

Wave and Motion : Sound Waves

(Typical Problems)

Practice of solving problems makes concepts so intuitive that one would find it easy to visualize how the concepts are playing role in various phenomena occurring around. This helps to sharpen observation followed by enhancement in analytical capability, a pre-requisite for creative and innovation of a person of worth. After touch sound is the first experience of every child after birth. In this set of problems in respect of vibrations of strings have been incorporated with necessary illustrations involving first principles, to the extent possible.

Solving typical problems on a gradual increase in complexity helps to build power of visualization of concepts that are essential in understanding a problem/n observation and evolving solution/answer. At this stage simpler calculations are being skipped in elaboration, with a hope that reader would be able to decipher intermediate steps.

Competitive examinations and more particularly in real life rarely expose to problems solved. Yet ability to solve such problems that one is groomed, it enhances competence to handle unknown problems speedily and correctly with a greater degree of clarity and confidence, an essential attribute of thought process needed for success in life.

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 has been possible 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 and Sound is Second of the Three parts of chapter Three covering Waves, 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. Repetition of efforts in reinventing wheel are circumvented through structured learning of science.

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 environment which is non-destructively. There are some excellent videos available on the web either free or on price which provide an experiences of different kinds through 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 list of search results. This abundance is distracting to students. But, mentors are best person to use these videos to modulate and upgrade their illustrations.

It creates a question; can one wait for suitable 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; this application is solving problems of variety. The key is to have patience and perseverance, to acquire proficiency without consumption of any other resource except time which is available with students.

Here, Question Banks include problems from various sources and they are being supported with illustrations. These illustrations 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. Some objective questions from different examinations have also been included. These questions 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.

Some students may find illustrations to be a bit lengthy and dwelling into basics more than what they require. These students, who are in abundance, not directly connected to us,. However, if they want to use this resource they are requested have patience.

Few question with their illustrations are drawn from Part-2, Set-3, on Sound and are appended here. The complete set of 90 questions is being uploaded as a free web-resource.

This initiative of a small group of passionate persons is aimed at to mentor unprivileged children and 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.