Lesson Plan 5

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| **Title**: **Chapter 19: The kinetic theory of gases** | | | **Ref. No**: Week 3  Day 1 | |
| **Target Group/Population**: B. Sc students (CS, EEE and IPE) | | | **Duration**: 90 min | |
| **Aims/Rationale**: To give the students basic concepts of ideal gas law and work done by an ideal gas using thermodynamic processes. | | | | |
| **Learning Outcomes**: At the end of the session, the students will be able to understand and analyze above topics and apply those to solve related problems. | | | | |
| **Contents:** 19-1: Avogadro’s number, 19-2: Ideal gases (ideal gases, work done by an ideal gas at constant temperature, work done at constant volume and at constant pressure) | 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. State and explain the ideal gas law in terms of the number of moles *n*. Also write down the ideal gas law in terms of total number of molecules.  2. Derive the work done by an ideal gas during an isothermal process, a constant-volume process and a constant-pressure process. | Lecture Discussion  QA  Problem  Solving  1st quiz | WB  MMP | | 60 min |
| **Conclusion**:   * Quick recap/summary * Feedback from the students * References * Forward planning |  | WB  MMP | | 15 min |
| Problems:  4. A quantity of ideal gas at 10.0 0C and 100 kPa occupies a volume of 2.50 m3. (a) How many moles of the gas are present? (b) If the pressure is now raised to 300 kPa and the temperature is raised to 30.0 0C, how much volume does the gas occupy? Assume no leaks.  7. Suppose 1.80 mol of an ideal gas is taken from a volume of 3.00 m3 to a volume of 1.50 m3 via an isothermal compression at 30 0C. (a) How much energy is transferred as heat during the compression, and (b) is the transfer *to* or *from* the gas? | | | | |