

Practicing Problem Solving- Physics

Growing with concepts has two parts, First is assimilation of concepts and Second is practicing concepts in problem solving. Second part is essential in carving proficiency in use of concepts, the essence of learning. Therefore, First Part of concepts through a series of articles in this column has been completed and integrated in Mentor's Manual, as a free web-resource.

The Second Part has been started in May'18 issue of the e-Bulletin. This would cover sequentially topic-wise typical questions in the form of a question paper. Since, such set of questions as of now shall be made available at monthly frequency, it may be difficult for students, aspiring to make best of it to wait for next month. Therefore, answers to each question are provided in the respective e-Bulletin, for verification. In case any student is unable to arrive at correct answer illustration of the problems is available in the same bulletin at a different place, with an advise not to jump on it in first attempt.

These questions are drawn from various sources viz. text books, study materials, examinations, and moderation has been made to the possible extent. This shall continue until we are able to automate extracting a set of questions, in the form of a question paper, where question are available on topic wise, level-wise, type-wise or mixed for intensive practice. All these effort are and shall be available as free web-resource.

It is advised that before starting with questions, concepts of the topic are so understood that it is possible to revise them without book or copy, i.e. revise mentally. It is assured that this capacity of mental revision is achievable with little practice, and then it keeps growing in intensity and complexity. *All that it requires is faith in enormous capacity of self and ability to think.* Albert Einstein had said – “*Education is not the learning of facts, but training of mind to think*”

Accordingly, some steps are to be followed while attempting question - **1)** Read question to see what is given. If it is nor clear read carefully the problem statement. **2)** Read question to understand what asked. This is the objective of problem and must be clear before attempting solution, else read it again. **3-a)** Never start attempting solutions intuitively, visualize the problem statements and for clarity, if required, draw a diagram, formulate basic equations also called mathematical model. **3)** Solution of problem - **3-b)** Choose equations most appropriate for solving the problem in hand, else a wrong starting point may divert attention leading to more calculations or a lengthy solution. **3-c)** Never be in hurry of calculation at each step, most of the calculations are simplified by cancellation. Generally in physics attempt is to test conceptual clarity. **3-d)** Never forget to write answer using principles of significant digits. **4)** Last but not the least – **4-a)** Check solution to verify whether it is conforming to step (2) above. **4-b)** Check solution to ensure given variables are placed correctly in solution and there is no calculation error.

General practice is to remember formulae of each chapter first, before solving problems. This may lead to error in application of concepts in the event of any twist in problem. Once practice is started with basic equations, automatically both concepts and related formulae become intuitive. This helps in – **a)** visualization of problems with clarity, **b)** evolving solution in minimum number of steps as suggested in step (3) above, **c)** better understanding with accuracy and speed, the parameter of excellence, intelligence and success, and **d)** acting as a safeguard from risk of unreliable efforts on mugging formulae first.

Keeping this in view, efforts have been made to provide illustration to the answers from basics, to the extent possible. Students with sound basics might find the details in illustrations to be redundant, nevertheless this initiative of Gyan Vigyan Sarita is targeted to mentor those unprivileged students who are neither connected through IOMS nor able to obtain suitable guidance which can groom competence among them to create a space for them in this competitive world. The effort would be successful only if such target students are able to use it for application of concepts with clarity, accuracy and speed, and in process leading them to undertake many steps as mental analysis, a necessity for success in competitive examinations.

Any input on typographical error in question, answers and illustration or to diversify the scope of this resource material is gratefully welcomed; it is in the spirit of Personal Social Responsibility (PSR) the core of this initiative. Readers are welcome to make suggestions for value addition through [CONTACT US](#).

Going forward these questions shall be organized by clustering each type of questions for intra-level practice by students. It is our endeavour to automate the practice tests. This will require students to register, free-of-cost, to avail facility of practice tests, self-evaluation and refer to detailed Illustrations in case of any doubt or difficulty.

“Mind has enormous capacity, ability and speed to think, all that it requires is, to shake it off from a dormant state, and use it. It is achievable through a gradual process of self-carving, without any short-cut.”