Riara School of Business

Nurturing business innovators

JANUARY-APRIL 2015 TRIMESTER EXAMINATIONS
DAY PROGRAMME
EXAMINATION FOR DIPLOMA IN BUSINESS MANAGEMENT, DIPLOMA IN PROCUREMENT AND SUPPLY CHAIN MANAGEMENT AND DIPLOMA IN BUSINESS INFORMATION TECHNOLOGY
BDM 012: INTRODUCTION TO BUSINESS MATHEMATICS

DATE: 2ND APRIL, 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 theexamination booklet

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QUESTION ONE: COMPULSORY (30 MARKS)

a) Mark the following statements as either TRUE or FALSE
   i) The empty has zero as the only element
   ii) The multivariate function has more than one dependent variable
   iii) At critical point, the first derivative is zero
   iv) A singular matrix can be inverted.
   v) "Set of all Cars" is an ambiguous set

(5 Marks)

b) A Microfinance company have a certain type of their product credit card, the percentage of debt recovered in any month is exponential in nature and a function of time since credit was issued to the customer. The function which describes the relationship.

$$P = 0.95(1 - e^{-0.81t})$$

$$where\ t = time(in\ months) and\ P = percentage\ of\ debt\ payed(in\ Sh.)$$

Required:
   i) Calculate the percentage of debtors recovered after 8 months.
   ii) Determine what should be the provisions for bad debts.

(6 Marks)

c) Solve for the values of x and y in the following set of simultaneous equations using Cramer's rule

$2x - y = 35$

$x + 3y = 21$

(3 Marks)

d) Biashara Company Ltd. Has a demand function given as:

$$P = 36 - 12q$$
$$where\ P = Price(sh.)\ and\ q = quantity\ produced\ and\ sold(units)$$

Required:

i) Determine the output and price that maximizes revenue, show it is a maximum.

ii) Calculate price elasticity when revenue is maximum.

(7 Marks)

e) The marginal revenue (MR) of Riara Schools Ltd. Is given by;

$$\frac{\mathrm{dR}}{\mathrm{dx}} = 100 - 2x$$

$where\ R = Revenue\ (sh.) and\ x = quantity\ produced\ and\ sold(units)$

If the company's revenue is Sh. 700 when 10 units are produced, what is the company's maximum revenue?

(4 Marks)

f) In a market research survey, 105 consumers of products A and B were interviewed. It was found that 60 liked product A while 65 liked product B. Determine the LEAST number of consumers who must have liked both products.

(5 Marks)

QUESTION TWO

a) Distinguish the following terms as used in set theory and provide business examples for each case.

i) Universal set Vs Subset

ii) An Infinite set Vs a Singleton Set

iii) Disjoint Sets Vs empty set

(Use a diagram where applicable)

(9 Marks)

b) A survey of 100 customers on preference of three Banks, Bank A, Bank B and Bank C in Nakuru County revealed that 5 people did not prefer any of the 3 banks under consideration, 4 preferred all the three banks, 40 preferred Bank A but not Bank C, 7 people preferred A and B, 9 people preferred bank A and C, 15 people preferred B but not A and C, 10 people preferred B and C.

Required:

i) Represent all the above information on a Venn diagram.
ii) How many people preferred exactly two banks?
iii) Determine the most preferred bank within Nakuru County, what proportion of the population prefers it.

(11 Marks)

QUESTION THREE

a) Explain three assumptions of Markov Analysis.

(6 Marks)

b) Assume you are a car dealer with operations in different towns (that is, Mombasa, Nairobi, Nakuru and Kisumu) and you are specifically dealing in station wagons, saloon and pick-ups).

The table below shows level of inventory in the different regions.

Town	Station Wagons	Saloons	Pick-ups
Mombasa	150	340	90
Nairobi	230	540	300
Nakuru	130	200	420
Kisumu	100	170	220

The Value table (00,000)

	Station Wagons	Saloons	Pick-ups
Mombasa	5	7.5	4.9
Nairobi	6.2	9.3	7.1
Nakuru	5.9	8.5	8.1
Kisumu	6.1	8.3	7.8

Required Determine the following;

i) Form the inventory and value matrix
ii) Total value of vehicles at Kisumu?
iii) Total value of all station wagon vehicles?
iv) Total value of all vehicles?

(14 Marks)

QUESTION FOUR

a) Explain four assumptions of C-V-P Analysis.

(8 Marks)

b) Matunda Ltd. Is conducting breakeven analysis for one of their product line. Data below relates to 2013 and 2014 trading period.

Trading Period	**Period sales**	**Profit**
2013	20,000	6,000
2014	35,000	10,000

You are required

i) Determine the fixed cost
ii) Determine the break-even sales revenue
iii) Calculate the profits generated when sales are 150000
iv) Determine the profit if variable cost incurred is sh. 80,000.

(12 Marks)

QUESTION FIVE

a) The demand and supply function for a commodity x is given as follows.
3360 - 10q - p=0
11.5q - 4000 – p=0
Where q is output and p is price

Required:

i) Describe the term " Market Equilibrium"
ii) Determine the equilibrium price and quantity
iii) Sketch the above information on a Graph.

(10 Marks)

b) Let B = {BBA Students at Riara University in the year 2015}
Let C = {All students taking CPA at Strathmore University in the year 2015}
Describe the following sets

i) C-N
ii) NUC
iii) NnC
iv) NΔC
v) NUC'

(10 Marks)