UVA WELLASSA UNIVERSITY OF SRI LANKA
FACULTY OF ANIMAL SCIENCE & EXPORT AGRICULTURE

BSc in Export Agriculture
Third Year First Semester Examination – April 2021
Environment and Resource Economics (EAG 331-3)

Section II– Essay Questions

Instructions:
Answer **all** questions in the given booklet.
No. of questions : Four (04)
No. of pages : Three (03)
Time : Two (02) hours
Total marks allocated : 50%

1. Write short notes on the followings
   (I) Private solutions to the problem of externalities
   (II) Marginal Revenue Product and Marginal Value Product of Labor
   (III) Least Cost Combination
   (IV) Production function (25 X 4 marks)
2.
   (I) What is meant by exhaustible resources? (20 marks)
   (II) "Efficient extraction of an exhaustible resource must account for market dynamics". Comment on this statement (30 marks)
   (III) Determine the equilibrium conditions for efficient intertemporal extraction of oil under the following conditions and two cases
   - **Two periods (T_0 and T_1)**
   - **Variable resource demand given by the equations**

     $D_0: P_0 = 50 - 0.20Q_0$ – Current Period

     $D_1: P_1 = 30 - 0.50Q_1$ – Future Period

Where P_0 and P_1 are the prices of oil in $ per billion barrel (bbl) and Q_0 and Q_1 are the quantities demanded in bbl

Case One

Unrestricted supply

Zero marginal extraction cost and Positive marginal extraction cost of 25 $

Discount rate is 8%.

Case Two

Restricted supply ($\mathbf{Q_0 + Q_1 = 200}$)

Zero marginal extraction cost

Discount rate is 10%.

a) Determine Q_0 and Q_1 under each case (efficient extraction rates of oil in the two time periods)
b) Determine Net Social Benefit from the optimum allocation

(50 marks)

3. A given allocation is said to be *Economically Efficient* in the Pareto Sense, **"when no re-allocation is possible which makes anyone better off without making someone else worse off".** Based on the given statement, show how an economy achieves Pareto Optimality. Support your answer with assumptions and graphical illustrations where necessary. (100 Marks)

4.

(I) Define the term "Elasticity of Production". (10 marks)

(II) What can be said about the elasticity of production, assuming the classical production function, at the output when;

a) MPP is at maximum? (10 marks)
b) APP is at maximum? (10 marks)
c) MPP is zero? (10 marks)
d) $MPP = APP$? (10 marks)
e) MPP is negative? (10 marks)

f) MPP is less than APP? (10 marks)

(III) Consider the production function $\boldsymbol{Y = 70 + 3X^2 - 0.02X^3}$

Find;

a) MPP and APP functions (10 marks)

b) The level of X at which Y is maximum (10 marks)

c) the level of X at which MPP is maximum (10 marks)

[End of the Section II]