



THE CATHOLIC UNIVERSITY OF EASTERN AFRICA

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MAIN EXAMINATION

AUGUST - DECEMBER 2016 TRIMESTER

FACULTY OF COMMERCE

DEPARTMENT OF ACCOUNTING AND FINANCE

EVENING PROGRAMME

CMS 321: ANALYTICAL DECISION MAKING

Date: DECEMBER 2016

Duration: 2 Hours

INSTRUCTIONS: Answer Question ONE and ANY OTHER TWO Questions

- Q1. i) A farmer can plant up to 8 acres of land with wheat and barley. He can earn \$5,000 for every acre he plants with wheat and \$3,000 for every acre he plants with barley. His use of a necessary pesticide is limited by federal regulations to 10 gallons for his entire 8 acres. Wheat requires 2 gallons of pesticide for every acre planted and barley requires just 1 gallon per acre. What is the maximum profit he can make?
- ii) Discuss the advantages of analytical decision making in business management. Support your discussion using the entities/players of the supply chain.
- Q2. i) A garden shop wishes to prepare a supply of special fertilizer at a minimal cost by mixing two fertilizers, A and B. The mixture is to contain:
at least 45 units of phosphate
at least 36 units of nitrate
at least 40 units of ammonium
Fertilizer A costs the shop \$.97 per pound. Fertilizer B costs the shop \$1.89 per pound.
Fertilizer A contains 5 units of phosphate and 2 units of nitrate and 2 units of ammonium.
Fertilizer B contains 3 units of phosphate and 3 units of nitrate and 5 units of ammonium. How many pounds of each fertilizer should the shop use in order to minimize their cost?
(15 Marks)

- ii) Consider a hypothetical situation in which a firm has the option to make or buy a part. Its annual requirement is 15,000 units. A supplier is able to supply the part at \$7 per unit. The firm estimates that its costs \$500 to prepare the contract with the supplier. To make the part, the firm must invest \$25,000 in equipment and the firm estimates that its cost \$5 per unit to make the part.

Costs	Make option	Buy option
Fixed cost	\$25,000	\$500
Variable cost	\$5	\$7
Annual requirements = 15,000 units		

- a) Find units at break-even point of make or buy option **(2.5 Marks)**
 b) Advise the firm whether to make or buy and support your answer using diagram of Make-or-Buy Break-Even Analysis. **(2.5 Marks)**

- Q3. i) The Soon Corporation is a multinational company that purchases one of its crucial from a supplier who offers quantity discounts to encourage larger order quantities. The supply chain manager of the company wants to determine the optimal order quantity to ensure that the TAIC is minimized. The company's annual demand forecast for the item is 1000 units, the order cost is \$20 per order and the annual holding cost rate is 25%. The price schedule for the item is:

Order quantity	Price per unit
1-200	\$5.00
201-500	\$4.50
501 and above	\$4.00

What is the optimal order quantity that will minimize the TAIC for this component? **(10 Marks)**

- ii) Draw the network for the following project. Compute the latest and earliest time for each node and also find the critical path. **(10 Marks)**

Activity		Immediate Predecessor		Time
A	1-2	-	-	5
B	1-3	-	-	4
C	2-4	A	1-2	6
D	3-4	B	1-3	2
E	4-5	C, D	2-4, 3-4	1
F	4-6	C, D	2-4, 3-4	7
G	5-7	E	4-5	8
H	6-7	F	4-6	4
I	7-8	H, G	6-7, 5-7	3

Q4. A dairy has three plants located throughout a country. Daily milk production at each plant is as follows:

- Plant A: 6 million liters
- Plant B: 1 million liter
- Plant C: 10 million liters

Each day the firm must fulfill the needs of its four distribution centers. Milk requirement at each center is as follows:

- Distribution center P: 7 million liters
- Distribution center Q: 5 million liters
- Distribution center R: 3 million liters
- Distribution center S: 2 million liters

Cost of shipping one million liters of milk from each plant to each distribution center is given in the following table in hundreds of dollars.

Plant	Distribution Center			
	P	Q	R	S
A	2	3	11	7
B	1	0	6	1
C	5	8	15	9

The dairy firm wishes to determine as to how much should be the shipment from which milk plant to which distribution center so that the total cost of shipment is the minimum. Determine the optimal transportation policy using Vogel's Approximation Method to establish initial feasible solution and Modified Distribution (MODI) method (also called U-V method) to identify the optimal solution. **(20 Marks)**

END