Lesson Plan 14

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| **Title**: **Chapter 15: Oscillations** | | | **Ref. No**: Week 8,  Day 2 | |
| **Target Group/Population**: B. Sc students (CS, EEE and IPE) | | | **Duration**: 90 min | |
| **Aims/Rationale**: To give the students basic concepts of energy in simple harmonic motion | | | | |
| **Learning Outcomes**: At the end of the session, the students will be able to understand and analyze above topics and apply this to solve related problems. | | | | |
| **Contents:** 15-2: Energy in simple harmonic motion | Method or  Technique | Resource  or Aid | | Time |
| **Introduction**:   * Welcome address * Rapport building * Review the main topics of last lecture * Importance/bridging the topic * Pre-assessment of student’s knowledge | Lecture QA | WB  MMP | | 15 min |
| **Development**:  1. The mechanical energy of a linear oscillator is indeed constant and independent of time, E = K + U = ½ kxm2. Sketch a graph of the kinetic energy, potential energy, and total energy of a spring–block oscillator, first as a function of time and then as a function of the oscillator’s position. | Lecture Discussion QA  Problem Solving | WB  MMP | | 60 min |
| **Conclusion**:   * Quick recap/summary * Feedback from the students * References * Forward planning |  | WB  MMP | | 15 min |
| Problems:  30. An oscillating block–spring system has a mechanical energy of 1.00 J, an amplitude of 10.0cm, and a maximum speed of 1.20 m/s. Find (a) the spring constant,(b) the mass of the block, and (c) the frequency of oscillation.  31. A 5.00 kg object on a horizontal frictionless surface is attached to a spring with k 1000N/m. The object is displaced from equilibrium 50.0cm horizontally and given an initial velocity of 10.0 m/s back toward the equilibrium position. What are (a) the motion’s frequency, (b) the initial potential energy of the block–spring system,(c) the initial kinetic energy, and (d) the motion’s amplitude?  36. If the phase angle for a block–spring system in SHM is π/6 rad and the block’s position is given by x = xm cos (ωt +φ), ,what is the ratio of the kinetic energy to the potential energy at time t = 0? | | | | |