MASINDE MULIRO UNIVERSITY OF SCIENCE AND TECHNOLOGY

(MMUST)

MAIN CAMPUS

UNIVERSITY EXAMINATIONS

2021/2022 ACADEMIC YEAR

SECOND YEAR SECOND SEMESTER MAIN EXAMINATION FOR DIPLOMA IN INFORMATION TECHNOLOGY

COURSE CODE: DIT 072

COURSE TITLE: INTRODUCTION TO STATISTICS AND PROBABILITY

DATE: 22/04/2022 **TIME: 3:00PM – 5:00PM**

INSTRUCTIONS TO CANDIDATES

- Answer questions in section A and any TWO questions in section B.

TIME: **1 HOUR 30 MINUTES**

MMUST observes ZERO tolerance to examination cheating

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SECTION A: Answer all questions (30 Marks)

QUESTION ONE

a) Define the following terms (3mks)
   i) Statistics
   ii) Variable
   iii) Parameter

b) Explain the difference between mean deviation and standard deviation (4mks)

c) A random variable X is binomially distributed with mean 6 and variance 4.2. Find $P(X \leq 3)$ (4mks)

d) Calculate the value of the mode for the following data using Grouping and analysis method (6mks)

Size of garment	28	29	30	31	32	33
No. of persons wearing	10	20	40	65	50	15

e) Use the table below to calculate β_0 *and* β_1 given that $Y = \beta_0 + \beta_1 x$ (7mks)

X	20	15	44	31	12	6	35	41	66
Y	12	60	52	17	19	19	60	60	28

f) Given that events A and B are independent, find $P(A \cap B)$ if $P(A) = 0.3$ and $P(B) = 0.012$ and hence find $P(A \cup B)$ (3mks)

g) Calculate the mean if the mode of the data is 35 and the median is 41 (3mks)

SECTION B: Answer any two questions (40 marks)

QUESTION TWO

a) The ages of individuals in a manufacturing company are given below:
62, 21, 26, 32, 56, 36, 37, 39, 53, 40, 54, 42, 44, 61, 68, 28, 33, 56, 57, 37, 52, 39, 40, 54, 43, 43, 63, 30, 34, 68, 35, 38, 50, 38, 52, 41, 51, 44, 41, 42, 43, 45, 46, 45, 46, 45, 47, 48, 49, 45, 46, 48.

For the above data:
   i) Construct a stem and leaf plot (3mks)
   ii) What is the average age of individuals working in the company (2mks)
   iii) Determine the harmonic and geometric mean of the ages (4mks)

b) Show that the expected value and the variance of a Poisson distribution is λ (11mks)

QUESTION THREE

a) State and explain three types of correlation (6mks)

b) The following table shows the sales and demand of a certain product

Demand	18	20	30	40	46	54	60	80	88	92
Sales	42	54	60	54	62	68	80	66	80	88

Find the product-moment correlation coefficient and comment on your value (8mks)

c) The number of industrial injuries per working week in a particular factory is known to follow a Poisson distribution with mean 0.5. Find the probability that in a particular week there will be;

i) At least two accidents (3mks)

ii) Exactly 6 accidents (2mks)

iii) No accidents (1mk)

QUESTION FOUR

a) The mean and standard deviation of a set of 100 observation were worked out as 40 and 5 respectively by a computer which by mistake took the value 50 in place of 40 for one observation. Find the correct mean and variance (6mks)

b) From the following data find the index numbers by taking (6mks)

i) 2005 as base year

ii) Using chain base method

Year	2005	2006	2007	2008	2009	2010	2011	2012
Price	60	62	65	72	75	80	82	85

c) Find the Spearman's rank correlation coefficient for the following data (8mks)

X	10.2	9.6	15.7	10.5	20.0	25.3	12.5	18.0	17.2
Y	20.3	15.5	30.0	25.5	35.6	32.0	18.6	22.0	18.6

QUESTION FIVE

a) In the frequency distribution of 100 families given below; the number of families corresponding to expenditure groups 20 – 40 and 60 – 80 are missing from the table. However, the median is known to be 50. Find out the missing frequencies hence calculate the mode of the frequency distribution (10mks)

Expenditure	0 – 20	20 – 40	40 – 60	60 – 80	80 – 100
No. of families	14	x	27	y	15

b) Suppose a series consists of the computer sales (Ksh.) and number of the workers in a factor

Sales (Kshs)	60	100	120	140	160
No. of workers	4	20	21	16	9

Calculate

i) The coefficient of quartile (4mks)

ii) The coefficient of variation (6mks)