

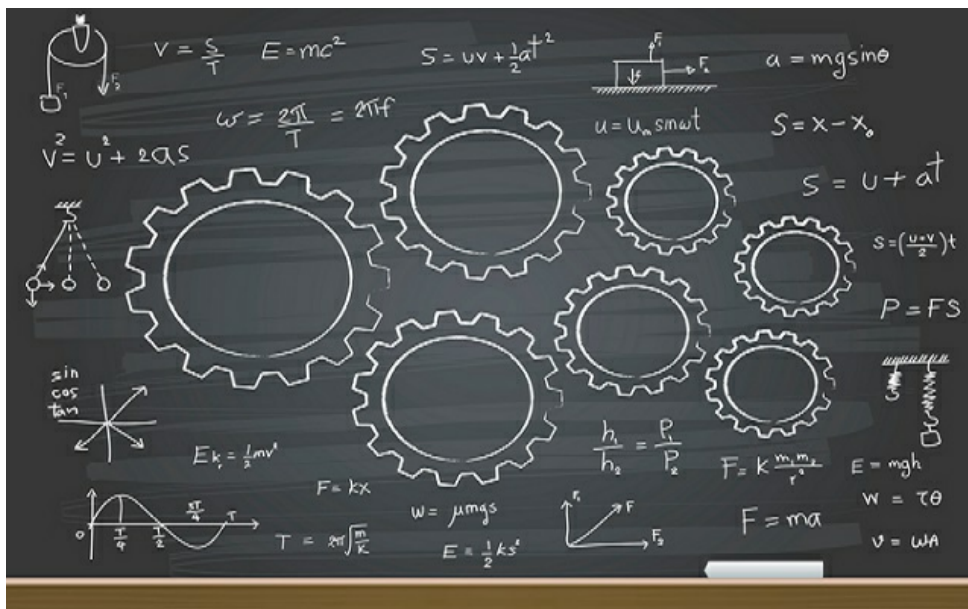
# Mechanics for JEE Advanced Exam Preparation: Physics

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Shiksha Knowledge Series

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JEE Advanced is conducted every year for admission to 23 IITs across the country. Either of the seven Indian Institutes of Technology (IITs) namely IIT Kharagpur, IIT Kanpur, IIT Madras, IIT Delhi, IIT Bombay, IIT Guwahati, and IIT Roorkee or Indian Institute of Science (IISc) Bangalore under the aegis of the Joint Admission Board



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(JAB) conducts the engineering entrance exam.

In the JEE Advanced, questions are asked from three subjects: Physics, Chemistry, and Mathematics. In the Physics question paper of [JEE Advanced](#), Mechanics is one of the broadest topics. Considering its weightage, which is almost one-third of the total portion of Physics, it is important to have good command on it for decent performance in the exam.

## Course Walkthrough

Now, let's go through the course briefly.

- First topic of mechanics is Kinematics in one dimension and two dimensions. This is the most fundamental part of mechanics. Uniform circular motion and relative motion are some topics in Kinematics from where questions are generally asked. However, in JEE Advanced, questions will not come solely from this topic but nonetheless, you should have good command on it because its concepts are used in many questions.
- The next one is Newton's Laws of Motion. This topic is the heart of mechanics. Whatever happens in mechanics is governed by these laws. Understand



these laws logically and intuitively. The topics which are covered under it are Work and Power, Friction and Conservation of Linear Momentum and Energy. You can expect a couple of questions directly from these topics.

- After that, you will study Centre of Mass(CoM) and Collisions(elastic and inelastic). CoM is easy if you're good at integration. You just have to follow a basic formula and you can solve almost any question. As far as collisions are concerned, you have to be a little more careful in questions on inelastic collisions as they can be a little tricky. But with the proper practice of some diverse questions, it will be fine.
- Next, you will study Gravitation. This topic, like previous ones, is also among the easy topics of the mechanics. You just have to remember the general formula of gravitational force and the variation of the gravitational field and potential with height/depth from the surface of the Earth. Solve some questions using these formulas and you can easily solve the questions asked in exams. Generally, one question comes in a couple of years directly from this topic.



- After that, you will study Rigid Body Motion. This topic can really be mind-boggling. To master this topic, your visualization of the situation in problem and understanding of the mechanics should be top-notch. You will study different terms in this topic like torque, angular momentum, and moment of inertia. Although these terms are equivalent to force and momentum of Kinematics in 1-D and 2-D, the questions related to them are little tricky. So, good knowledge of previous topics can be very helpful to understand this. Rolling without slipping in rings, cylinders, and spheres is also an important but relatively easy part of this topic. You can expect the use of its concepts in lots of questions in JEE Advanced.
- Now comes the Simple Harmonic Motion (SHM). Although its name contains 'Simple', it certainly is not a simple topic. The concepts of SHM can be used in every part of Physics. In recent years, SHM weightage has been increased in JEE Advanced. Sometimes, even a whole paragraph based question appears in the exam from this topic.
- Hooke's law and Young's Modulus are quite simple



topics. There are some standard questions that you can solve and remember the basic theory. This will be enough for you to solve any question of the JEE Advanced level on these topics.

- The next part is Fluid Mechanics. In this topic, you have to memorize some of the things to get an edge in the exam. That's why students with sharp memory generally perform better in it. Of course, it doesn't mean that memory is all you need for this topic. There are also some concepts that you need to understand like Pascal's law, Archimedes's principle, and Bernoulli's equation. You should memorize all the formulas related to Capillary rise, Stoke's law, and Terminal velocity. It has a pretty good weightage in JEE Advanced.
- The last topic of mechanics is Wave motion. This is another tough topic of mechanics. This topic can be very deep and confusing. So I will suggest that first, you should study about Beats, the speed of sound in different material, Doppler effect and Resonance which are simple. Then you study the vibration of strings and air columns. At last, study the superposition of waves.



## Some basic tips:

- If you are struggling with mechanics, then don't worry, you are one of the many students who are going through the same phase. So, the first thing you need to understand is where you are struggling. It may depend upon which state of preparation you are at.
- If you are at the final stage of your preparation, then you might have doubts about certain concepts. So for this, you should take the help of your teacher or your classmates as this is the most efficient way to clear your doubts. Don't start to search for things on the internet in the last time. You will just confuse yourself. If time is very less, then focus on things which have high weightage in an exam. Don't try to learn too many things in little time. Just strengthen whatever you know. This is the best strategy.
- If you have just started your preparation, then you may have difficulty with the basic things. Don't lose your calm. You will understand it. Reading books and different types of articles will also strengthen your



concepts. But make sure that you don't waste your time. After all, it is although important, but only a part of your whole massive JEE syllabus.

## Some relevant books

- For someone who has just started preparation, H C Verma will be a good book to start with for a better understanding of basic concepts.
- If you have difficulty in understanding the theory, Resnick Halliday is a good option. It explains every concept in detail.
- If you are good at mechanics then solving I.E.Irodov can be fun. If you can solve this book, then, believe me, you will easily cruise through JEE Advanced physics paper.

At last, I just want to say that mechanics may seem tough to you but once you get its idea, I'm sure you will enjoy it. The solutions to problems in mechanics follow a certain set of rules and laws, which you will know after solving lots of problems. Just work hard, stay focused and enjoy the most interesting topic of Physics.

## About the Author:





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*During his free time, he enjoys writing articles/blogs. He is an Entrepreneur, Coder, Speed-cuber, gamer, and fan of Air crash investigation!*

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