

Department of Economics

Examination paper for SØK1101**Environmental and Resource Economics****Academic contact during examination: Colin Green****Phone: 940 37 271****Examination date:** 01.06.2018**Examination time (from-to):** 4 hours (09.00 -13.00)**Censorship date:** 22.06.2018**Permitted examination support material:** C /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.

Calculator: Casio fx-82ES PLUS, Casio fx-82EX Citizen SR-270x, SR-270X College or HP 30S.

Language: English**Number of pages (front page excluded):** 2**Number of pages enclosed:** 0**Informasjon om trykking av eksamensoppgave****Originalen er:****1-sidig** **2-sidig** **sort/hvit** **farger** **skal ha flervalgskjema** **Checked by:**

Date

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Answer all 4 questions. All questions are worth the same amount of marks.

Question 1.

Consider a two-period model with a depletable resource.

The demand function for both periods is $P=15-0.5Q$, where P and Q are price and quantity of the resource.

There are only 20 units of the resource available in total.

The Marginal cost of extraction is \$4 per unit.

The discount rate is 5% (0.05).

- a. Calculate the equilibrium price and quantity for both period 1 and period 2 and show this diagrammatically.
- b. What is meant by the term marginal user cost? Why is this different to the marginal cost of extraction? What is the marginal user cost in period 1 and period 2?
- c. Is this allocation of the depletable resource across the two periods fair?

Question 2

- a. Define what is meant by a public good? Why does the market not provide efficient levels of public goods? Provide examples of public goods.
- b. Demonstrate how negative production externalities reduce total economic surplus.
- c. Imagine a case with one firm who is a polluter, and one firm is affected by the pollution. How can assigning property rights solve the externality problem? Does it matter which firm gains these property rights?

Question 3

- a. What do we mean by the optimal level of pollution? Why is the optimal amount of pollution typically not zero?

Two firms have marginal costs of pollution abatement of $MC_1= \$100q_1$ and $MC_2 = \$50q_1$

Without any government intervention, both produce 10 units of emissions (total emissions are 20 units)

- b. Compute the cost effective allocation of pollution abatement if a total abatement (reduction in pollution) of 10 units is required.
- c. What emissions charge (charge per unit of emissions) would need to be imposed to reach this abatement objective?

Question 4

- a. In natural resource settings such as fisheries, demonstrate and discuss what is meant by maximum sustainable yield.
- b. How is this different to the economic concept of efficient sustainable yield?
- c. What are open-access resources and why does this lead to inefficient rates of harvesting?