

**EKSAMENSOPPGAVE I SØK3524
MILJØ- OG RESSURSØKONOMI**

Faglig kontakt under eksamen: Anders Skonhoft

Tlf.: 9 19 39

Eksamensdato: Fredag 3. juni 2011

Eksamenssted: Dragvoll

Eksamenstid: 6 timer

Studiepoeng: 15

Tillatte hjelpemidler: Flg formelsamling: Knut Sydsæter, Arne Strøm og Peter Berck (2006): Matematisk formelsamling for økonomer, 4utg. Gyldendal akademiske. Knut Sydsæter, Arne Strøm, og Peter Berck (2005): Economists' mathematical manual, Berlin.
Enkel kalkulator Citizen SR-270x el. HP 30S.

Sensur: 27. juni 2011

Eksamen består av 3 oppgaver med delspørsmål som alle skal besvares.

Question 1

The abatement cost function of a firm writes $C_i = \alpha_i(\hat{M}_i - M_i) + \beta_i(\hat{M}_i - M_i)^2$ where \hat{M}_i is the emission without abatement ('business as usual') and M_i the actual emission. $\alpha_i > 0$ and $\beta_i > 0$ are parameters. Altogether there are two polluting firms.

- The regulator ('Statens Forurensningstilsyn') has established a market for tradable emission permits and where the total amount of permits is \bar{M} . Assume that the initial amount of permits to each of the firm is given as M_i^0 and the quota price is p . Find the demand for emission by the firms and the quota price.
- Formulate instead the problem if the regulator wants to minimize the total abatement costs subject to the emission cap \bar{M} .
- Discuss finally any possible connections between the solution of the above problem a) and b).

Question 2

- Discuss briefly the difference between a flow pollution problem and a stock pollution problem.
- Discuss briefly the open access problem of a fishery

Question 3

A landowner is controlling a wildlife stock that grows according to $dX / dt = F(X) - h$. She sells hunting licences for a fixed price p . On the other hand the wildlife causes browsing damage on her property as given by q per animal. The current profit of the landowner hence writes $\pi = ph - qX$.

- Formulate the optimal management strategy of the landowner and find the stock and hunting when the goal is to maximize present-value profit. Consider both the transitional dynamics and the steady-state.
- Find how the price p and cost q influence the optimal landowner steady-state stock and hunting.
- Assume that the natural growth is governed by the logistic function $F(X) = rX(1 - X / K)$. Interpret the parameters of this function, and find how these parameters influence the above optimal steady-state.
- Assume finally that the wildlife also causes a positive externality on the general public in the form of a viewing and experience value. How would you have incorporated such values in the management problem if you had been the social planner?