UGANDA MARTYRS UNIVERSITY, NKOZI CAMPUS

FACULTY OF BUSINESS ADMINISTRATION AND MANAGEMENT

DEPARTMENT OF ACCOUNTING & FINANCE

BAM 1SEMESTER TWO 2017/18

COURSE UNIT: QUANTITATIVE METHODS

DATE: Monday, 7th May 2018

Time allowed: 9:30am-12:30pm

Instructions to Candidates:

Read the following before answering the examination questions.

1) Do not write anything on this question paper.
2) Write neatly and show all workings clearly.
3) Start every question on a new page
4) Clearly state the question number & sections attempted
5) Answer **any four** questions, all questions carry equal marks

QUESTION ONE

a) Explain the major strengths of a mathematical modelling in business decision analysis **(6 marks)**

b) Use Cramer's rule to solve the simultaneous equations

$4x + y = 13$

$3x + 2y = 16$ **(4marks)**

c) Java House blends two types of coffee beans, Arabica coffee and Robusta to make two blends of coffee A and B. The A blend uses 75gms of the available Goodafrican coffee and 10gms of the Coffee day beans. The B blend uses 20gms of available Goodafrican coffee and 60gms of Coffee day beans..

(i) If Java House buys 200kgs of Arabica and 300kgs of Robusta beans, how much can each blend. **(5 marks)**

(ii) If they want to make 400 cups of blend A and 600 cups of blend B, what amount of beans should they buy. **(10 marks)**

QUESTION TWO

(a) Explain the following terms in simplex algorithm with using business knowledge **(2 marks each)**

i) Slack variables

ii) Surplus variables

(b) Solve the LP problem using Simplex method. Determine the following :

Maximize $Z = 5x_1 + 6x_2$

Subject to constraints,

$2x_1 + x_2 \leq 2000$

$x_1 \leq 800$

$x_2 \leq 200$

Where x_1, x_2

i) What is the optimal solution? **(15 marks)**

ii) What is the value of the objective function? **(2 marks)**

iii) Which constraint has excess resources and how much? **(4 marks)**

QUESTION THREE

Three commercial banks Equity, Finca, DFCU are competitors for an array of loan customers The table below shows the flow of customers between 1st March and 1st April 2018

			GAINS FROM			LOSSES TO				
			E	F	D	E	F	D		
Company	**Cust.1stmarch**	**M/kt share**							**Cust. 1st APRIL**	**M/kt share**
EQUITY(E)						0	40	48	1732	
FINCA(F)						80	0	68	3232	
DFCU(D)						100	60	0	3836	

i. State the number of customersfor each company in March.**(6 marks**)

ii. State the number of customers gained **(1 mark)**

iii. State the market shares for the months of March and April. (**6 marks)**

iv. Obtain the matrix of Transition probabilities**(6 marks**)

v. Predict the market shares of 1st May and 1st June.**(6marks)**

QUESTION FOUR

a) For your next presentation to the management team, you are asked to explain the following:

(i) The key elements of a time series.**(4 marks)**

(ii) The use of forecasting in business.(**1 mark)**

b) A management accountant is attempting to derive a cost-output relationship for his company. The following data has been collected over the past months.

a) A management accountant is attempting to derive a cost-output relationship for his company. The following data has been collected over the past two years.

Year	**Quarter**	**Units of Output (000s)**	**Cost Shs 000s**
2016	1	10	32
	2	20	39
	3	40	58
	4	25	44

2017	1	30	52
	2	40	61
	3	50	70
	4	45	64

i. Using linear regression analysis, derive the relationship between the variables and interpret your answer. **(12 marks)**

ii. Estimate the strength of the relationship between the variables and explain the principle of the co-efficient of determination **(08 marks)**

QUESTION FIVE

(a) Explain the purpose of differentiation and integration in calculus **(4 marks)**

(b) Use the definition above (a) to find the derivative of the following. **(1 mark each)**

i) $f(x) = -7x^2 + 4x$ ii) $f(x) = 5 - 2x$

(c) Find the integrals of the functions **(2 marks each)**

i) $\int (8x^3 - 3x^2 + 6x - 10)dx$ ii) $\int (2.4x^2 - 8.6x - 3)dx$

(d) A manufacturer knows that if x (hundred) products are demanded in a particular week: (i) the total cost function (shs. '000'000) is 14 + 3x and (ii) the total revenue function (shs.'000'000) is

$9x - 2x^{2.}$

(a) Derive the total profit function **(3 marks)**

(b) Find the break even points **(4 marks)**

(c) Calculate the level of demand that maximises profit (i.e maximum profit point) and the amount of profit obtained **(6 marks)**

QUESTION SIX

(a) Find the best decision with the following gains matrix **(8 marks)**

	Event		
Alternative	X	Y	Z
	P=0.7	*P=0.2*	*P=0.1*
A	14	24	12

B	6	40	90
C	1	70	30
D	12	12	6

(b) A business man asked his bank for a loan to expand his company. The bank managers have to decide whether or not to grant the loan. If they grant the loan, the businessman's expansion maybe successful or unsuccessful. if the bank managers don't grant the loan, the business man may continue banking as before or he may move to his account to another bank. Draw a decision tree of this situation. **(5 marks)**

(c) Suppose the business man currently values his account at shs. 20,000,000. If the manager grants the loan and expansion succeeds, the value to the bank of increased business and interest charges will be shs. 30,000,000 a year. If the expansion does not succeed, the value to the bank declines to shs. 10,000,000 because of lower business volumes and allowance for write off of bad debt. There is a probability of 0.7 that the expansion plan will succeed. If the manager does not grant the loan there is probability of 0.6 that the business man will transfer his account to another bank.

Analyse the problem tree for the business man **(12 marks)**

GOOD LUCK