JARAMOGI OGINGA ODINGA UNIVERSITY OF SCIENCE AND TECHNOLOGY

SCHOOL OF BUSINESS AND ECONOMICS

UNIVERSITY EXAMINATIONS FOR DEGREE OF MASTER IN BUSINESS ADMINISTRATION

1ST YEAR 1ST SEMESTER 2018/2019 ACADEMIC YEAR

KISUMU LEARNING CENTRE

COURSE CODE: MBA 805

COURSE TITLE: QUANTITATIVE METHODS

DATE _____   **TIME: _____**

DURATION: 3 H0URS   **DECEMBER 2018**

INSTRUCTIONS:

    i) This paper contains **Six** questions

    ii) Answer question **ONE** and any other **THREE** questions

    iii) Question one is **COMPULSORY**

    iv) Candidates are advised not to write on the question paper

    v) Candidates must hand in their answer booklets to the invigilator while in the examination room

Question One (25 marks)

a) Solve for the unknowns in the following simultaneous equation

$$4x + 3y + z = 8$$

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

$$3x + 0y + z = 1$$ **(4marks)**

b) From a bag containing 4 white and 6 red balls, two balls are drawn together. Find the probability when:

    i) Both the balls are white   **(2marks)**
    ii) Both the balls are black   **(2marks)**
    iii) One is white and the other is black   **(2marks)**

c) Outline Three characteristics of a normal distribution   **(3marks)**

d) Explain Three assumptions of the Markov Chains   **(3marks)**

e) Highlight Three Quantitative Forecasting methods which are under time series model **(3marks)**

f) Evaluate the following function

$$\int_{-2}^{2} (12x + 8)dx$$

(3marks)

g) Explain each of the following terms

   i)   Function   **(1mark)**
   ii) Limit   **(1mark)**
   iii) Continuity   **(1mark)**

Question Two (15marks)

a) A company is producing shorthand notebooks has the following cost and revenue functions

        Revenue $(R) = 200q - 2q^2$

        Cost $(C) = q^2 + 20q + 30$

   Where q is the number of units sold.

   i)   How many units should the firm sell to maximise profit   **(4marks)**
   ii) At what price   **(3marks)**
   iii) What will be the amount of profit   **(3marks)**

b) Work out the integral of: **(5marks)**

$$f\ (8x^3 + 12x^5 + 4x^2 + 2x + 3)dx$$

Question Three (15marks)

a) Moi University produces three types of milk products, each of which must be processed through three departments. The table below summarises the labour-hours required per unit of each milk produced in each department. The monthly labour-hour capacities for three departments are 1800, 1450 and 1900 hours respectively.

Department	Product 1	Product 2	Product 3
A	3	2	5
B	4	1	3
C	2	4	1

Determine whether there is a combination of three milk products which could be produced monthly so as to consume the full monthly availabilities of all departments   **(10marks)**

b) Explain the following terms   **(5marks)**

   i)   Technological coefficient
   ii) Intermediate demand
   iii) Steady state probability
   iv) Transition matrix
   v) Identity matrix

Question Four (15marks)

a) The number of workers absent per working week in a road construction project is known to follow a Poisson distribution with a mean of 0.5. Determine the probability that in a particular week there will be:

i) Less than two workers absent

ii) More than two workers absent **(11marks)**

b) Explain Four characteristics of a binomial distribution **(4marks)**

Question Five (15marks)

The management of Fancy Coats believes that the probability of a customer buying a master coat and the company's major competition, Rain Gear, is based on the customer's most recent purchase. Suppose the transition matrix is as follows:

From	To	
	Master Coat	Rain Gear
Master Coat	0.8	0.2
Rain Gear	0.1	0.9

Required:

i) What is the probability that a customer purchases a Master Coat on his second and fourth purchase?

ii) What is the long run market share for each of these products? **(15marks)**

Question Six (15marks)

The management of Fancy Coats believes that the probability of a customer buying a master coat and the company's major competition, Rain Gear, is based on the customer's most recent purchase. Suppose the transition matrix is as follows:

From	To	
	Master Coat	Rain Gear
Master Coat	0.8	0.2
Rain Gear	0.1	0.9

Required:

i) What is the probability that a customer purchases a Master Coat on his second and fourth purchase?

ii) What is the long run market share for each of these products? **(15marks)**

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