Student:	Test #2 Open Book
Date: 7 Nov 2003	Thermodynamics and thermal-hydraulics.

Scope:	1. List all parameters that impact on the thermal efficiency of a nuclear power reactor, quantify and explain their impact. [22 points] -- 2. Explain how do you understand the application of 1st and 2nd Law of Thermodynamics in the thermal-hydraulics design of reactor heat transport system [22 points] -- 3. Assuming a certain geometry of the reactor fuel core (and fuel elements), show the relationship between the volumetric heat generation rate q''' [kW/m3], surface heat flux q'' [kW/m2], linear heat-generation rate q' [kW/m], rate of generated energy per fuel element q [kW], and core power Q [kW]. Explain the application of the above parameters in the design process [12 points] -- 4. Explain the key design issues in the pump design and operation in the primary and secondary side of the reactor cooling system. Use diagrams and plots to support your discussion. [22 points] -- 5. Draw a diagram of change of fluid, cladding and fuel temperatures in radial and axial directions and explain the temperature trends. [22 points]