

Waves and Motions : Simple Harmonic Motion

Every phenomenon that we experience has a cycle. Be it occurrence of day and night or sound created by dropping an object, human utterances, lightning thunder etc. These phenomenon are invariably observed yet their How and Why are ignored. Any cyclic phenomenon is composed of one or more sinusoidal functions. The sinusoidal function is most fundamental variation called Simple Harmonic Motion (SHM). In different SHMs their parameters frequency, amplitude and/or phase may be different but the basic function remains common. Sound waves and light waves are also cyclic and therefore understanding SHM becomes primary to understand and apply SHM. The SHM is most perceivable phenomenon yet often left un-noticed.

In light of the above, though invariably SHM is a subject matter of study in Mechanics, yet its elaboration has been integrated as a precursor of Sound and Optics in the Mentors' Manual.

Mentors' Manual is one of the dimensions of the Gyan Vigyan Sarita through which efforts are being made to reach out to remote teachers through our experience of mentoring unprivileged children who are disconnected from us by virtue of multiple barriers. Direct interaction through Interactive Online Mentoring Sessions (IOMS) a working model of connecting unprivileged children in a selfless manner. This experience is being disseminated to the teachers spread out by writing of chapters of an open source Mentors' Manual. Simple Harmonic Motion is First of the Three parts of chapter Three covering Sound and Optics..

Science is a subject not to learn but a matter of realization through experiments and its visualization in surrounding. Every student is not equipped either to conduct experiment or an environment for visualization of science in his surroundings. This is where simulation is a technique to verify the concepts and study effect of variation in parameters related to the concept. There are various simulation tools leading to virtual laboratories.

India, growing digital, provides optimism to every student to be able to have an access to virtual laboratory, where without any physical laboratory, involving consumption of equipment and material, it is possible to carry out experiments in an e-environment. There are some excellent videos available on the web either free or on price which provide an experiences of kind in simulation of the concepts, The only problem with this is of sequencing and scaling of concepts and selection of an appropriate video out of a big lot of search results. In absence of this it is neither possible nor affordable for a student to first make a survey to select most suitable video and then view it for gaining proficiency in the concepts.

It creates a question, can one wait for the virtual labs to become available to each student to gain proficiency in concepts? Definitely not, then the only way to get going on acquiring proficiency in concepts and their applications, soon after learning them, is solving problems of variety. This is a key, have patience and perseverance, to acquire proficiency without consumption of any other resource except time which is available with students. All that they miss is the direction in which they can deploy their efforts.

Problem solving in mathematics and physics is inevitable to gain necessary proficiency.

Question Banks comprises of from various sources and they are being supported with illustrations. These are not just solutions but an attempt to bring home use of basics involved in solving a problem. In an effort to compile problem there some good text books including those authored by Prof. H.C. Verma and a team of authors Robert Resnick, David Halliday and Kenneth S. Krane and many more. Questions in these books are graded and authors have attempted to incorporate all concepts covered in the book. Thus it necessitates a student to read each chapter carefully before taking up questions.

In addition, progressively, questions from different examinations provide an opportunity to handle questions of sorts, a necessary practice to be followed once graded questions are solved.

In the illustrations to the problems, supported with each question bank, some student may find them to be a bit lengthy and dwelling into basics more than required. Their patience is requested for the benefit of those students who did not have proper opportunity to understand, basics at their level, and apply them. Such students are in plenty spread all across, yet disconnected from main stream and interactive learning through IOMS. Brighter students, however, may like to take that part which matches with the wavelength of their conceptual understanding.

Few question with their illustrations are drawn from the set-1, on Waves and Motion : Simple Harmonic Motion, covering and appended here. The complete set of 50 questions is being uploaded as a free web-resource.

This initiative is aimed at to mentor unprivileged children is of a small group of passionate persons is driven with a sense of Personal Social Responsibility (PSR) in a non-organizational, non-remunerative, non-commercial and non-political manner. You are welcome to add value to this initiative by way of suggestion, advising correction or new type of questions. Or any other form that suits to your competence and convenience.

