KABARAK   **UNIVERSITY**

UNIVERSITY EXAMINATIONS
2009/2010 ACADEMIC YEAR
FOR THE DEGREE OF BACHELOR OF COMMERCE

COURSE CODE: FNCE 212
COURSE TITLE: MANAGEMENT MATHEMATICS II

STREAM: **Y2S1**

DAY: **FRIDAY**

TIME: **2:00 – 4:00 P.M.**

DATE: **04/12/2009**

INSTRUCTIONS:
  i. *Answer Question **One** and Any **Other Two questions***
 ii. *All workings leading to answers must be clearly shown*

PLEASE TURN OVER

QUESTION 1 (30 Marks) Compulsory

a) A lump sum of money is invested at a rate at 20% p.a. compounded quarterly. How long will it take the invested to

      i.   Double   (3Marks)

      ii.   Triple   (3 Marks)

b) ABC Piston Company wishes to produce three types of pistons; X, Y, Z. to manufacture a type x piston requires 2 minutes each on machine I and II and 3 minutes on machine III. A type y piston requires 2 minutes on machine I, 3 minutes on machine II and 4 minutes on machine III. A type z piston requires 3 minutes on machine I, 4 minutes on machine II and 3 minutes on machine III. There are 3½ hours available on machine I, 4½ hours for machine II and 5 hours for machine III. How many pistons of each type should the Company make in order to use all the available time.   (6 Marks)

c) Write short notes on the following

    i.   Annuity   (2 Marks)

    ii.   Markov process   (2 Marks)

    iii.   Mortgage   (2 Marks)

    iv.   Matrix   (2 Marks)

    v.   Decision theory   (2 Marks)

d) In Kenya there are two main types of newspapers; Nation and Standard. A researcher is interested in the reading habit of the people. He comes up with the following:

    i.   of those who read Nation on a given day, 60% did so the following day and the rest read the standard

    ii.   of those who read the standard on a given day, 30% changed to the Nation the following day

    iii.   Yesterday, the readership was 20% for the standard, 80% for the Nation.

Assume that all the assumptions hold. Determine the readership for both dailies

    i.   Today

    ii.   Tomorrow

    iii.   If the process persists into the future, what will be the readership level in the long run?   (8 Marks)

QUESTION 2 (20 Marks)

a) Raha Tele, a small island has established that her economy mainly depends on fishing, tourism and coconut processing. Data based on last year's operations indicate that fishing; tourism and coconut processing had total turnovers of Kshs. 600M, Kshs. 500M and Kshs. 400M respectively. During the year, fishing required Kshs. 20M,

Kshs. 10M, and 30M worth of inputs from fishing, tourism operations and coconut processing respectively. Respective inputs in support of tourism operations were worth Kshs. 70M, Kshs. 30M and Kshs. 20M. Coconut processing required inputs worth Kshs. 40M, Kshs. 20M and Kshs. 60M from the three industries respectively. Require:

   i. Compile the input-output table for the year   (4 Marks)

   ii. This year, Raha Tele has received output orders worth Kshs. 500M, Kshs. 450M and Kshs. 350M from the three industries respectively. Determine the total outputs required from the three industries to satisfy the order. (8Marks)

   iii. Distribute the outputs in (b) above among the sectoral and external users. (4 Marks)

b) Isabella borrowed Kshs. 84,000 for four years at 18% compound interest. Calculate the maturity value of the loan.   (4 Marks)

QUESTION 3 (20 Marks)

a) The following is a payoff table for a particular venture which Miriam is considering to undertake.

	S_1	S_2	S_3	S_4
A_1	150	225	180	250
A_2	180	140	200	225
A_3	220	185	195	180
A_4	190	210	230	160

Determine the optional decision which Miriam should take using

   i.   MaxMin   (2 Marks)

   ii.   MaxMax   (2 Marks)

   iii.   Minimax regret   (2 Marks)

   iv.   Laplace   (2 Marks)

   v.   Hurwicz $(\alpha = 0.6)$ (2 Mark)

b) Write short notes on the following

   i.   Markov process

   ii.   Transition matrix

   iii.   Initial state probability

   iv.   Decision under certainty

   v.   Decision under uncertainty   (10 Marks)

QUESTION 4 (20 Marks)

a) Miriam invested a sum of Kshs 2,000,000 in a savings account at a rate of 8% p.a.

if all the interest is re-invested, what will be the value of the investment after 5 years

if interest is compounded

      i.   Annually   (2 Marks)

     ii.   Semi-annually   (2 Marks)

   iii.   Quarterly   (3 Marks)

   iv.   Monthly   (3 Marks)

e) Felix who is a proprietor of a stationary shop has to decide on the number of packets of new years greetings cards to order for 2011. His present ten year records indicate the following:

Sales (packets)	Probability
200	0.1
300	0.3
400	0.1
500	0.2
600	0.3
Total	**1.0**

Each packet of cards cost him Ksh40 and he sells for Ksh60. An unsold packet at the end of January 2011 fetches for Ksh20 only. Using the Maximum Expected Monetary Value (EMV), how many packets should he order for 2011? (10 Marks)