



SOUTH EASTERN KENYA UNIVERSITY

UNIVERSITY EXAMINATIONS 2015/2016

MAY-AUGUST 2016 (PRACTICUM) SEMESTER EXAMINATION FOR THE DEGREE OF MASTER OF BUSINESS ADMINISTRATION

DMS 501: BUSINESS QUANTITATIVE ANALYSIS

(Machakos Campus)

DATE: 1ST AUGUST, 2016

TIME: 9.00 – 12.00 NOON

INSTRUCTIONS

1. This paper consist of two sections
2. Question **one** is **compulsory** and carries 30 marks
3. Answer any **two** questions in section II. Each question in section II carries 20 marks

SECTION I

QUESTION ONE (Compulsory 30 marks)

- a) The choice of the suitable quantitative technique to apply in a particular situations requires the judgement and experience of a manager. This is because of the several limitations associated with quantitative techniques. Discuss any three limitations of quantitative techniques. **(3 marks)**

- b) A company produces two products X and Y. Product X requires 6 labour hours for fabrication and 1 labour hour for finishing. Product Y requires 4 labour hours for fabrication and 1 labour hour for finishing. The maximum labour hours available per day for fabricating and finishing are 108 and 24 respectively. Using matrices, determine how many units of each product should be produced to completely exhaust the labour hours available. **(5 marks)**
- c) A Certain consulting firm surveyed an urban area to study consumer's switching behaviour for three soft drinks. A sample of 600 respondents had been chosen which provided the following information regarding the use of Cola, Afia and Softa. From the underlying sample, 240 were using Cola, 185 Afia and rest Softa. Due to the active promotions, the following pattern was observed. Out of the users of Cola, 36 switched to Afia and 24 to Softa while the rest remained loyal to Cola. From the users of Afia, 150 remained brand loyal, 20 switched to Cola and the rest to Softa. Similarly, from the users of Softa, 12 switched to Cola, 18 to Afia and the rest remained brand loyal.

Required:

- i. Construct consumer's brand switching matrix **(3 marks)**
- ii. If the given consumer's switching patterns persists, calculate the future market share for the three products. **(4 marks)**
- d) An insurance company takes a keen interest in the age at which a person is insured. Consequently a survey conducted on prospective clients indicated that for clients having the same age the probability that they will be alive in 30 years time is $\frac{2}{3}$. This probability was established using the actuarial tables. If a sample of 5 people was insured now, find the probability of having the following possible outcomes in 30 years
- i. All are alive **(2 marks)**
- ii. At least 3 are alive **(3 marks)**
- e) The function describing the marginal profit from producing and selling a product is $MP = -3x + 500$ where x equals the number of units and MP is the marginal profit measured in shillings. When 200 units are produced and sold, the total profit equals Shs.15,000. Determine the total profit function **(5 marks)**

- f) State the procedure for hypothesis testing (5 marks)

SECTION II (Answer any two questions)

QUESTION TWO

- a) Solve the following linear simultaneous equations using matrix method (4 marks)

$$\begin{aligned} \text{i) } & X_1 + 2X_2 + 3X_3 = 3 \\ & 2X_1 + 4X_2 + 5X_3 = 4 \\ & 3X_1 + 5X_2 + 6X_3 = 8 \end{aligned}$$

- ii) Consider the following two commodity market model:

$$Q_{d1} = 8 - 2p_1 + p_2$$

$$Q_{s1} = -5 + 3p_1$$

$$Q_{d2} = 16 + P_1 - P_2$$

$$Q_{s2} = -1 + 2P_2$$

Given that $Q_{d1} = Q_{s1}$ and $Q_{d2} = Q_{s2}$

Determine by Cramer's rule:

- i) The value of equilibrium prices (4 marks)
 ii) The value of equilibrium quantities (4 marks)
 b) Discuss with relevant examples the following terms as used in market process
 i) Absorbing state (2 marks)
 ii) Cyclic chains (2 marks)
 c) What is Spearman's rank correlation coefficient? Bring out its usefulness (4 marks)

QUESTION THREE

- a) The data below shows the ages and prices of eleven Toyota cars. The age is in years while prices are in ten thousand shillings

Age(yrs)	6	8	7	7	6	5	8	7	6	6	3
Prices (0000)	32	22	23	22	28	35	17	24	27	75	47

Required

- Compute the coefficient of correlation and interpret it (10 marks)
 b) The interaction of three industries X, Y and Z in a given economy was observed for some period and was found to be as given below.

Production	Consumption			External Demand
	X	Y	Z	
X	50	60	40	200
Y	55	75	30	300
Z	70	20	90	500

If in two years time the demand for industries X and Y increases by 20% and that of Z reduces by the same percentage.

Required:

- i) The technology matrix A (2 marks)
- ii) The Leontiff inverse (6 marks)
- iii) The total output to meet this new demand? (2 marks)

QUESTION FOUR

- a) A firm has a monopoly on its market, so it can decide for which price to sell its products. If it sells the product for price p , the demand is $q = 300 - 2p$; while the cost of producing q units are given by the function $C(q) = 30 + 30q - \frac{1}{10}q^2$ the revenue is $R(p) = pq$

Required:

- i) Determine revenue function (in terms of q) (2 marks)
 - ii) Determine the profit function (2 marks)
 - iii) Calculate the value of q that will yield maximum profit (3 marks)
 - iv) What will the price be if the capacity of the firm was limited to 120 units (3 marks)
- b) The proprietor of Makali Enterprise wanted to establish the relationship between the number of sales people he employed, and the amount of sales realized from their activities. Details from the previous activities are shown the below:

Number of sales people	17	17	17	18	18	19	19	19	19	20	21
sales in '000'Ksh	28	28	29	30	31	31	31	32	33	34	35

Required

- i) Determine the regression equation for estimating sales. (7 marks)
- ii) Estimate sales when for 15 sales people (3 marks)

QUESTION FIVE

- a)
- i) Discuss the distinctive features of binomial and normal probability distribution(4 marks)
 - ii) Explain four main uses of poison distribution. (2marks)

b) A sample of 400 accounts from an institute in Kitui town was taken to test. The accuracy of posting and balancing of accounts where in 40 mistakes where found. Find out the population proportion use 90% level of confidence. **(5marks)**

c)

i) Discuss the condition under which χ^2 -test(chi-square) is applicable and point out four routes of its roles as in business decision making **(4 marks)**

ii) The mass in kilogram of 10 shipments are given below :

38, 40, 45,53,47,55,48,52,49

Can it be said that variance of the distribution of weight of all shipment from which the above sample of 10 shipments was drawn is equal to 20 square kilograms? **(5 marks)**