Lesson Plan 8

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| **Title**: **Chapter 19: The kinetic theory of gases** | | **Ref. No**: Week 4,  Day 2 | | |
| **Target Group/Population**: B. Sc students (CS, EEE and IPE) | | **Duration**: 90 min | | |
| **Aims/Rationale**: To give the students basic concepts of adiabatic expansion of an ideal gas | | | | |
| **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:** 19-9: The adiabatic expansion of an ideal gas (the adiabatic expansion of an ideal gas and free expansions) | 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. Prove that the relation between the pressure and the volume during an adiabatic process of an ideal gas is *pVγ* = a constant, where *γ* = *Cp /Cv.* | Lecture Discussion  QA  Problem  Solving  2nd quiz | | WB  MMP | 60 min |
| **Conclusion**:   * Quick recap/summary * Feedback from the students * References * Forward planning |  | | WB  MMP | 15 min |
| Problems:  54. We know that for an adiabatic process *pVγ* = a constant. Evaluate “a constant” for an adiabatic process involving exactly 2.0 mol of an ideal gas passing through the state having exactly *p* = 1.0 atm and *T* = 300 K. Assume a diatomic gas whose molecules rotate but do not oscillate.  55. A certain gas occupies a volume of 4.3 L at a pressure of 1.2 atm and a temperature of 310 K. It is compressed adiabatically to a volume of 0.76 L. Determine (a) the final pressure and (b) the final temperature, assuming the gas to be an ideal gas for which *γ* = 1.4. | | | | |