"Investing in Africa's future"

COLLEGE OF BUSINESS, PEACE, LEADERSHIP AND GOVERNANCE

NMEC 401: MANAGERIAL ECONOMICS

END OF FIRST SEMESTER EXAMINATIONS

NOVEMBER 2022

LECTURER: G. MANDEWO

DURATION: 3 HOURS

INSTRUCTIONS

Answer **QUESTION NUMBER 1** AND ANY **OTHER THREE QUESTIONS**.

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.

1. (a) Information asymmetry is the problem where two parties in a market do not have the same information about a product or a service. To compound this problem two sub problems normally arise which are moral hazard and adverse selection.

i. Suggest a practical example of moral hazard **[5 marks]**

ii. Technically explain and demonstrate how the problem of adverse selection is resolved. (Hint: you may use payoff matrices) **[5 marks]**

(b) The income elasticity of demand for furniture is 3. A recession reduces consumer incomes by 10%. What will happen to furniture sales? Explain why the demand for soap will be much less responsive to a reduction in income than the demand for furniture if the income elasticity of demand for soap is only 0.3 **[5 marks]**

(c) With reference to the payoff matrix given below;

		Firm B	
		Advertise	*Don't advertise*
FIRM A	*Advertise*	90, 90	500, 50
	Don't advertise	50, 500	150, 150

i. Distort the payoff matrix such that there is no dominant strategy for firm A by adjusting the pay offs. **[5 marks]**

ii. Use the Maxmin strategy to determine optimal outcome of the above pay off matrix and explain why non cooperative games are suboptimal **[5 marks]**

iii. Change the above payoff to reflect outcomes of a zero sum game **[5 marks]**

(d) Give detailed explanation of the following concepts and show how they are applied to business:

i. limit pricing **[5 marks]**

ii. transfer pricing **[5 marks]**

2. (a) A firm's Total cost function is given by the following equation

$$TC = Q^3 - 20Q^2 + 26Q + 90$$

(i) Determine the total variable cist and the total fixed cost. **[2 marks]**

(ii) What is the firm's marginal cost function? **[2 marks]**

(iii) Using two distinct methods, determine the rate of output where the Average Variable cost is at its minimum. **[4 marks]**

(b) For a perfectly competitive firm, the market price is \$16.00 The total cost equation is

$$TC = Q^3/3 + 5Q^2 + 40Q$$

Determine the profit maximizing rate of output and the level of profit. **[4 marks]**

(c) Market price is \$50. The firm's marginal cost curve is given by :

$MC = 10 + 2Q$. Find the profit-maximizing output for the firm **[4 marks]**

(d) A bread baker faces a horizontal demand curve. The firm`s total costs are given by the equation:

$$\mathbf{TC = 100 + 200Q - 3Q^2 + 2Q^3}$$

Below what price should the firm shut down its operations? **[4 marks]**

3. (a) Product bundling depends on the availability of a commodity with a high demand. Comment **[4 marks]**

(b) Triangle Limited produces Sugar and Molasses (jointly produced goods). The following functions represent the demand for the two products

$$P_{sugar} = 80 - 0.5Q$$

$$P_{molasses} = 50 - 2Q$$

The marginal cost function for production is given by

$$MC = 40 + Q$$

Determine the optimal output for the production of both sugar and molasses, the price of sugar and that of molasses. **[4 marks]**

(c) Illustrate practical application of cost plus pricing. **[4 marks]**

(d) Make a clear distinction of the following forms of price discrimination and for each give a practical example. **[4 marks]**

(e) Illustrate why monopoly production is undesirable. **[4 marks]**

4. (a) Suppose the class president, Eugine, is engaged by N. Richards to determine the demand for dry groceries in Marondera. The following data is available for her estimation

	Mon	Tues	Wed	Thurs	Fri	Sat	Sun
Quantity	15	12	11	11	9	8	6
Price	1	3	4	5	5	7	8

i. Estimate the demand function using the above information. **[5 Marks]**

ii. Compute and interpret the point elasticity of demand when price is $9.00 **[4 Marks]**

iii. Determine the coefficient of determination and give an interpretation **[4 Marks]**

You may refer to the following formulae

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

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

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

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

(b) Mr. Eugine is a business consultant; he is faced with a retail customer who needs advice on a policy package that will enhance his business. The original plan is to increase the price of beverages by **10%,** decrease advertising expenses by **5%** and increase credit offering to the public by **2%.** It is known that the credit offering elasticity is **+2.0** and the price elasticity of demand **-0.05** and the advertising elasticity of demand is **-1.0** Evaluate the net effect of this initial plan and suggest a viable alternative, if any is needed. **[4 Marks]**

(c) Show how a production surface captures all important concepts in production **[4 Marks]**

(e) Explain how you would determine the minimum of the Average Variable Cost (AVC) and how does the alternative method to the one you have used authenticate your findings?

