JARAMOGI OGINGA ODINGA UNIVERSITY

OF SCIENCE & TECHNOLOGY

UNIVERSITY EXAMINATIONS 2012/2013

2ND YEAR 1ST SEMESTER EXAMINATION FOR THE DEGREE OF BACHELOR OF BUSINESS ADMINISTRATION WITH IT

(REGULAR)

COURSE CODE: ABA 205

COURSE TITLE: MANAGEMENT MATHEMATICS II

DATE: 13/8/2013   TIME: 9.00-11.00AM

DURATION: 2 HOURS

INSTRUCTIONS

1. This paper consists of 5 Questions.
2. Answer Question 1 (Compulsory) and any other 2 questions.
3. Write your answers on the answer booklet provided.

QUESTION ONE COMPULSORY (30MARKS)

Tee Technology company manufactures three products X ,Y and Z.The products passes thrugh three processes A, B, and C .Each of the product 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 :

i) Formulate simuliteneous equations in three unknowns   (3 marks)

ii) Solve the equations by matrix inversionto detrmine number of units to be
     produced of each product.   (9 marks)

iii) If the selling price for 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.

(3marks)

b) Digitek Publishers ltd has established its revenue function to be
    $R = 20Q + \dfrac{5Q^2}{2}$ and the marginal cost function as 16+2Q.

Determine:

   i)   Total revenue when between 10 and 20 units are produced.   (2marks)

   ii) Profit function.   (3marks)

   iii) Total profit between activity level of 20 and 30 units   (4marks)

c) Explain three importance of input –output analysis in the Kenyan economy.

(6marks)

QUESTION TWO

a) Expliain the **five** components of an open input- output model   (10marks)

b) Dr. Banda 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, 50% will do so again at the next election. Assuming that in the first election 7M and 3M voted for Republicans and Democrats respectively.

Required;

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

(2marks)

(ii) Whether Kazi Banda 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 Mr. Banda if you were his campaign Manager in the long run steady state?   (6marks)

QUESTION THREE

a) Outline four assumptions that guide a manager to subject a management problem to a markov chain analysis.   (4marks)

The table below shows two sector economy Agriculture and Industry.

Inputs	Interdependent sectors Agriculture Industry		Final Demand	Total output
Agriculture	300	600	100	1000
Industry	400	1200	400	2000
Primary inputs	300	200	0	500
Total inputs	1000	2000	500	3500

Required :

    i)   Technical coefficient matrix   (3marks)

ii) Suppose the final demand for agriculture increased by 40% and that of industry reduced by 10%, determine the total output that will satisfy intermediate demand and final demand, hence account for the industry output. (13 marks)

QUESTION FOUR

a) Solve by Cramer's rule the following equations:

$$3x + 3y - z = 11$$

$$2x - y - 2z = 9$$

$$4x + 3y + 2z = 25 \tag{9marks}$$

b) The Cool U Refrigiration Company produces two models of refrigirators : Jumbo and Coolex.due to comprtitive conditions , the profit margins are less so thatso that the company sells these products to dealers at a profit of vKsh. 200 per Jumbo and Ksh. 100 per unit of Coolex .A Jumbo requires on average ,150 man-hours for assembly ,50 man hours for painting and 10 man-hours for testing. A unit of Coolex reqires 60,40,and 20 man-hours respectively in these departments. During each production run, there are 30,000,13,000,and 5000 man-hours for asembly ,painting and testing respectively.

Required :

i) Formulate all the relevant constraints depicting above situation.

ii) By graphical method ,dtermine the number of units to be produced for maximum

profit , hence the binding constraints.

iii) Develop the Primal Problem.

(11marks)

QUESTION FIVE

(a) Differentiate with respect Q

   i) $y = (2q +3)(q +3)$ (3marks)

   ii) $\dfrac{3q2+3x+8}{4q -3}$ (4marks)

b) (i) Given that $P = 100 – q2$ represent a demand function. Find the rate of change of price, P, with respect to unit changes in q, hence investigate how fast is the price changing with respect to q, when q = 5, assuming that P is in Kshs.   (3marks)

   ii)   ABC manufacturer's cost function is given by:

         $C = 0.25q2 + 3q + 400$, where q = number of units produced.

         At what level of output will average cost per unit be a minimum? Hence the minimum cost

                                                          (3marks)

   iii)   The net income of a Computer firm is modeled by a quadratic function
         $R=128.5X^2-69.5X+2681$ where R is net income in millions of shillings and x   is the number
         of years after the year January2000. Find the net income in year ending December 2004,
         hence the year after 2000 when net income will be maximum or minimum.   (7 marks)