

Institutt for samfunnsøkonomi

Eksamensoppgave i SØK3524 – Miljø- og ressursøkonomi

Faglig kontakt under eksamen: Anders Skonhoft

Tlf.: 73 59 19 39

Eksamensdato: 28. november 2016

Eksamenstid: 6 timer (09.00-15.00)

Sensurdato: 19. desember 2016

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 Casio fx-82ESPLUS, Citizen SR-270x, HP 30S eller SR-270X College

Målform/språk: Engelsk

Antall sider: 2 (inkl. forside)

Antall sider vedlegg: 0

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 concept of 'sustainable development'.
- Discuss briefly problems of how to regulate 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 . The wildlife also causes a value due to tourism etc. This value is assumed to be related to the stock, and the value function writes $W = W(X)$. The current profit of the landowner hence writes $\pi = ph - W(X)$.

- 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 the discount rate δ 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 negative externality on the general public in the form of browsing damage. How would you have incorporated such value in the management problem if you had been the social planner?