

BSc in Export Agriculture
Third Year Second Semester Examination – December/January 2016/17

Theories of Agricultural Resource Management (EAG 323-3)
Essay Questions

Instructions:

Answer **all** questions.

No. of questions : Five (05)

No. of pages : Three (03)

Time : Three (03) hours

Total marks allocated : 100%

1. Natural resources can be classified into two broad categories: exhaustible resources and renewable resources.

(I) Define;

a) Exhaustible resources

b) Renewable resources (10 marks X 2 = 20 marks)

(II) How would you explain the dynamics of exhaustible resources using a simple model? (20 marks)

(III) With the help of the above model, briefly explain how you find the reserves to use ratio (R)

(20 marks)

(IV) A stock equation for a biomass of renewable resource is given below.

$$S_t = S_0 - H_{t-1} + G_{t-1} - L_{t-1}$$

a) State what $S_t, S_0, H_{t-1}, G_{t-1},$ and L_{t-1} stand for (10 marks)

b) Explain on which conditions the biomass decreases, increases or remain constant (30 marks)

2.

(I) Distinguish between static efficiency and dynamic efficiency in resource allocation (20 marks)

(II) Demand and supply equations for land under pure competition are given below.

$$P_d = 50 - 0.5Q_d$$

$$P_s = 5 + 0.5Q_s$$

- a) Briefly explain the normative decision criterion for determining the efficient resource use in a static framework. (20 marks)
- b) Based on the above criterion, calculate the Net Social Benefits (NSB) using the given equations (20 marks)
- c) How would you show that the calculated NSB is the maximum NSB? (10 marks)
- d) Suppose that demand shifts to the right so that the new equation is;
- $$P_d = 60 - 0.5Q_d.$$
- Determine the new NSB. (10 marks)
- e) How would you find the NSB in a dynamic efficiency framework? (20 marks)

3.

(I) With the use of suitable illustrations, describe the following in relation to fisheries

- a) Sustainable yield
- b) Maximum Sustainable Yield (MSY)
- c) Maximum Economic Yield (MEY)
- d) Open access equilibrium
- e) Carrying capacity
- f) Effect of harvesting on fish stock
- g) Stock accounting identity (10 marks X 7 = 70 marks)

(II) Suppose that the biological mechanics of a fishery is given by;

$$F(X) = 180X - 0.04X^2$$

where;

X – The stock of fish in metric tons

F(X) – The annual growth rate of the stock

- a) What is the stock at carrying capacity?
- b) What is the stock at MSY?
- c) What is the MSY? (10 marks X 3 = 30 marks)

4.

(I) What are the requirements in achieving Pareto Efficiency in resource allocation?
(10 marks)

(II) Using Edgeworth – Bowley box diagram, show how efficiency in production is achieved.
(30 marks)

(III)

- a) What is meant by a cost function?
- b) Graphically show the relationship between per unit production functions and the per unit cost functions
- c) Consider the following short run cost function.

$$TC = 100 + 50Q - 12Q^2 + Q^3$$

Determine,

- i. TFC function
- ii. TVC function
- iii. AC function
- iv. AFC function
- v. MC function
- vi. Calculate TC, ATC, AVC and MC when the firms produce 10 units of output. (10 marks X 6 = 60 marks)

5. Write short notes on the followings. Use illustrations where necessary.

(I) Tragedy of Commons

(II) Public Goods

(III) Coase Theorem

(IV) Market Based Solutions towards Externalities (25 marks X 4 = 100 marks)

[End of Paper]