LAIKIPIA UNIVERSITY

UNIVERSITY EXAMINATIONS

EXAMINATION FOR MASTER OF BUSINESS ADMINISTRATION

MBAD 681: QUANTITATIVE METHODS

STREAM: ***TIME: 3 HRS***

DAY: THURSDAY [12.30-15.30 P.M] ***DATE: 17/04/2025***

THIS QUESTION PAPER CONSISTS OF FOUR (4) PAGES

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QUESTION ONE

a). The following data was obtained during a social survey conducted in Nakurus's Milimani area regarding the annual income of given families and the corresponding expenditures.

Family	(x)Annual income Kshs.000	(y)Annual expenditure Kshs. 000
A	420	360
B	380	390
C	520	510
D	610	500
E	400	360
F	320	290
G	280	250
H	410	380
J	380	240
K	300	270
Total	4020	3550

Required

Calculate the product moment correlation coefficient **(8marks)**

b). Demand function for a firm is given by

$$P = 12 - 0.4Q$$

P is the price of the product, Q is the quantity demanded, and the total cost (C) is given by

$$C = 5 + 4Q + 0.6Q^2$$

At what price and quantity will the firm have maximum profit? If the firm aims at maximizing sales, what price should it charge? **(4marks)**

c). A random sample of 10 items is taken and it's found to have a mean weight of 60 grams and a standard deviation of 12 grams. What is the mean weight of the population?

i). With 95% confidence? **(3marks)**

ii). With 99% confidence **(3marks)**

d). Calculate the mean, standard deviation and variance of the following data

5, 8,15,29,47,47,64, 71,74 **(6marks)**

e). Explain the properties of good estimators **(6marks)**

QUESTION TWO

a). Describe the procedure of hypothesis testing **(7marks)**

b). A firm purchases a very large quantity of metal offcuts and wishes to know the average weight of an offcut. A random sample of 625 offcuts is weighed and it is found that the mean sample weigh 150 grams with a sample standard deviation of 30 grams .What is the estimate of the population mean and what is the standard error of the mean? What would be the standard error if the sample size was 1,225? **(8marks)**

QUESTION THREE

a). The following data was obtained from a given financial institution. The data refers to the loans given out in 2024 to several firms

Firms (f)	Amount of loan per firm (x)	fx	$\lvert x-\bar{x}\rvert$	$\lvert x-\bar{x}\rvert.f$
3	20000	60000	4157.9	12473.70
4	60000	240000	35842.1	143368.40
1	15000	15000	9157.9	9157.9
5	12000	60000	12157.9	60789.50
6	14000	84000	10157.9	60947.40
Σf = 19		Σfx = 459000		286736.90

Required

Calculate the mean deviation for the amount of items given **(6marks)**

b). A card is drawn from a shuffled pack of 52 cards. What is probability of drawing a King or a heart? **(3marks)**

c). A bag contains 80 balls of which 20 are red, 25 are blue and 35 are white. A ball is picked at random what is the probability that the ball picked is:

(i) Red ball **(2marks)**
(ii) Black ball **(2marks)**
(iii) Red or Blue ball. **(2marks)**

QUESTION FOUR

a). The output of two workers was compared over a number of days with the following results

	Average output per day	**Standard deviation**	**Number of days Observed**
MAN A	30	6	50
MAN B	32	5	60

Is there a significant difference in output at the 95% level? **(5marks)**

b). Explain Type I and Type II errors in hypothesis testing **(4marks)**

c). Describe three types of sets as used in set theory **(6marks)**