

Department of Economics

Examination paper for SØK1101

Environmental and Resource Economics

Academic contact during examination: Colin Green**Phone: 940 37 271****Examination date:** 21.05.2019**Examination time (from-to):** 4 hours (09.00 -13.00)**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):** 1**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

Signature

Answer all 4 questions. Weights are given next to each question.

Question 1 (30%)

- a. What is meant by the term externality? Provide examples of externalities.
- b. How do negative production externalities affect total economic surplus?
- c. Illustrate and discuss how assigning property rights can, in principle, solve problems related to negative production externalities. In practice, what are some of the difficulties in doing this?

Question 2 (20%)

- a. What is the difference between a stock pollutant and a flow pollutant?
- b. Discuss and demonstrate the societally optimal level of pollution? When would this level of pollution be zero?
- c. In the case of uniform pollutants, demonstrate how either pollution charges or emission permits can generate efficient reductions in pollution? Why might a regulator or government prefer either taxes or permits?

Question 3 (20%)

- a. How can a lack of property rights lead to over harvesting of natural resources?
- b. Why does freeriding make binding international climate agreements more difficult? How can 'issue-linkage', where access to other resources are tied to climate agreements, potentially reduce this problem?

Question 4 (30%)

Consider a depletable resource stock of $Q=20$ to be allocated across two periods.

The marginal willingness to pay (demand curve) is given by $P=10-0.5Q$

Where P is the price and Q is the amount extracted.

The demand curve is identical in both periods

The marginal cost is constant and equal to 2

- a. Determine the extraction amount in two periods that maximises the present value for both periods. Set the discount rate equal to 0.10. Illustrate and explain graphically.
- b. Is this allocation fair? Why or why not?
- c. What is the market price in period 1? What is the marginal user cost in period 1?
- d. What is the market price in period 2? What is the marginal user cost in period 2?