TECHNICAL UNIVERSITY OF MOMBASA

Faculty of Business and Social Studies

DEPARTMENT OF BUSINESS STUDIES

UNIVERSITY EXAMINATIONS FOR DEGREE IN

BACHELOR OF BUSINESS ADMINISTRATION

BACHELOR OF COMMERCE

BMS 4102: MANAGEMENT ACCOUNTING II

END OF SEMESTER EXAMINATIONS

SERIES: APRIL 2015

TIME: 2 HOURS

INSTRUCTIONS:

- Answer Question **ONE (Compulsory)** and any other **TWO** questions.
- Do not write on the question paper

This paper consists of Five printed pages

QUESTION 1 (Compulsory)

a) Find the determinant of the following matrices:

i) $T = \begin{bmatrix} 8 & 3 \\ -2 & -4 \end{bmatrix}$ **(2 marks)**

ii) $A = \begin{bmatrix} 2 & 4 & 7 \\ -1 & 3 & 2 \\ 4 & -2 & 0 \end{bmatrix}$ **(3 marks)**

b) Differentiate the following functions;

i) $Y = \dfrac{2}{(2t^3 - 5)^4}$ **(4 marks)**

ii) $Y = 3x^2 \sin 2x$ **(3 marks)**

c) Minimize $Z = 3x_1 + 6x_2$

Subject to:

$$4x_1 + x_2 \geq 20$$
$$x_1 + x_2 \leq 20$$
$$x_1 + x_2 \geq 10$$
$$x1\,,\ x2 \geq 0$$

(3 marks)

d) Solve for x and y by use of Cramer's rule

i) $\begin{matrix} 5x + 3y = 1 \\ 2x - 3y = -8 \end{matrix}$ **(3 marks)**

ii) $\begin{matrix} 24x + 2y = 86 \\ 15x + y = 52 \end{matrix}$ **(3 marks)**

e) Determine the inverse of the following matrix:

i) $A = \begin{pmatrix} 4 & 3 \\ -2 & -1 \end{pmatrix}$ **(2 marks)**

ii) $B = \begin{bmatrix} 1 & 2 & 0 \\ 1 & 0 & -1 \\ -1 & 3 & 2 \end{bmatrix}$ **(4 marks)**

f) Integrate the following functions:

i) $\int 3x^4 \ dx$ **(2 marks)**

ii) $\int \frac{2}{x^2}\, dx$ **(2 marks)**

QUESTION 2

a) Consider the system of equations and solve using matrices:

$$x_1 + 2x_2 = 5$$
$$x_1 - x_3 = -15$$
$$-x_1 + 3x_2 + 2x_3 = 40$$

(5 marks)

b) Differentiate the following functions:

i) $(3x^2 - 5x + 8)^{10}$ **(2 marks)**

ii) $x^2 e^{2x}$ **(4 marks)**

c) Differentiate the following functions:

i) $Y = 2x^2 (5x + 3)$ **(3 marks)**

ii) $e^{3t} \sin 4t$ **(3 marks)**

iii) $Y = Ln\ (5x^2 - 2x + 1)$ **(3 marks)**

QUESTION 3

a) Determine solution to the system of equations:

i) $$\begin{aligned} 3x_1 - 5x_2 &= 22 \\ 4x_1 + 2x_2 &= 12 \end{aligned}$$ **(3 marks)**

ii) $$\begin{aligned} 2x_1 + 3x_2 &= 1 \\ 4x_1 + 7x_2 &= 3 \end{aligned}$$ **(3 marks)**

b) Intergrate the function

i) $Y = \int (12x + 24x^2)\ dx$ **(2 marks)**

ii) $Y = \int (48x - 0.4x^{-1.4})\ dx$ **(2 marks)**

c) Find the determinant for each of the following matrices

i) $\begin{bmatrix} -6 & 25 \\ -10 & -20 \end{bmatrix}$ **(1 mark)**

ii) $\begin{bmatrix} 2 & 0 & -1 \\ 5 & 2 & 3 \\ -10 & 0 & 5 \end{bmatrix}$ **(3 marks)**

d) Differentiate with respect to x

i) $y = 2 \cos 6x$ **(2 marks)**

ii) $y = \dfrac{x^2}{1+x}$ **(3 marks)**

e) A producer of machinery wishes to maximize profit from producing two products, product A and product B. The three major inputs for each product are steel, electricity and labour hours. The table below summarizes the requirements per unit of each product, available resources and profit margin per unit. The number of units of product A should be no more than 80% of the number of product B. Formulate the linear programming model for this situation.

	Product		
	A	**B**	**Monthly total available**
Energy	100K wh	200 K wh	20,000k wh
Steel	60 lb	80 Lb	10,000 Lb
Labor	2.5 h	2 h	400h
Profit per unit	$ 30	$ 40	

QUESTION 4

a) Solve the following simultaneous equations using Cramer's rule:

i) $$x_1 + x_2 = -1$$ $$2x_1 - x_2 = 7$$ **(3 marks)**

ii) $$5x_1 - 2x_2 = 3$$ $$3x_1 + x_2 = -1$$ **(3 marks)**

b) Differentiate the following functions:

i) $Y = \dfrac{x+1}{\sqrt{x}}$ **(4 marks)**

ii) $Y = (3x^2 - 7x + 4)^6$ **(3 marks)**

iii) $Y = 10e^{5x^2 - 4x}$ **(3 marks)**

c) Minimize $Z = 5x_1 + 8x_2$

Subject to:

$$x_1 + x_2 \geq 6$$
$$3x_1 + 2x_2 \leq 30$$
$$2x_1 + x_2 \leq 5$$
$$x_1 \ , \ x_2 \geq 0$$

(4 marks)

QUESTION 5

a) Differentiate the following functions:

i) $Y = \dfrac{5}{3\sqrt{x^4}}$ **(3 marks)**

ii) $Y = e^{x}$ **(2 marks)**

b) The population of a country is estimated by the function $P = 125\, e^{0.035t}$ where P is equals the population (in millions) and t equals time measured in years since 1990.

i) What is the population expected to equal to in the year 2000. **(3 marks)**

ii) Determine the expression for the instantaneous rate of change in the population. **(2 marks)**

c) Solve the following linear programming problem

Maximize $z = 2x_1 + 10x_2$

Subject to:

$$2x_1 + 5x_2 \leq 16$$
$$6x_1 + 10x_2 \leq 30$$
$$x_1 \geq 0,\ x_2 \geq 0$$

(4 marks)

d) Differentiate the following function

$Y = 3x^3 - 2x^2 + x - 4$

e) Give **FOUR** applications of linear programming. **(4 marks)**