[4 Marks]

5. (a) Given the Production Function:

$$\mathbf{Q = 72X + 15X^2 - X^3}$$

Where Q = Output and X = Input. What is the Marginal Product (MP) when

X = 8? **[2 marks]**

(b) If a production function is given by the equation:

$$\mathbf{Q = 12X + 10X^2 - X^3}$$

Where Q = Output and X= Input, calculate the equations for average product. **[2 marks]**

(c) Market price is \$50. The firm's marginal cost curve is given by :

MC = 10 + 2Q. Find the profit-maximizing output for the firm. **[4 marks]**

(d) A serious computer virus has affected Jesca, who was working on a consultancy project for Bhaddella. Mr Chinzvende Volunteered to help her and these are the excerpts of information he managed to retrieve.

$\mathbf{\sum PQ = -200}$ $\mathbf{(\sum Q) = 90}$ $\mathbf{\sum Q^2 = 1240}$ $\mathbf{\sum pq = -175}$

$\mathbf{\sum p^2 = 70}$ $\mathbf{\sum q^2 = 450}$ $\mathbf{(\sum Q)^2 = 8100}$ $\mathbf{(\sum pq)^2 = -175}$

Average output is 30 and the Average price is 10

Where upper case letters represent absolute values and lower case letters represent deviations

P is the price level

Q is the output

i. Use regression analysis to estimate the demand that faces Bhadella Enterprises. **[4 marks]**
ii. Using the estimated function from part (a) forecast the demand that results from an increased price of \$10 and a reduced price of \$5. **[4 marks]**
iii. Compute the coefficient of determination and interpret it **[4 marks]**

You may find the following formulae useful

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

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

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

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

6. (a) Two goods have a cross-price elasticity of +1.2.
Would you describe these goods as substitutes or complements? **[2 marks]**

(b) A firm produces a product at a fixed marginal cost of $2 and sells the product on two different markets. The inverse demand in market A is $P_A = 10 - Q_A$ and the demand in market B is $P_B = 20 - Q_B$. What output should the firm sell in market A?

[4 marks]

(c) A monopoly has demand curve $P = 100 – 2Q$ and cost curve $TC = 2.5Q^2$.
Calculate the deadweight loss of profit-maximizing production. **[4 marks]**

Why is long run equilibrium for a monopoly the same as that of short run?

(d) An engineer is considering expanding the scale of production for his department. He is facing a multiple of production functions. What advise (in terms of inputs) would you give her if she wishes to double output using the following production functions?

(i) $Q = \sqrt{K}L^{0.5}$ **[2 marks]**

(ii) $Q = K^{0.8}L^{0.5}$ **[2 marks]**

(iii) $Q = K^{0.8}L^{0.1}$ **[2 marks]**

(f) If the rental cost per month is $1000 and the targeted output is 100 units and the price is $20. What is the contribution per margin is the manager is targeting break even?

[4 marks]

7. (a) Given that Total Revenues is a product of price and quantity, determine the value of marginal revenues that shows a direct relationship between price elasticity of demand and marginal revenues. **[5 Marks]**

(b) Using the finding in item (a) investigate the effect of increasing prices for the following cases (**you may enhance your answer using diagrams**)

i. The elasticity of demand for bio carbonate soda for use in preparing Okra is unitary (e_p= -1.0) **[4 Marks]**

ii. The elasticity of demand for imported perfumes is elastic (e_p= -4.901) **[4 Marks]**

iii. The elasticity of demand for cooking oil is inelastic (e_p= -0.01) **[4 Marks]**

(c) Demonstrate two methods you would use to determine the optimal labour input and optimal capital input given a Cobb Douglas production function of the form $Q = 180L^{0.85}K^{0.15}$ And that the wage rate is $4 per hour and the price of the machine is $1 per hour. The Total cost is $20 000.00 Use the Langrangian technique to determine the optimal output, Capital units and Labour units. **[8 Marks]**

8 (a) Given a demand function of the form

P = 10 – 0.125Q

i. Determine the Average Product (AP), Total Product (TP) and Marginal Product (MP) **[4 Marks]**

ii. If Q is 2, what is the value of the Total Production? **[4 Marks]**

(b) Considering the following concepts of game theory

i. Nash equilibrium **[4 Marks]**

ii. Dominant Strategy **[4 Marks]**

iii. Non cooperative games **[4 Marks]**

Explicitly demonstrate an understanding of these concepts and business application

(c) An EMBA student of managerial economics was presented with three production functions of the form: $Q = \sqrt{K}L^{0.5}$; $Q = K^{0.8}L^{0.5}$ and $Q = K^{0.2}L^{0.1}$. She recommended that these are Cobb Douglas production functions if one wants to double output inputs should be doubled. Authenticate or deny the statement. What is your recommendation? **[4 Marks]**

END OF PAPER