



Uva Wellassa University
Faculty of Animal Science and Export Agriculture
BSc in Export Agriculture



End Semester Examination September/ October 2013
Year III Semester II

Theories of Agricultural Resource Management EAG 323-3

Instructions

Answer **all** questions. Each question bears equal marks.

No. of questions : Five (05)

No. of pages : Four (04)

Time : Three hours (03hrs)

Total marks allocated : 40%

1.
 - a. What is meant by exhaustible resources?
 - b. "Efficient extraction of an exhaustible resource must account for market dynamics". Comment on this statement
 - c. Define marginal use cost.
 - d. Discuss the Hotelling's Principle in relation to exhaustible resources management?
 - e. Suppose the demand equations for oil are $p_0 = 10 - 0.20Q_0$ in the current period and $p_1 = 30 - 0.50Q_1$ in the future period. Marginal extraction cost is \$1 per bbl in the current period and \$2 per bbl in the future period. Determine the efficient prices and extraction in both periods and net social benefit when the oil reserve is 80 bbl and the discount rate is 10 percent.

2.
 - a. What is meant by Coase Theorem?
 - b. Briefly explain how you use the Coase Theorem in dealing with the following situation/assuming the water supply is fixed. Use graphical illustrations where necessary

"In 2002, a drought in Taiwan forced difficult water-allocation decisions between the computer chip industry and rice farmers."

- c. Briefly explain how to determine the optimum water and yield for maximum income from irrigated crops. Use functions and graphs where necessary

3.

- a. Define the followings;
- Externality
 - Market failure
 - Marginal private cost (MPC)
 - Marginal social cost (MSC)
 - Pigouvian tax
- b. What is meant by internalizing an externality?
- c. Briefly explain the types of externalities
- d. What are the private solutions in dealing with externalities? You need to explain them briefly.
- e. Two firms can control emissions of a pollutant with following total costs;
- $$TC_1 = 1000 + 100q_1^2$$
- $$TC_2 = 1000 + 50q_2^2$$
- where q_1 and q_2 are the amount of emissions reduced by the first and second firm respectively.
- Derive the marginal cost function for each firm
 - How many units of emissions will each firm control under a cost effective allocation? Assume total reduction of 18 units of emissions is necessary.
 - What is the total industry cost of pollution control?

4.

- a. Briefly explain the term fishery
- b. Distinguish between the followings;
- Maximum Sustainable Yield (MSY) and Maximum Economic Yield (MEY)
 - Stock effort relationship and growth effort relationship
- c. What is meant by open access equilibrium in fishery?

- d. The effort catch relationship (production function) of a fishery is given by,

$$Y = 80E - 2E^2$$

Where Y is the sustainable yield measured in kilograms of fish and E is fishing effort measured in number of fishing trips. Each fishing trip costs Rs.500.00.

Fish are sold at Rs.50.00 per kilogram.

Calculate the followings;

- i. Maximum Sustainable Yield, corresponding level of fishing effort and private profit
- ii. Maximum Economic Yield, corresponding level of fishing effort
- iii. Find the open access equilibrium level of effort and yield

5. Using graphs and equations,

- a. Discuss the requirements for achieving Pareto Efficiency in resource allocation
- b. It is said that any point inside the production possibility frontier is technically inefficient. WHY?
- c. Prove that, for optimal resource allocation, the marginal rate of substitute between any two commodities must be the same as the marginal rate of transformation between these two commodities for any producer
- d. How do you relate production possibility frontier, utility possibility frontier and grand utility frontier to each other?

