MAASAI MARA UNIVERSITY

REGULAR UNIVERSITY EXAMINATIONS

2018/2019 ACADEMIC YEAR

SCHOOL OF BUSINESS AND ECONOMICS

BACHELOR OF COMMERCE

COURSE CODE: BCM 1211

COURSE TITLE: BUSINESS MATHEMATICS II

DATE: 18TH APRIL 2019   **TIME: 1100 - 1300 HRS**

INSTRUCTIONS:
Attempt Questions One In Section**A** And Any Other Three Questions In Section **B**:
Clear Examples, Calculations and Explanations Are Awarded
Do not write on the exam question paper.

SECTION A (QUESTION ONE IS COMPULSORY)

Question one

a) Tot bull doubles up as a production and marketing manager of two product manufacturing company. Explain two matrix concepts which would be useful to bull and how.**(4 marks)**

b) Mwananchi Solutions Ltd has to evaluate an investment project using Average rate of return method (ARR). Their stream of earning before, interest and taxes (EBIT) during the first year through to five years is expected to be 2000,24000,28000,32000 and 40,000 respectively. Assuming a 40% tax rate and depreciation on a straight line basis.

Required

  i.   Compute the ARR for the project given capital rate of 16 %   **(8 marks)**

  ii.   Which other method would you use in (i)above and why   **(3 marks)**

c) Tri-prod co.ltd. Manufactures three products A, B and Each of the products requires certain amounts of three raw materials as well as labour.Each unit of product A requires 2kg, 3kg and 2kg; B requires 3kg,2kg and 4 kg and C requires 4kg,2kg and 5kg of raw material 1,2 and 3 respectively. Each unit ofA, B and C requires 6, 8 and 4 labor hours respectively. The three raw materials cost Kshs.200, ksh. 800 and Kshs 250 per kg respectively while labor costs Kshs 80 per hour. Recently Tri-prod has received an order to supply 1500, 900, 1200 units of products A, Band Crespectively.

Use appropriate matrix operations to determine:

  i.   The total quantities of the inputs required to produce the desired quantities of A, B and C.   **(6 marks)**

  ii.   The combined total cost of producing the desired quantities.   **(4 marks)**

SECTION B (ATTEMPT ANY THREE QUESTIONS IN THIS SECTION)

Question two

  a. Explain any one condition of markov-ian process   **(3 marks)**

  b. Lemon tea packers (LTP) CO.LTD who have been operating in Kenya market for an year, has established that they enjoyed 30 percent of the tea market by the end of 2002.The total consumer pool was then 2 million households and the pool was expected to increase exponentially at the rate of 10 percent per Annam up to the end of the year 20 10 after which the pool is projected to be fairly stable. Each household in the consumer pool is estimated to spend on average Kshs 500 per annum on tea. LTP intends to implement a promotion campaign strategy at the beginning of year 2004 at a cost of 5 million. The campaign is expected to increase consumer shift to LTP by 10 percent from the current 30 percent and reduce shift from LTP by 5 percent from the current 25 percent per year.

Required

  i.   Determine LTP's expected revenue during the year 2003.   **(4 marks)**

  ii.   Advise LTP whether they should implement the campaign strategy. **(8 marks)**

Question three

a) Distinguish between the following terms as used in matrix algebra
   i) Identity matrix and scalar matrix
   ii) Singular matrix and non- singular   **(4 marks)**

b) Consider the following transaction table for two industries, S and T for the previous year

Producer output		S	T	Final demand	
	S	20	30	50	
	T	10	10	30	

N.B The transaction are in billions of shillings

Required

(i)   The technical coefficient matrix A   **(2 marks)**

(ii) The total output required for each industry so as to satisfy both intermediate and final demand for this year given that forecasted final demands are Sh 54 billion and Sh 37 billion for S and T respectively   **(6 marks)**

(iii) Determine the intermediate demands for industries S and T for the production levels in (ii) above.   **(3 mark)**

Question four

a) Explain the environment of conflict and one best way to deal with it.   **(4 marks)**

b) Maatronics engages in production and marketing of electronics. Each item costs on averageksh 46 to produce and market .Each item is sold and produced at a price of ksh.74.out of 100 days the company was able to sell the following quantities.

quantity	100	200	300	400
No of days	18	25	40	17

Required

a. Develop this companies payoff data   **(2 marks)**

b. Develop the optimum production quantities using the following approaches
   i.   Expected opportunity loss   **(4 marks)**
   ii. Laplace criterion   **(2 marks)**
   iii. Hurwicz criterion   **(3 marks)**

Question five

a. Explain the duality and post optimality of a linear programming problem **(5 marks)**

b. China HuwiiInc. manufactures a 1500 watts and 2000 wattsgenerators. Each 1500 cc generator makes a profit of kshs. 3700 and each 2000 wattsgenerator make a profit of kshs. 3600. Tomanufacture these generator involves three key processes; to manufacture one 1500 watts generator requires 600,300 and 900 hours of assembly, component manufacture and engine shop, while to manufacture one 2000 wattsgenerator requires 1200,300 and 0 hours of assembly, component manufacture and engine shop respectively. The maximum available hours each month for assembly, component manufacture and engine shop are 9000, 3000 and 6300 respectively.

   Required

   i. Determine the output mix of two types of generators that would maximize total profit   **(10 marks)**

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