Riara University

Riara School of Business
Nurturing business innovators

SEPTEMBER DECEMBER 2015 TRIMESTER
EXAMINATION FOR DIPLOMA IN BUSINESS MANAGEMENT

DAY PROGRAMME

BDM: 102: BUSINESS MATHEMATICS

DATE: DECEMBER , 2015   **TIME: 2 HOURS**

INSTRUCTIONS

   i)   **Answer question one and any other two**
   ii)   **Marks allocated to each question are shown at the end of the question**
   iii) **Arrange your work neatly and indicate the questions answered in the examination booklet**

QUESTION ONE: (30 MARKS)

a) Mark the following statements as either TRUE or FALSE

   i.   Set operation P – Q, means all elements in Q but not in P.
   ii.   A quadratic function has two turning points.
   iii. A multivariate function has more than one predictor variable.
   iv.   {Set of all odd numbers} is a finite set.
   v.   A diagonal matrix must also be a square matrix

(5 Marks)

b) In a survey of the 600 students enrolled in a certain college campus: 267 students take Finance, 168 students take Mathematics, 171 students take Business Law, 33 students take both Finance and Business Law but not Mathematics, 9 students take all the three subjects, 15 students take Finance and Mathematics but not Business Law, 24 students take Mathematics and Business Law but not Finance. Represent the above information on a Venn diagram.

(5 marks)

c) Kazi Ltd. a manufacturer of powder soap has a target profit of Sh. 15,000,000 this year, the unit price (*p) is sh. 300,* unit variable cost (*v*) = *sh. 160* and the fixed annual cost *(f)= Sh. 3.2 Million.* Determine the breakeven sales units and the sales units required realise the target profit above.

(5 Marks)

d) The marginal profit function for a product is given as:
$\frac{\partial \pi}{\partial q} = 600 - 5q$

The breakeven output is 40 units. Determine the profit generated when output is 80 units

(5 Marks)

e) Given the following matrices

$$A = \begin{pmatrix} 5 & -3 \\ 0 & 12 \end{pmatrix} \quad B = \begin{pmatrix} 21 & -2 \\ -4 & 8 \end{pmatrix} \quad C = \begin{pmatrix} -11 & 6 & 2 \\ 6 & 3 & -1 \end{pmatrix}$$

Perform the following matrix operations: A^T, BA, $A+C$, B^{-1}, $B-A$.

(10 Marks)

QUESTION TWO (20 MARKS)

a) Distinguish the following terms as used in application of matrices and give example for each case.
  i)   Row matrix and column matrix
  ii) Identity matrix and zero matrix
  iii) Matrix transposition and matrix inversion

(9 Marks)

b) You are a senior system analyst of Xanto Xolani & Company, CISA. The firm is one of the two firms offering professional IS consultancy services in the town of Chazui. The other firm is Yaki Yakira & Company, CISA. The two firms are abbreviated as X and Y.

Your Firm is worried about its market share and the senior partner in charge of partnership development has collected the following data, which she wants you to analyze. She further informs you that the observed client behavior is expected to remain about the same for the foreseeable future.

FLOW OF CLIENTS						
No. of clients		Gains From		Losses To		No. of Clients
31.12.2011		X	Y	X	Y	31.12.2012
X	40	-	20	-	30	35
Y	60	30	-	35	-	65

Required:

  i)   Determine the transition matrix for the above Markov process.   **(4 Marks)**
  ii)   Estimate the firm's market shares for the year 2013 and 2014

(4 Marks)

  iii) Estimate the firm's steady state market shares   **(5 Marks)**

QUESTION THREE (20 MARKS)
a) Explain three applications of calculus in Business and Management.

(9 Marks)

b) The revenue function of a product function of a product is $R=28q-q^2$ and the unit variable cost $v= q-8$ while fixed cost is sh. 64. Determine the following
  i.   Total cost function
  ii.   Profit function
  iii. Output and price for maximum profit
  iv.   Show that the output for maximum profit is not necessarily the same as the output for maximum revenue.
  v.   Represent the above functions on a graphical sketch.

(11 Marks)

QUESTION FOUR (20 MARKS)

a) Explain the following concepts as used in set theory.
   i)   A Well-defined set
   ii) Set membership
   iii) Compliment of a set

(7 Marks)

b) With an aim of facilitating translation equipment and personnel to the 2nd Academy of International Conference Sub-Saharan Chapter (AIB-SSC) upcoming conference. A survey of people who attended the 1st AIB-SSC Conference was conducted and the following data was generated.

   200 spoke French
   193 spoke Swahili
   170 spoke English
   108 spoke both Swahili and English
   100 spoke both Swahili and French
   18 out of those who do not speak Swahili speak English
   42 out of those who do not speak Swahili are non-English speaking
   30 spoke all the three Languages

   Required:
   i.   Represent the above information on a Venn diagram.
   ii.   How many people attended the conference?
   iii. How many scholars in the conference did not speak Swahili?
   iv.   How many scholars were non-French speaking?

(13 Marks)

{GRAND TOTAL 70 MARKS}