UNIVERSITY OF OSLO
DEPARTMENT OF ECONOMICS

Exam: ECON4925 – Resource economics

Date of exam: Tuesday, December 6, 2005 **Grades are given: January 3, 2006**

Time for exam: 2:30 p.m. – 5:30 p.m.

The problem set covers 1 page

Resources allowed:
- No resources allowed

The grades given: A-F, with A as the best and E as the weakest passing grade. F is fail.

1. Consider a country with both hydropower- and thermal production of electricity. Assume that the production capacities of the systems are fixed. Consider the hydropower system as consisting of one generating unit with one reservoir with a limited storage capacity and the thermal system as one system described by a variable cost function.
    a) Explain briefly the rationale for aggregating the hydro system consisting of many generating units with reservoirs in this way and the use of the aggregate cost function for the thermal system.
    b) Set up the social planning problem for the utilisation of the energy sector consisting of thermal and hydro capacity for a number of periods and discuss typical solutions to the fundamental dynamic problem involved. (Disregard investments in production capacities.) You may utilise bathtub diagrams.
    c) Discuss the use of hydropower and thermal as peak capacity and base load respectively.

2. Consider the biological growth of a stock of fish and a homogenous forest.
    a) How will you most conveniently illustrate the two growth processes?
    b) Define the concept of maximum sustainable yield for fisheries and discuss how the concept may be applied to forestry.
    c) Find the single rotation period for a forest when the objective is to maximise average yield. State the simplifying assumptions you use in the analysis. Disregard discounting. You may make use of the illustration you provided under a).
    d) Introduce discounting and consider the optimal solution for the rotation period considering only one rotation. Compare the solution with the one obtained in c).
    e) Discuss the weakness of the assumption of a single rotation period and suggest an alternative. Try to reason how your alternative may change the rotation period compared with the one period rotation you found above in d).