



**AFRICA
UNIVERSITY**

(A United Methodist-Related Institution)

"Investing in Africa's Future"

**COLLEGE OF BUSINESS, LEADERSHIP, PEACE &
GOVERNANCE**

COURSE TITLE: MEC 502- MANAGERIAL ECONOMICS

SEMESTER 1: FINAL EXAMINATION DECEMBER 2017

LECTURER: MR. L. NGENDAKUMANA

TIME: 3 HOURS

INSTRUCTIONS

Answer all questions in SECTION A and any other THREE (3) questions in SECTION B.

Total possible mark is 100.

Start **each** question on a new page in your answer booklet.

The marks allocated to **each** question are shown at the end of the section.

Show all your workings.

Credit will be awarded for logical, systematic and neat presentations.

SECTION A

Question 1

(i) Two firms can either reduce their prices or keep them at the present level. If firm A cuts prices it will earn \$7.00 in profit and it is the same for B if it also cuts prices. Firm A will earn \$15.00 if firm B does not cut prices. However, if firm A makes no price change, it will earn nothing if firm B reduces prices and \$5.00 if firm B makes no price change. The outcomes for B are the same as for firm A.

- a. Develop a payoff matrix for this game? [4]
- b. Does the game have Nash equilibrium? [3]
- c. Does either firm have a dominant strategy? Explain. [2]

(ii) Assume a monopolist is faced with the following demand function

$$Q = 400 - 20P$$

And the total cost function

$$TC = 5Q + Q^2/25$$

You are required to determine the profit maximizing price and output and further determine the profit. [3]

Question 2

In economic theory, it is known that the demand for a normal good is inversely related to the price of that good. Management of UPFUMI Pvt Ltd sets out to determine the demand for a new palm wine in a low density suburb in Chitungwiza.

Period	price	quantity
1	100	15
2	90	18
3	85	19
4	110	14
5	120	13
6	90	19
7	105	16
8	100	14

- a. Use a regression analysis to estimate the demand that faces UPFUMI Pvt Ltd and interpret your result [5]
- b. Using the estimated function from part (a) forecast the demand that results from estimated price levels of \$150 and \$ 135. [2]
- c. Compute and interpret the goodness of fit. [2]
- d. Compute the point price elasticity of demand at the mean values of the variables and interpret your result. [2]
- e. Assess the probable impact of a price decrease on UPFUMI total revenue. Explain [2]

Question 3

- (a) Using a well labelled diagram, show that monopoly pricing results in allocative inefficiency and income redistribution [4]
- (b) Explain the concept of cost plus pricing and illustrate using a practical application [4]
- (c) Peak-load pricing is market sensitive. Comment [3]
- (d) After defining the concept of leveraged firm, explain how the concept of profit elasticity can be used to explain leverage [4]

SECTION B

Question 4

- (i) Ndiku Softwares is a small firm that specializes in the production and mail order distribution of computer programs. The accounting department has gathered the following data on development and production costs (in dollars) for a typical program and the documentation (i.e. the manual) that must accompany the program.

Development costs (fixed):

Program development	15 000	
Manual preparation and typesetting	3 000	
Advertising	<u>10 000</u>	
Total		<u>28 000</u>

Variable costs per unit:

Blank disk	3.00	
Loading cost	1.00	
Postage and handling	2.25	
Printing of the manual	<u>3.75</u>	
Total		<u>10.00</u>

A typical program of this type sells for 45. Based on this information:

- a. Determine the break-even number programs and the total revenue associated with the volume. [4]
- b. Ndiku Softwares has a minimum profit target of \$50 000 on each new program it develops. Determine the unit and dollars volume sales required to meet this goal. [4]
- c. While this program is still in the development stage, market prices for software fall by 50 cents due to the significant increase in number of programs being supplied to the market. Determine the new break- even unit and dollar volumes. [4]
- (ii) Profit contribution analysis helps managers to make business decisions. Explain in detail using a concrete example [8]

Question 5

Consider a Cobb-Douglas production function that shows a production of textiles in Ghana

$$Q = 100K^{0.5} L^{0.5}$$

Where Q is output, K is capital input and L is labor input.

