball thrown at an angle, a stone slid off a table, or a fan blade spinning in a circle. The big new idea is the VECTOR: a quantity with magnitude AND direction (velocity, displacement, force) as opposed to scalars (mass, time, temperature). Your child will learn to add vectors using the triangle and parallelogram laws, break them into components (A_x and A_y), and apply unit vectors $\hat{i}$, $\hat{j}$, $\hat{k}$. The chapter's centrepiece is PROJECTILE MOTION — calculating how far a ball travels, how high it goes, and how long it stays in the air when launched at an angle. The trick is that horizontal and vertical motions are INDEPENDENT — you solve each as a separate 1D problem and combine results. The chapter ends with UNIFORM CIRCULAR MOTION — a body moving in a circle at constant speed still has acceleration (called centripetal acceleration, always pointing to the centre). Projectile motion is the highest-yielding 5-mark question in the entire Class 11 syllabus, asked nearly every year.

5 QUESTIONS TO ASK YOUR CHILD

- What is the difference between a scalar and a vector? Give one example of each.
- Write down the projectile motion formulas for time of flight T , max height H , and range R . At what angle is range maximum and what is its maximum value?
- Why is the horizontal velocity of a projectile constant throughout its flight?
- At the highest point of a projectile, is the velocity zero? (Trick — only the vertical component is zero; horizontal continues.)
- What is centripetal acceleration and in which direction does it point? Why does the speed of a body in uniform circular motion remain constant despite having acceleration?

WEAK-SPOT INDICATORS

- Adds vector magnitudes directly ($|A + B| = |A| + |B|$) regardless of angle — flag this immediately.
- Uses $\sin$ where $\cos$ is needed (or vice versa) when resolving vectors into components.
- Treats horizontal and vertical motion of a projectile as coupled rather than independent.
- Says total velocity is zero at the peak of a projectile — confuses with 1D vertical throw.
- Says speed changes during uniform circular motion — classic misconception, redo the topic.

WHEN TO WORRY — AND WHAT TO DO

If your child cannot solve a single projectile numerical end-to-end after 1 week of practice, or struggles to resolve a vector into components, request a focused revision with the faculty. This chapter is the conceptual backbone for all of Class 11 mechanics and many Class 12 topics.

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