

**JARAMOGI OGINGA UNIVERSITY OF SCIENCE AND TECHNOLOGY**  
**SCHOOL OF BUSINESS AND ECONOMICS**  
**UNIVERSITY EXAMINATION FOR DEGREE OF MASTER OF BUSINESS**  
**ADMINISTRATION**  
**1<sup>ST</sup> YEAR 1<sup>ST</sup> SEMESTER 2016/2017 ACADEMIC YEAR**  
**MAIN CAMPUS**

---

**COURSE CODE: MBA 805 APRIL 2017**

**COURSE TITLE: QUANTITATIVE METHODS**

**EXAM VENUE:**

**STREAM (MBA)**

**DATE:**

**EXAM SESSION:**

**TIME: 2.00 HOURS**

---

**Instructions:**

- 1. Answer ANY four questions.**
- 2. Candidates are advised not to write on the question paper.**
- 3. Candidates must hand in their answer booklets to the invigilator while in the examination room.**

**QUESTION ONE (15 MARKS)**

- a) Explain three major assumptions of Markovian process analysis. **(6 Marks)**
- b) Dr. Bogamoya is considering running for presidential election in the year 2022 in Utopia State. Suppose that from a survey done in 2013 on voting patterns, among the eligible voters of Utopia it was found; of those who voted Republicans at an election, 40% will vote Republicans at the next election. Of those who voted democrats, 70% will do so again at the next election. Assuming that in the first election 8 M and 2M voted for Republicans and Democrats respectively.

**Required;**

How will this pattern change in 2017 elections (which are the next immediate Elections?) **(2Marks)**

(ii) Whether Bogamoya will win if 50% or more majority rule will be used in 2017 given he is a Republican. **(2 Marks)**

(iii) What advice will you give Dr. Bogamoya if you were his campaign manager in the long run? **(5Marks)**

**QUESTION TWO (15 MARKS)**

a) A company manufactures three models of flat-screen color TVs: 19-inch model, a 27-inch model and a 32-inch model. The TVs are shipped to two warehouses. The number of units shipped to each warehouse is given in matrix **A**, and the prices of the models are given in matrix **B**. Use matrix multiplication to determine the total value of the TVs in each warehouse. **(4 Marks)**

Matrix A			Matrix B
19-inch	27-inch	32-inch	Price
<b>W1</b> (5,000	6,000	8,000)	<b>19 inch</b> (Kshs 12,400)
<b>W2</b> (4,000	10,000	5,000)	<b>27 inch</b> (Kshs 36,366)
			<b>32 inch</b> (Kshs 62,600)

(b) Tee Technology company manufactures three products X, Y and Z. The products pass through three processes A, B, and C. Each of the products spent the following times in the processes as shown below.

Products	time spent in processes		
	A	B	C
X	3	3	1
Y	3	2	3
Z	2	0	1

Process A, B, and C have capacities 130, 85 and 60 respectively.

**Required:**

By matrix inversion determine the number of units to be of each product to be produced of each product. **(9 Marks)**

iii) If the selling price per unit of X, Y, and Z are Kshs. 60, 45, and 70 respectively, determine total revenue realized from the number of units produced assuming all the units are sold. **(2 Marks)**

**QUESTION THREE (15 MARKS)**

(a) (i) Outline three applications of probability theory. **(3 Marks)**

(b) The data below relates to costs incurred at various output levels for a certain company.

Output level (units)	Cost incurred (\$)
40	812
55	890
68	955
73	948
82	1050
89	1100
94	1160
95	1095
103	1250
110	1380

- i. By taking output level (X) as the independent variable and cost incurred (Y) as the dependent variable obtain the simple linear regression equation of Y on X. **(5 Marks)**
- ii. If the company management projects an output levels of 86 or 118 units, how much cost should they expect to incur? **(2 Marks)**
- iii. Standard error of regression **(5 Marks)**

**QUESTION FOUR (15 MARKS)**

(a) Find the derivative of  $y = (5x^2 - 3x + 2)(0.5x^2 - 2)$  using Product rule **(4 Marks)**

(b) The manager of Nakumatt Kisumu established the firm's average cost and marginal revenue functions to be:  $AC = 100 + 6Q$  and  $MR = 200 + 10Q$  respectively, where Q is the number of units sold.

**Required:**

- i) The equation of total revenue **(2 Marks)**
- ii) The equation of marginal cost. **(3 Marks)**
- iii) The level of output that maximizes profit, hence maximum profit **(6 Marks)**

**QUESTION FIVE (15 MARKS)**

a) Explain giving appropriate example

- i. Subset (2 Marks)
- ii. Set intersection (2 Marks)
- iii. Set difference (2 Marks)

(b) A researcher interviewed 350 University students in a Business School and established the following: **170** were finance students; **150** were registered in accounting; **180** were marketing students; **60** were registered in finance and accounting; **40** were registered in accounting and marketing; **60** were registered finance and marketing and **50** were neither in the three courses.

Required:

- i) Venn diagram representing the above information (3Marks)
- ii) The number of students taking all the three courses. (3Marks)
- iii) Number of students who strictly take a single subject (3Marks)

**QUESTION SIX (15 MARKS)**

a) ABC Ltd has established the following:

Revenue function  $R = 20Q + 2.5Q^2$  and the marginal cost function as  $16 + 2Q$ . Determine total profit between activity level of 20 and 30 units (5marks).

b). Two investment proposal have been presented to you for consideration

	Project X	Project Y
YR	Cash flows	Cash flows
0	(350,000)	(480,000)
1	100,000	90,000
2	80,000	120,000
3	110,000	300,000
4	60,000	50,000
5	200,000	60,000

Assuming 12% cost of capital applies and the cash flows have the probabilities of 0.3,0.5,0.7,0.9,and 0.8 for years one to five respectively, advise on the basis of Expected Net Present Value technique the best option to exercise.

(10marks)



