 COURSECODE: MBA 805

COURSE TITLE: QUANTITATIVE METHODS.

DATE:…………………………………   TIME :…………………..

DURATION: TWO HOURS

INSTRUCTIONS

This paper contains FIVE (5) questions.

Answer question one (1) and any other TWO questions.

Write all the answers in the booklet provided.

Question One

a) Explain the role of the following in business analysis in an organization

  i)   Markov chain analysis
  ii) Input output analysis   (6marks).

b) A chemical company is planning to launch a new fertilizer and carries out a market survey in order to determine the likely demand. The survey indicates that the company can expect to sell between 1000 and 2000 tons per month and that the relationship between the price and the quantity demanded will be as follows

Table 1.

Price(Shs'000' per ton)	16	15	13	13	12
Monthly demand in thousand tons	1.00	1.25	1.50	1.75	2.00

The company estimates that the marginal cost (in Shs '000') of producing the fertilizer can be represented by the equation:

$$MC = 2X^2 - X + 5.$$

Where X is the monthly output in thousands of tons. The fixed cost will be Kshs 100,000 per month.

Required:

i) Determine the quantity and the price which should be produced and charged to maximize profit.
ii) Determine the maximum revenue and profit   (14 marks)

Question Two

a) In an economy there are two sectors A and B. Table 2 gives the data for that economy.

Table 2.

Producer	Users		Final demand	Final output
	A	B		
A	500	350	150	1000
B	320	360	120	800

Required:
i)   Determine the technical matrix of each coefficient
ii)   Determine the output factor of the economy if the final demand changes to 200 for A and 100 for B
iii) Determine the total primary input needed for the production to meet the above demand.   (15 marks)

Question Three

Toyota Company uses three types of steel to manufacture three different types of cars. The requirement of steel for each type of car and total availability is summarized in table 3.

	Type of cars			Total tons of steel
Types of steel	A	B	C	
X	2	3	4	290
Y	3	2	1	160
Z	1	1	2	130

Required:
Determine the number of units of cars A, B and C that can be produced   (15 marks)

Question Four

a) Outline the FIVE assumptions made in the use of Markov analysis to predict evolutions of a system for example change and stability of market share of a product or brand switching (5 marks).

b) To investigate brand switching between different brands of a detergent powder a research company surveyed shoppers in an area to discover their behaviour. The survey on a number of shoppers in relation to three brands; super wash, clean and Shine has revealed the following information.

From brand	To brand			
	Super wash	Clean	Shine	Total
Super wash	200	50	25	275
Clean	80	150	45	275
Shine	130	20	100	250
Total	410	220	170	800

i) Using the information; develop transition probability matrix

ii) Calculate the market share for each brand after two purchases.

iii) Calculate the market share for each brand in the long run (10 marks).

Question Five

a) A company employing ten people has a total cost of £ 300,000 a year. This cost includes fixed cost of £50,000 for overheads and variable cost for each person employed.

Required:

i) Determine the variable cost

ii) What would be the cost of production if the company expands to employ 50 people. (7 marks)

b) Marginal cost of a company is given by the function MR= 100- 2X; where X is sales in units. The company breaks even on sales 5 units. Find the fixed cost of the company (8 marks)