



MASENO UNIVERSITY
UNIVERSITY EXAMINATIONS 2016/2017

**FOURTH YEAR FIRST SEMESTER EXAMINATIONS FOR THE
DEGREE OF BACHELOR OF BUSINESS ADMINISTRATION WITH
INFORMATION TECHNOLOGY**

HOMA-BAY CAMPUS

ABA 402: QUANTITATIVE METHODS IN BUSINESS II

Date: 24th June, 2017

Time: 9.00 - 12.00 noon

INSTRUCTIONS:

- Attempt question ONE and any other THREE questions.
- Neatness is vital
- Question one has 25 marks while the rest have 15 marks each.



QUESTION ONE (25 MARKS)

a) Explain the main roles of sensitivity analysis on optimal solution.

(3 marks)

b) Explain the following terms.

(6 marks)

i. Slack variables

ii. Surplus variable

iii. Unrestricted variables

c) (i) Define correlation.

(2 marks)

(ii) Give *any four* significance of correlation.

(4 marks)

d) State *any four* assumptions made when working with assignment problems.

(4 marks)

e) Below is an objective function and constraints for a maximization problem.

$$z = 4x_1 + 6x_2, \text{ where } x_1 \geq 0 \text{ and } x_2 \geq 0 \text{ subject to the following constraints}$$
$$\begin{aligned} -x_1 + x_2 &\leq 11 \\ x_1 + x_2 &\leq 27 \\ 2x_1 + 5x_2 &\leq 90 \end{aligned}$$

Required: Generate the first Tableau and indicate the *entering variable*, *leaving/departing variable* and the *pivot element*.

(6 marks)

QUESTION TWO (15 MARKS)

- a) What is an assignment problem? Give the various steps involved in solving assignment problem. **(3 marks)**
- b) Four jobs are to be allocated to four machines in accordance with the information given below, which relates to the time each machine would take to complete each job.

		Machines (Time in minutes)			
		1	2	3	4
JOB	A	10	28	20	13
	B	16	30	7	28
	C	33	22	21	17
	D	21	29	27	12

Required: **(12 marks)**

- i. Find out the allocation of time to four machines which minimizes total running time.

QUESTION THREE (15 MARKS)

- a) What is simulation? **(2 marks)**
- b) State three reasons for carrying out simulation. **(3 marks)**
- c) A loading dock has trucks arriving every 36 minutes (0.6 hours) on average, and the average service (loading / unloading) time is 30 minutes (0.5 hours). A new conveyer belt system can reduce that to 15 minutes (0.25 hours). Simulate the arrival of 200 trucks to see how performance would be affected by the new system. **(10marks)**

QUESTION FOUR (15 MARKS)

The following table show the various data of X and Y variables:

X	1	2	3	4	5
Y	2	5	3	8	7

Required:

- a) Develop a *scatter diagram* for regression equation of Y on X in a) ii above. (3 Marks)

b)

- i. Calculate regression equation of X on Y (6marks)
- ii. Calculate regression equation of Y on X (6marks)

QUESTION FIVE (15 MARKS)

- a) What is coefficient of Determination? How is coefficient of determination obtained? (5 marks)
- b) A sample of 6 children was selected; data about their age in years and weight in kilograms were recorded as shown in the following table.

Serial No.	Age (Years)	Weight (Kg)
1	7	12
2	6	8
3	8	12
4	5	10
5	6	11
6	9	13

Required:

- i) Find the coefficient of determination r^2 between age and weight of these 6 children. (2 marks)
- ii) Find the correlation between age and weight. (8 marks)

QUESTION SIX (15 MARKS)

A transportation problem involves the following costs, supply and demand.

From	To				Supply
	1	2	3	4	
1	Kshs. 500	Kshs. 750	Kshs. 300	Kshs. 450	12
2	650	800	400	600	17
3	400	700	500	550	11
Demand	10	10	10	10	

Required:

- a) Find the initial solution using:
- i) The north west corner method, (3 marks)
 - ii) The minimum cell cost method, and (3 marks)
 - iii) Vogel's Approximation Model (VAM) (3 marks)
- b) Using the VAM initial solution, find the optimal solution using the modified distribution method (MODI) (6 marks)