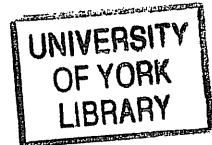2520004

# THE UNIVERSITY *of York*

### Degree Examination 2005

### ENVIRONMENT DEPARTMENT

### BSc in Environment, Economics and Ecology, Part 1b

### ECONOMICS OF ECOLOGICAL RESOURCES

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

Answer **ONE question from SECTION A** and **ONE question from SECTION B**

University calculators and graph paper will be provided

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

# SECTION A

**Question 1 (50 marks)**
Discuss the economic theory of fishery under open access both in static and in dynamic settings. Your answer should contain adequate explanation of the underlying theory as well as reference to real world examples where relevant.

**Question 2 (50 marks)**
Discuss pollution as an externality problem.

# SECTION B

# Question 3
The organisation "English Nature" sends a mailing to Aldo and Barbara to solicit a contribution of £50 per foot to buy/preserve the last 100 feet of prime trout stream. Aldo is willing to pay £30 per foot and Barbara £40 per foot, towards the effort for a total of £70 per foot. The monetary benefits of preservation exceed the costs by £20 per foot.

a) Assuming that Aldo and Barbara have perfect information about each other's willingness to pay, will "English Nature" get enough in contributions to buy/preserve the land? (**10 marks**)

b) Assume now that the trout stream is for sale to private individuals. Knowing that when the price of the trout stream is £50 per foot, Aldo demands 60 feet while Barbara demands 80 feet, define Aldo's and Barbara's individual linear demand curves both algebraically and graphically. What is the total demand for the private good (i.e. trout stream) when the price is £50 per foot? (**25 marks**)

c) Plot on the same graph both the total demand for the trout stream as a public good and the total demand for the trout stream as a private good. What is Aldo and Barbara's individual and total willingness to pay for 140 feet of prime trout stream as a public good? Comment on your results. (**15 marks**)

## Question 4

Consider the case of a non-renewable resource extraction (e.g. coal) over two periods: period 1 (t=1) and period 2 (t=2). The inverse demand curve has the form

$$p_t = 12 - 0.3q_t$$

where $p_t$ is the price (£) of the resource at time t and $q_t$ is the quantity (e.g. tons) of resource extracted at time t. The marginal cost of extraction (£) is constant and is equal to £3.

a) If the resource were abundant (non scarce) how much would be extracted in period 1 and in period 2? What would the price be in the two periods? What would the marginal user cost (MUC) be in the two periods?

**(10 marks)**

b) Given that the total amount of non-renewable resource available (Q) is 30, find the dynamic efficient allocation of the non-renewable resource in period 1 and period 2 if the discount rate (r) is equal to zero. What would the efficient price and the marginal user cost be in the two periods?

**(15 marks)**

c) If you were to apply a discount rate of 8%, would the dynamic efficient allocation of the scarce non-renewable resource in period 1 and period 2 be affected? If so, how much resource would you extract in period 1 and in period 2? What would the efficient prices and marginal user costs be in the two periods?

**(25 marks)**