2510102

THE UNIVERSITY of York

Degree Examination 2005

ENVIRONMENT DEPARTMENT

BSc in Environment, Economics and Ecology, Part 1a

PRINCIPLES AND APPLICATIONS OF ECOLOGICAL ECONOMICS

Time allowed: **one and a half hours**

Answer any **TWO** questions

University calculators and graph paper will be provided

Pay adequate attention to spelling, punctuation and grammar, so that your answers can be readily understood

Question 1

Many fisheries operate under open access conditions. How does this help us to understand the over-exploitation of the oceans. Your answer should include a comparison of the equilibrium under private ownership and the open access equilibrium. **(50 marks)**

Question 2

Consider a paper mill operating on a river and a fishery operating downstream from the paper mill. Emissions from the paper mill impose a negative externality on the fishery

a) Show diagrammatically how the privately optimal solution leads to a socially sub-optimal outcome. Explain your answer. **(15 marks)**

b) The net private benefits, NPB (£), derived from the paper production is related to the emissions, E (tonnes), by the equation $NPB = 15E - E^2$. The external cost, EC (£), from the paper mill is also related to the emission of the pollutant by the equation $EC = 1.5E^2$.

i) Identify the privately optimal amount of emissions and the total profit that the paper mill will earn. Explain you answer. **(7 marks)**
ii) Identify the socially optimal amount of emissions. Explain your answer. **(7 marks)**
iii) What tax level should a government choose to internalise the externality? Explain your answer. **(6 marks)**

c) Recently pollution permit systems have become more popular among environmental policy makers. Explain and show diagrammatically how such a system works and give two examples were it has been implemented. **(15 marks)**

Question 3: answer part a, b and c

a) Explain the purpose of a social cost benefit analysis. How does this differ from the decision tools used by private firms. **(15 marks)**

b) Consider a project to clean up a local river which is used for commercial fishing and for recreational activities by the local population. The initial costs of the project are £10,000. It is estimated that the net benefit to the fishery is £2,000 annually. Furthermore, it is assumed that the local population will benefit from the clean up by £500 annually. The annual maintenance costs are £75. The annual costs and benefits accrue at the end of the year, starting from the end of year one.

i)Evaluate this project assuming that the benefits and cost accrue for five years. Calculate the net present value of the project given discount rates of 5%, 7% and 10%. Identify graphically the internal rate of return and explain your analysis. **(15 marks)**

ii)Explain how your analysis would change if the benefits were assumed to be permanent? (You do not need to carry out the analysis) **(5 marks)**

c) Choose an imaginary project with environmental consequences and explain the steps of analysis you would apply within a social cost benefit analysis to evaluate whether or not the project should go ahead on economic grounds. **(15 marks)**

Question 4:

a) What distinctions can be made between private and public goods and why is this relevant for the provision of environmental goods in a market-based economy. **(15 marks)**

b) Imagine that there are two households A and B, and one good. The marginal benefit which household A derives from consumption of the good is given by $MB_A = 5 - 0.5X$, where X is the quantity of the good. The marginal benefit which household B derive from consuming the good is given by $MB_B = 2 - 0.25X$. The good is provided by the government and the marginal cost of provision is given by $MC = 1X$.

i) Draw the aggregate marginal benefit curve assuming that the good is a public good. What would be the socially optimal level of provision of this public good? Explain your answer. **(10 marks)**

ii) Draw the aggregate marginal benefit curve assuming that the good is a private good. What would be the optimal provision of the private good? Explain your answer **(10 marks)**

c) Discuss different types of environmental policies that the government can implement to address the provision of environmental public goods. **(15 marks)**