UGANDA MARTYRS UNIVERSITY, LUBAGA CAMPUS

FACULTY OF BUSINESS ADMINISTRATION AND MANAGEMENT

DEPARTMENT OF ACCOUNTING & FINANCE

BAM 1 SEMESTER TWO 2017/18

COURSE UNIT: QUANTITATIVE METHODS

DATE: Thursday, 3rd May 2018

Time allowed: 4:00pm- 7:00pm

Instructions to Candidates:

Read the following before answering the examination questions.

1) Do not write anything on this question paper.
2) Attempt **FIVE** questions.
3) Ensure that your **Registration number** is indicated on all pages of your answer sheets.
4) Ensure your work is **clear** and **readable**. Untidy work shall be penalized

QUESTION ONE

A portable computer corporation produces two types of computers, DELL and TOSHIBA on which it earns a profit of UGX3, 000 per DELL computer and UGX4,000 per TOSHIBA computer. DELL requires four hours of labor and while TOSHIBA requires six hours. DELL uses 1 kg of materials while TOSHIBA requires the same amount of materials. In terms of processing, DELL takes four hours while TOSHIBA takes two hours. In any given period of time, 180 hours of labor, 40 kg of materials and 100 hours of processing are available. Trade agreement restricts DELL computers to a maximum of 20 units and at least 10 units of TOSHIBA.

Required:-

a) **[1 mark]** formulate the objective function for the company
b) **[4 marks]** formulate the constraints for the company above
c) **[8 marks]** determine the weekly production that maximizes profits
d) **[2 marks]** calculate the maximum profit
e) **[5marks]** determine the degree of utilization of each constraint

QUESTION TWO

a) **[5 marks]** the marginal cost of manufacturing Q units of a product is $5 + 16Q - 3Q^2$. The total cost of producing 5 items is $500. Determine the total cost function

b) **[5 marks]** the demand function for a certain manufacturer is $3Q = 24 - 2P$. Determine the value of Q that maximizes revenue

c) The cost function of a firm is given as $100x - 10x^2 + \frac{1}{3}x^3$. Determine the output at which

i) **[3 marks]** marginal cost is minimum

ii) **[3 marks]** average cost is minimum

iii) **[4 marks]** average cost is equal to the marginal

QUESTION THREE

a) The following table shows a number of females and males who shopped from the different arcades in Kampala town.

Arcade	A	B	C	D	E
Female	20	30	10	15	10
Male	25	15	12	20	10

Determine the probability that a randomly selected person shopped from arcade:-

i) **[2 marks]** A

ii) **[2 marks]** C or E

iii) **[3 marks]** A and D

iv) **[3 marks]** B given that the person is a male

b) **[10 marks]** car company in Japan uses two types of steel A and B. for producing two types of cars; Toyota and Honda. To produce Toyota, using 375,000 kg steel, you need 9,000 kg of A and 12,000 kg of B. To produce Honda using 400,000 kg of steel, you need 20,000 kg of A and 5,000 kg of B. Determine using a matrix method the number of cars of each type.

QUESTION FOUR

Quantitative analysis follows a logical series of steps to help management make rational decisions about problems faced in their companies. However, there are also drawbacks associated with the analysis.

a) **[8 marks]** identify and explain each logical step
b) **[6 marks]** spot and give a summary of the drawbacks one may face
c) **[6 marks]** suggest possible solutions to the drawbacks you have identified

QUESTION FIVE

a) **[6 marks] a** company's cost depends on two inputs; Labor hours (x) and machine hours (y). if the cost function is $C(x, y) = 20x^2 + 5y^2 - 8xy + 4$ and the marginal cost of each input is 1400; determine the number of hours for each input

b) **[4 marks]** DFCU bank charges its customers an interest rate of 15% compounded monthly while Centenary bank offers 20% compounded quarterly. Determine which bank one should borrow a loan for a business venture.

c) **[4 marks]** find the compound amount and the interest if 600 is accumulated for 15 years at 3% compounded semi annually for 10 years and at 4% compounded monthly for the next 5 years.

d) **[6 marks]** calculate the present value of annuity in arrears of $15,000 paid annually for 20 years at the rate of interest of 9%.

QUESTION SIX

A company produces and sells items. The unit selling price of an item is 20,000 shillings while the fixed costs are 25,400,000/=. The estimates for demand and variable costs are as follows

Demand	Probability	Variable cost	Probability
6000	0.2	5,000	0.4
8000	0.4	15,000	0.2
10000	0.3	8,000	0.1
15000	0.1	10,000	0.3

a) **[14 marks]** determine the expected profit of the company
b) **[6 marks]** identify three uses of expected values to a project

FORMULA SHEET BAM 1

n^{th} term of Arithmetic Series : $T_n = a + (n-1)d$

Sum of n terms of Arithmetic Series: $S_n = \dfrac{n}{2}\{2a + (n-1)d\}$

Compounding once a year: $A = P(1+r)^n$

Componding m times a year: $A = P(1+\dfrac{r}{m})^{mn}$

Effective Annual Interest Rate $(EAIR) = (1+\dfrac{n}{m})^m - 1$

EAIR Continuous Compoudnig $= e^n - 1$

Present Value of Ordinary Annuity $(PV_{OA}) = \dfrac{F[1-(1+r)^{-n}}{r}$

PV_{OA} compounded m times a year $= \dfrac{F[1-(1+\dfrac{r}{m})^{-nm}}{\dfrac{r}{m}}$