Test QUESTIONS- FINAL

FINAL EXAM May 15 - 1:30p.m.

25 questions Cover Entire Semester.

1. 13-7

2 13-8

3 13-9

4 13-11

5 13-12

6 If you increase the temperature of a surface from 27°C to 327°C, by what factor would the radiation emitted by it change? Why?

7. Which process of heat transfer is most effective in (i) Solids, (ii) liquids/gases (iii) Vacuum? Why?

8. "Cloudy nights are warmer than clear nights". Why?

9. Which process of heat transfer determines the "wind chill" factor? Why?

10. Show that for a satellite in circular orbit, the kinetic Energy (positive) is one half of the potential energy (negative).

11. 13 – 14

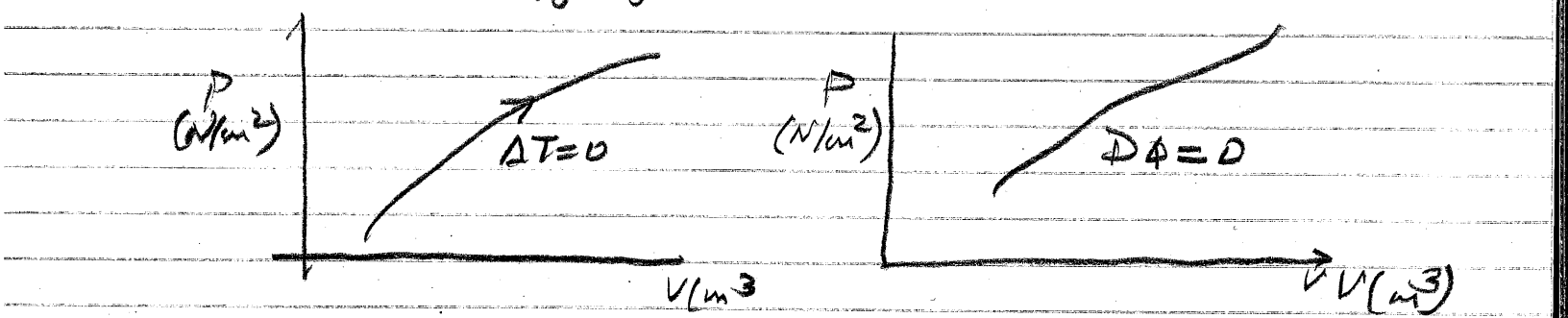
12 The first law of thermodynamics is written as

$$\pm DQ \pm DW \pm dU = 0$$

Why do we need two kinds of "DEEs" to designate these changes?

13. Clearly define the following thermodynamic processes:
(i) Isochoric
(ii) Isobaric
(iii) Isothermic
(iv) Adiabatic
Support your answers with curves in a (Pressure) vs (Volumn) diagram.

14. The pictures show (i) Isothermic and (ii) Adiabatic processes. Can such processes occur? Justify your answers.



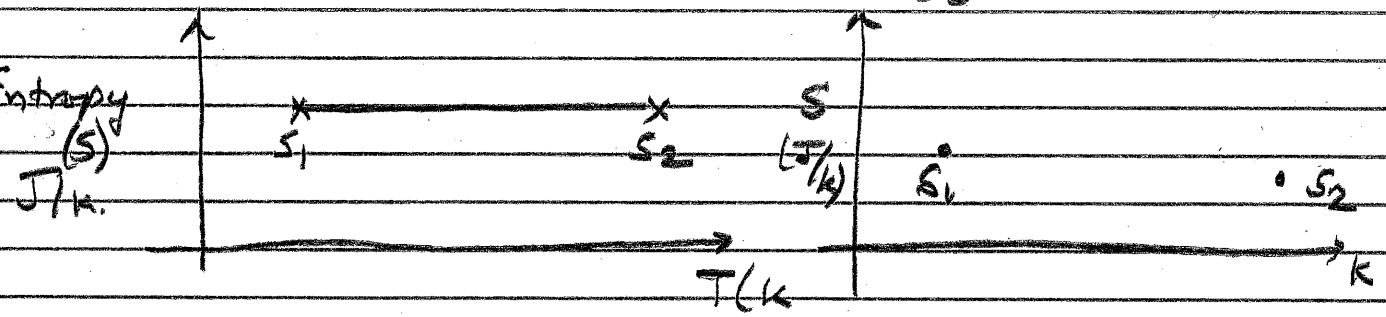
15.

. Why is the specific heat of a gas at constant pressure always larger than the specific heat at constant volume?

16 A gas changes its pressure from P_i to $3P_i$ at constant volume. Its initial temperature is 27C and the amount is 2 mols. (i) What is the work done? Why? (ii) What is the final temperature? Why? (iii) What is the change in internal energy if it is a) He, b) N_2? Why?

17.-24 Wk 14 problems

25 The pictures show two adiabatic processes. What is the difference? Why?



26 What is the work done by the gravitational force during 2a complete orbit of a satellite

26. Prove that when a mass M is located at a height h above the surface of the Earth, the potential Energy of the system is Mgh.

27. Why does a pendulum hang vertically only at the poles and the equator?

28. If you were asked to design a conducting boundary would you use Copper ($K = 400$ watt/m/°C) or Glass ($K = 0.8$ watt/m/°C). Justify your answer (assume equal areas).

29. What does the 2nd Law of Thermodynamics tell you about change of Entropy in an adiabatic process? Why?

29. The moon is an Earth satellite with a period of 27 days and orbital radius 4×10^5 km. Where would you locate a satellite whose period is 1 day? Why?