The Co-operative University of Kenya

END OF SEMESTER EXAMINATIONS APRIL-2019

EXAMINATION FOR THE DEGREE OF BACHELOR OF SCIENCE IN INFORMATION TECHNOLOGY (YR I SEM II)

UNIT CODE: BMAT 1104

UNIT TITLE: MANAGEMENT MATHEMATICS II

DATE: 25TH APRIL, 2019 **TIME: 2:00 PM – 4:00 PM**

INSTRUCTIONS:
Answer question **ONE (compulsory)** and any other **TWO** questions **Question one**

QUESTION ONE

(a) Define the following terms

i. Price Elasticity of Demand [2 marks]

ii. Cross Elasticity of Demand [2 marks]

iii. Optimization [2 marks]

iv. Marginal Analysis [2 marks]

(b) The price of two commodities are represented by the following equation. Calculate the values of X and Y using matrices. [7 marks]

$2x - 2y - 3 = 0$

$8y = 7x + 2$

(c) Find the derivative of the functions below

i. $f(x) = \frac{x-1}{x+2}$ [4 marks]

ii. $f(x) = \frac{\ln(x)}{2x^2}$ [4 marks]

(d) Find the derivative of $y = e^{-3x} \sin 4$ [3 marks]

(e) Find

$\int_1^3 \int_0^2 (xy + x^2y^2)\, dxdy$ [4 marks]

QUESTION TWO

(a) In analysing switching by Business Class customers between airlines, the following data has been obtained by Kenyan Airline (KA)

		Next flight by	
		KA	Competition
Last flight by	KA	0.85	0.15
	Competitiom	0.10	0.90

Business class customers make 2 flights a year on average currently BA have 30% of the Business Class Market. What would you forecast BA's share of the Business Class Market to be after two years? [10 marks]

(b) A cinema charges $8 per ticket for evening screenings and selss 250 tickets a night on average. They estimate that the price elasticity of demand for tickets is (-) 1.6. Calculate the expected number of tickets sold if they reduce the ticket price to $7 [6 marks]

(c) Evaluate the integral

$\int e^{3x-2}\,dx$ [4 marks]

QUESTION THREE

(a) A local council raises the price of Car parking from $3 per day to $5 per day and finds that usage of car parks contracts from 1,200 cars a day to 900 cars per day. Calculate the price elasticity of demand for this price change and calculate whether total revenue from the car park rises or falls [10 marks]

(b) Find the exact value $\int_0^1 x^2\,e^x dx$ [6 marks]

(c) Find the derivative of the function $y = \sqrt{x^2-1} - \ln\left[\frac{1}{x} + \sqrt{1+\frac{1}{x^x}}\right]$ [4 marks]

QUESTION FOUR

a. Find y' of the following by implicit differentiation

i. $3y^3 + 4x^3 - y = x^6$ [3 marks]

ii. $7y^2 + \sin(3x) = 12 - y^4$ [3 marks]

b. Given two matrices A and B such as

$$A = \begin{bmatrix} 1 & 6 & 2 & -2 \\ -4 & 4 & -3 & -1 \end{bmatrix}, B = \begin{bmatrix} 5 & 3 & 6 & 2 \\ 7 & 4 & -2 & 8 \\ 0 & 9 & 1 & -3 \\ 10 & 11 & 12 & 13 \end{bmatrix}$$

Find AB [4 marks]

c. Find the fist four derivatives for each of the following

i. $f(y) = \sin(3y) + e^{-2y} + \ln(7y)$ [4 marks]

ii. $R(t) = 3t^2 + 8t^{1/2} + e^t$ [4 marks]

d. Explain the importance of profit optimization in Management Mathematics [2 marks]