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

BSc in Export Agriculture
Third Year First Semester Examination – June/July 2017
Environment and Resource Economics (EAG 331-3)

Section II – Structured Questions

Instructions:
Answer **all** questions in the given space.
No. of questions : Two (02)
No. of pages : Twelve (12)
Time : One (01) hour
Total marks allocated : 20%

Index No.

1.

(I) Define the followings;
   a) Marginal Private benefit (MPB)
   b) Marginal Private cost (MPC)
   c) Marginal External Cost (MEC)
   d) Marginal Social Cost (MSC)
   e) Marginal Social Benefit (MSB)

(II) The MPC and MPB Function for refined petroleum products are;

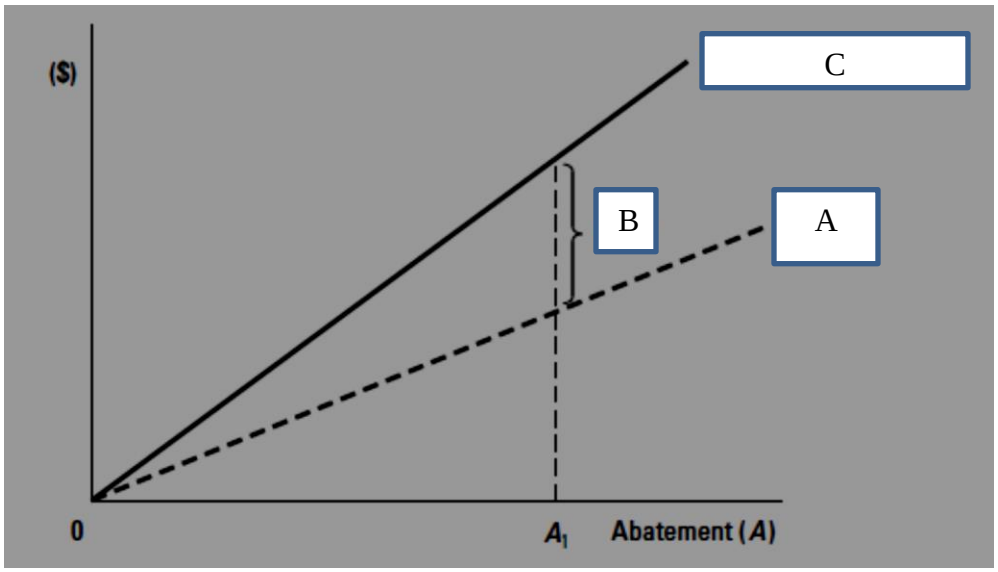
$$MPC = 10 + 0.075Q$$
$$MPB = 42 - 0.125Q$$

Where Q is measured in thousands of barrels per day and P is the price per barrel.
   a) Sketch MPC and MPB functions with equilibrium price and quantity
   b) What is the marginal profit at equilibrium?
   c) Is the resource allocated efficiently at the equilibrium price? Justify your answer.

(III) MEC function for refined petroleum products is given below
   a) $MEC = 0.05Q$
   b) Derive the MSC function
   c) Sketch the MSC function in the above [II(a)] graph
   d) Comment on the equilibrium price
   e) What is the marginal profit?
   f) From the firm's perspective, does it earn profit/ loss?

(IV) "Standards form the fundamental basis of most environmental policies for internalizing the externalities"

a) List three environmental standards which can be implemented by a government
b) What is meant by an allocative efficient standard?
c) The following graphical illustration shows the costs to society as polluters reduce their releases of contaminating residuals. Identify A,B and C



d) Which of the above mentioned environmental standards is/ are efficient?

(V) Assume there are two firms, each emitting 10 units of pollutants into the environment, for a total of 20 units in their region. The government sets an aggregate abatement standard of 10 units. The polluters cost functions are as follows:

Polluter 1: $\boldsymbol{TAC_1 = 1.25(A_1)^2}$,

$\boldsymbol{MAC_1 = 2.5A_1}$,

Polluter 2: $\boldsymbol{TAC_2 = 0.3125(A_2)^2}$,

$\boldsymbol{MAC_1 = 0.625A_2}$,

where

$TAC - Total\ Abatement\ cost, MAC - Marginal\ Abatement\ Cost \qquad A - Abatement\ level$

a) Assuming that the government implements the 10-unit standard uniformly, calculate $TAC's$ and MAC of each polluter?
b) What is the total abatement cost for the region?
c) Which polluter has the abatement cost advantage?
d) Does this standard achieve the cost effective criterion?
e) What is the principle that is needed to meet the environmental standard at a minimum cost?
f) Based on the above principle, calculate the abatement level of each polluter