The following table shows the various input rates and the attained output(s)

Rate of
Capital input
(K)

8	283	400	490	565	632	693	748	800
7	265	374	458	529	592	648	700	748
6	245	346	424	490	548	600	648	693
5	224	316	387	447	500	548	592	632
4	200	283	346	400	447	490	529	565
3	173	245	300	346	387	426	458	490
2	141	200	245	283	316	346	374	400
1	100	141	173	200	224	245	265	283

1 2 3 4 5 6 7 8

Rate of labour input (L)

Inferring from the above table illustrate and explain the following concepts

(a) Input substitutability, returns to scale and returns to factor [6]

(b) Economic and technological efficiencies. [4]

(c) Suppose that the price of capital is \$ 3 per unit and the price of labor is \$1 per unit. After explaining the concept of expansion path provide the missing information in the table below:

K	L	Q	Cost \$		
			Capital	Labour	Total
3					
6					
9					
12					
15					

[6]

(d) Use the information in the table showing the production of textiles in Ghana to distinguish between the concepts of isoquant and isocost. Use well labelled diagrams in your explanations [4]

Question 6

- (i) (a) Illustrate and explain long run profit maximization for a perfectly competitive firm and a monopoly. [5]
- (b) Under what circumstances should you defend pure competition as the most efficient market structure? [3]
- (ii) The production function for Superlite Sailboats, Inc., is given by $Q = 20K^{1/2}L^{1/2}$.
- If the price of capital \$ 6 per unit and the price of labor is \$ 3 per unit, determine the expansion path of the firm. [2]
 - Currently, the firm is producing 200 units of output per period using input rates of 25 units of capital and 4 units of labour. Is this an efficient input combination? Why or why not? If not, determine the efficient input combination for producing an output rate of 200 units. [3]
 - Using well labelled diagrams, distinguish between the production isocost and production isoquant [4]
 - Use the concepts in (c) to derive the condition for optimal employment of two factor inputs. [3]

Question 7

- (i) Using the concept of price discrimination:
- Briefly explain the different types of prices discrimination and provide criteria for successful price discrimination [5]
 - Explain the advantages and disadvantages of price discrimination [4]

(ii) (a). SOSUMO Pvt (Ltd) produces Sugar and Molasses (jointly produced goods) IN Burundi. The following functions represent the demand for the two products

$$P_{\text{sugar}} = 2.00 - 0.001Q_{\text{molasses}}$$

$$P_{\text{molasses}} = 1.6 - 0.001Q_{\text{molasses}}$$

The marginal cost function for production is given by

$$MC = \$ 0.60$$

Determine the optimal output for the production of both sugar and molasses, the price of sugar and that of molasses. [5]

(b) LELE Distributing sells videocassettes in two separate markets. The marginal cost of each cassette is \$ 2. For the first market, demand is given by: $P_1 = 4 - 0.2Q_1$. The demand equation for the second market is given by: $P_2 = 10 - 0.5Q_2$. If the firm uses third degree price discrimination, what will be the profit maximizing price and quantity in each market? How much economic profit will the firm earn? Show that greater profits result from price discrimination than would be obtained if a uniform price would be used. [6]

Question 8

- (a) Using a payoff matrix, show in what way a maxmin strategy is valid business strategy [4]
- (b) Game theory is used in economics because of the realization that the performance of a firm is also dependent upon the strategies employed by its competitors. Use a payoff matrix used in (a) to demonstrate this concept [4]
- (c) The Prisoner's Dilemma model illustrates that the result of a game can be undesirable. Assess this statement using a practical illustration [8]
- (d) Outline and briefly explain four major applications of game theory [4]

END

You may refer to the following formulae

$$\hat{\beta} = \frac{\sum xy}{\sum x^2}$$

where $x = X - \bar{X}$ and $y = Y - \bar{Y}$

$$\hat{\alpha} = \bar{Y} - \hat{\beta}\bar{X}$$

$$R^2 = \hat{\beta}^2 \frac{\sum x^2}{\sum y^2}$$