(*University of Choice*)

MASINDE MULIRO UNIVERSITY OF SCIENCE AND TECHNOLOGY (MMUST)

MAIN CAMPUS

UNIVERSITY MAIN EXAMINATIONS

2023/2024 ACADEMIC YEAR

FIRST YEAR SECOND SEMESTER EXAMINATION

FOR THE DEGREE OF BACHELOR OF HOSPITALITY AND INSTITUTIONAL MANAGEMENT

COURSE CODE: BHM 209

COURSE TITLE: **BUSINESS MATHEMATICS & STATISTICS**

DATE: THURSDAY 18TH APRIL 2024 TIME: 3.00-5.00PM

INSTRUCTIONS TO CANDIDATES

*Answer question **ONE** and any other **TWO** questions*

TIME: **2 HOURS**

QUESTION ONE

a) Differentiate the following equations stating the rule applicable.

i) $Y = (4x + 6)^8$ (2 mks)

ii) $Y = (2x^2 + 3x)(4x^3 + 2)$ (2 mks)

b) Integrate the following function

i) $Y = {}^2/_3x^5 + 2x^3 + 2$ (2 mks)

c) The following information was obtained from Hotel Association of Kenya which was giving seed capital to some small scale hoteliers in 2022. The seed capital is in form of thousands of Kenya shillings:

Loans Sh "000"	Units
46 – 50	12
51 – 55	10
56 – 60	8
61- 65	7
66 – 70	6
71 – 75	5
76 – 80	4
81 – 85	8

Required:

i) From the above information construct a histogram and determine the mode (5 mks)

ii) Calculate the second coefficient of skewness (15 marks)

d)

$$D = \begin{bmatrix} 6 & 8 & 9 \\ 3 & 4 & 2 \end{bmatrix} \quad E = \begin{bmatrix} 5 & 1 & 2 \\ 3 & 7 & 6 \\ 9 & 5 & 4 \end{bmatrix}$$

Derive D x E (4 mks)

QUESTION TWO

A consumer survey among 3000 customers performed by Hotel Keepers Association (HKA) during the month of February 2014 revealed the following switching patterns. Among 1000 customers of Norfolk hotel 200 shifted to Crown hotel and 300 customers shifted to Sarova hotel, the rest remained loyal to Norfolk hotel. Among 800 customers of Crown hotel 300 shifted to Norfolk hotel and 200 students Sarova hotel, the rest remained loyal to Crown hotel. Among 1200

customers of Sarova hotel 100 shifted to Norfolk hotel and 300 customers shifted to Crown hotel, the rest remained loyal to Sarova hotel.

Required

i) Transition matrix representing the above switching pattens (3mks)

ii) Respective market shares two months later (8mks)

iii) Market share in the long run (6mks)

iv) Highlight three applications of a markovian process (3mks)

QUESTION THREE

a) The data on price and quantity purchased relating to a commodity for five months is given below:

Month	January	February	March	April	May
Prices (Ksh)	6	8	9	10	9
Quantity (Kg)	2	4	2	1	2

Required

i) Compute simple linear regression equation (8 marks)

ii) Predict price to be charged when quantity is 8 Kg (2 marks)

iii) Predict quantity to be purchased when price is Ksh 15 (2 marks)

iv) What is the strength of the relationship between the price and the quantity (4 marks)

b) Highlight four functions of averages (4 marks)

QUESTION FOUR

a) From the following matrix, get inverse of C (14 mks)

$$C = \begin{bmatrix} 6 & 4 & 8 \\ 4 & 5 & 7 \\ 8 & 9 & 2 \end{bmatrix}$$

b) A business manager wants to make an investment in a project whose cost is $2 million. The cost is expected to remain constant in nominal terms. He can save $40,000 annually to fulfill his desire. How long should he wait if his savings earned an interest rate of 13%? (6 Mks)

QUESTION FIVE

a) An investment costs £ 100,000 and is expected to generate the following returns

Year	Cashflows (£)
1	45,000
2	28,000
3	46,000
4	32,000
5	45,000

Required rate of return is 12 %.

Required

i) Compute the Net Present Value. (6mks)

ii) Compute the internal rate of return (6 mks)

iii) Advice the management on the viability of the above investment based on the two criteria. (3mks)

b) For a markovian process to apply several requirements / conditions must be satisfied, highlight two such conditions (2 mks)

c) Enumerate any three objectives of measures of dispersion (3 mks)