KABARAK   **UNIVERSITY**

UNIVERSITY EXAMINATIONS

2009/2010 ACADEMIC YEAR

FOR THE DEGREE OF BACHELOR OF COMMERCE

COURSE CODE: **FNCE 212**

COURSE TITLE: MATHEMATICS MANAGEMENT II

STREAM: **Y2S1**

DAY: **THURSDAY**

TIME: **3.00 – 5.00 P.M.**

DATE: **12/08/2010**

INSTRUCTIONS:

- Answer Question **ONE** and any other **TWO** questions

PLEASE TURNOVER

QUESTION ONE

a) Define the following terms,
   - i. Break even point (1mark)
   - ii. Market equilibrium (1mark)
   - iii. Sinking funds (1mark)
   - iv. Amortization annuity (1mark)
   - v. Present value of annuity (1mark)

b) If A= $\begin{pmatrix} 2 & -1 \\ -1 & 2 \end{pmatrix}$

   Show that $A^2 - 4A+3I= 0$ hence find A^{-1} (10marks)

c) What is the maturity value of a fund paying 9.5% to which 5 advance annual payments of £2,400 are make using a schedule method. (5marks)

d) A firm manufactures two products. The products must be processed through on department product A requires 4hours per unit and Product B requires 2 hours per unit. Total production time available for the coming week is 60 hours. A restriction in planning the production schedule therefore is the total hours used in producing the two products cannot exceed 60 hours. Assume that the products in the above needs to be processed through another department in addition to the original department.
In this second department, assume that product A requires 3 hours per unit and that product B requires 5 hours per unit. If the second department has 75 hours available each week, graph this inequality and show the feasible region.

(6marks)

e) A manager has a choice between
   - i. A risky constract promising Kshs.7 million with probability 0.6 and Kshs. 4million with probability 0.4 and,
   - ii. A diversified portfolio consisting of two constracts with independent outcomes each promising Ksh.3.5 million with probability 0.6 and Kshs. 2 million with probability 0.4 construct a decision tree for using EMV criteria can you arrive at the decision using EMV criteria?

(4marks)

[Total: 30 marks]

SECTION B (ANSWER ANY TWO QUESTIONS

QUESTION TWO

a) Given that,

$$A = \begin{pmatrix} 1 & 3 & 4 \\ 1 & 4 & 5 \\ 2 & 5 & 7 \end{pmatrix}$$

Show that A^{-1} does not exist (5marks)

b)   A firm plans to invest an amount of money at the beginning of every year in order to accrue a sum of £100,000at the end of a five year period. What is the value of the amount, if the investment rate is 14%   (5marks)

c)   A company borrows £46,000, which is compounded at 15% to finance a new production line. The debt will be discharged at the end of the 5 years with regular annual payment into a sinking fund which pays 11.25% . Calculate the annual payment into the fund and construct a schedule. Assuming that the first payment into the fund is made at the end of the first year.

(10marks)
[Total: 20 marks]

QUESTION THREE

a)   Solve the following equations using matrix method.
$$3x-y+2z = 13$$
$$2x+y-z = 3$$
$$x+3y-5z= -8$$
                                                                                              (10marks)

b)   The variable cost associated with a certain processes is £0.65 per item. The fixed cost per day have been calculated as £250 with special costs estimated as £ $0.02x^2$ where x is the size of the production run
$$\left[\text{number of items produced.} \right]$$

Required
i.   Derive a function demand to describe cost per unit for a day's production
ii.   Calculate the size of the daily run that will minimize costs per item.
iii.   Find the cost of a day's production for a run that minimizes cost per item.
                                                                                              (10marks)

[Total: 20 marks]

QUESTION FOUR

a)   Discuss the main five advantages of linear programming?   (10marks)

b)   Suppose a businessman wants to decide whether to stock commodity x or commodity y he can stock either, but not both if he stocks x and if it   is a success, he feels that he can make $200 but if it is a failure he will loss $500. If he stocks y and it is a success he feels that he can make $400 but if it is a failure he would lose $300. What commodity x and y should he stock. He has the following probability distribution in view.

Probability of	with stock of commodity x	commodity y
Success	0.8	0.60
Failure	0.2	0.40

Construct EMV or expected pay off method and decision tree diagram.

(10marks)

[Total: 20 marks]

QUESTION FIVE

A wholesale stationer stocks heavy (2B) medium (HB), fine (2H), and extra fine(3H), 14 packs of (2H), 35 packs of(HB) and 8 packs of (2B) if a pack of pencil is chosen randomly for inspection what is the probability that they are

     i.   Medium
     ii.   Heavy
     iii.   Not very fine.
     iv.   Neither heavy nor medium   (8marks)

   b)   Solve the following equation using Gramer's rule

$$2x+y-z = 3$$
$$x+y+z = 1$$
$$x-2y-3z = 4$$

(8marks)

Define the following terms

     i.   Non – mathematics economics   (1mark)
     ii.   Mathematics economics   (1mark)
     iii.   Econometrics   (1mark)
     iv.   Linear programming   (1mark)

[Total: 20 marks]