Define the followings;

i. Production function
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ii. Average Physical Product
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iii. Marginal Physical Product
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iv. Elasticity of production **(E)** (You need to derive the equation)
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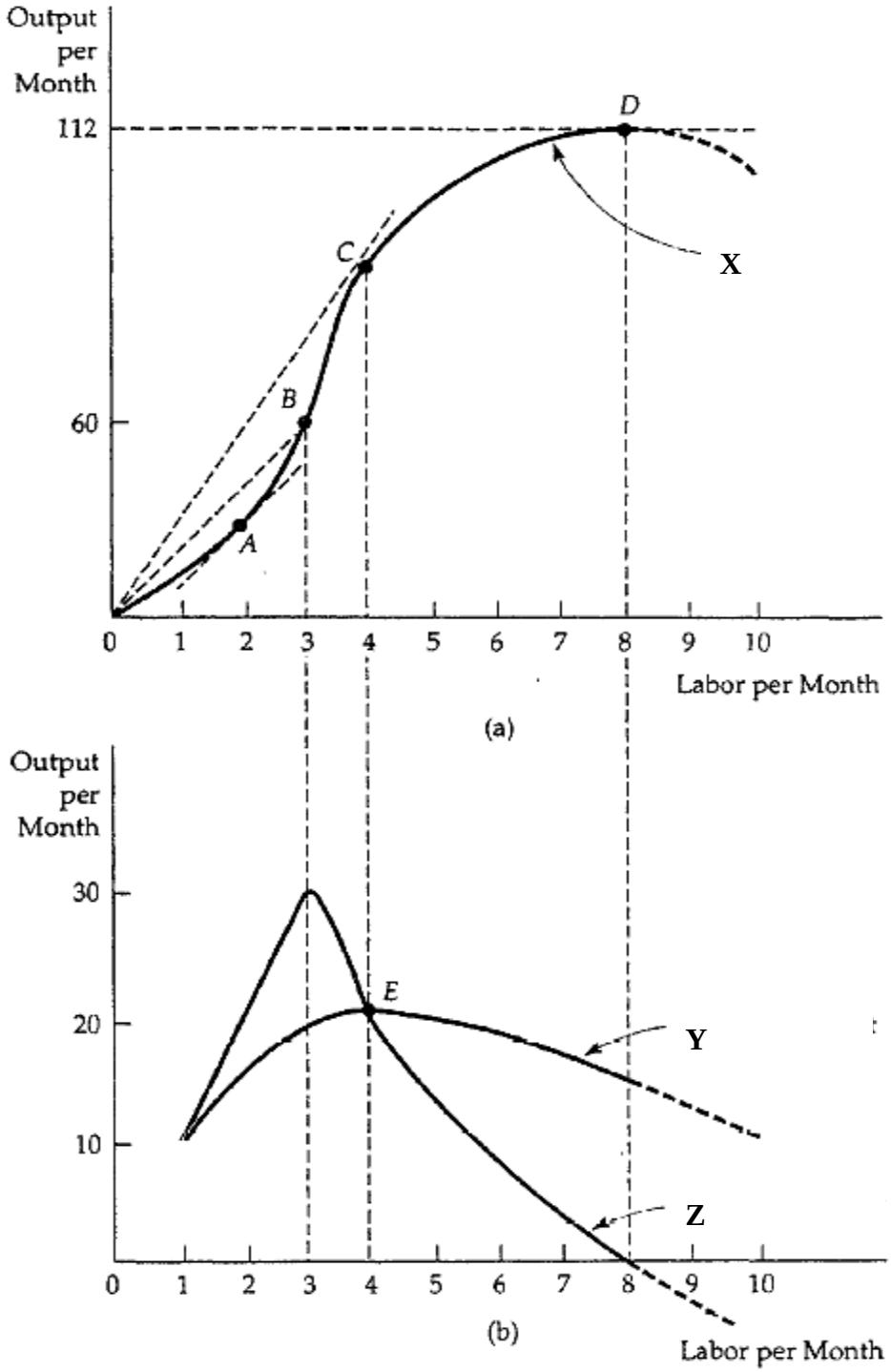
II. Following graphs (**a** and **b**) show the relationship between output per month and labor per month.



i. Name X, Y and Z curves

ii. Show the stages of productions with the elasticity (E) of production in each stage

iii. What do the points B, C and D denote?

B…….....

C…….

D…….....

iv. What is meant by **Diminishing Marginal Returns**?

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v. From which **point** onwards, does the producer start to experience Diminishing Marginal Returns?

……...

vi. During which stage does the maximum production efficiency fall?

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III

i. What is meant by an **Isoquant**?

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ii. The following table provides data on the production of 6000Kg of paddy produced by different combinations of Nitrogen fertilizer (N) and water (W)

N in Kg, P_N=Rs 25	W in M3/ha, P_W=Rs 350	Marginal Rate of Technical Substitution [$MRTS_{(NW)}$]
0	21	
50	10.6	
100	4.4	
150	1.6	
200	0.6	

iii. Calculate $MRTS_{(NW)}$ for each combination of two inputs

iv. What is the optimum combination of fertilizer and water?

Fertilizer :…….

Water :…….

v. What is the total cost for that combination

……...

2.

a)

b)