Aud-1 English translation (The following auditorium exercises will also be given in English)

1) What are these physical quantities, how do you define them, i.e. in terms of equations, and what dimensions do they have in the SI-system?
2) Are the expressions vectors or scalars?
3) What assumptions must be true in order for these eq. to be valid.
4) Which physical quantities describe the ideal gas law and Newton's friction law.

5) In problems a-f of Figure 2 we are to consider how the water level h in a small pond will change as objects floating on a buoyant box fall off. Four outcomes are possible:
   1. The water level increases slightly.
   2. The water level decreases slightly.
   3. The water level stays exactly the same.
   4. We cannot say without more information.
   Discuss amongst yourselves which outcome 1-4. will occur and explain why.

   a) A rock falls off and sinks.
   b) A glass of water spills over and empties. The glass remains atop the box.
   c) A glass of water falls off and oats. Some water remains in the glass.
   d) A glass of water falls off and sinks.
   e) A rock falls off and sinks. In addition, someone has thrown a boot in there as well.
   f) A polar bear and a sports car are floating atop an iceberg. When the ice melts the sports car sinks but the polar bear swims happily at the surface.

6) A suction cop with D approx 10cm is attached to a roof. Can it hold a student with m<100kg?
7) We shall lift an elephant with a 10m2 hydraulic platform. How high must the water level/column H be.
8) Two bobbles with diameter D1 and D2 merges and creates a third bubble with a resulting diameter D3. Assume isentropic process and find a function of D3, dependent on p_atm, D1, D2 and Gamma. Hint: Start with demanding conservation of mass.