



MASINDE MULIRO UNIVERSITY OF SCIENCE AND TECHNOLOGY

(MMUST)

MAIN CAMPUS

UNIVERSITY EXAMINATIONS

2021/2022 ACADEMIC YEAR

**SECOND YEAR SPECIAL/SUPPLEMENTARY EXAMINATION FOR
DIPLOMA IN INFORMATION TECHNOLOGY**

COURSE CODE: DIT 072

COURSE TITLE: INTRODUCTION TO STATISTICS AND PROBABILITY

DATE: 02/08/2022

TIME: 8AM – 10AM

INSTRUCTIONS TO CANDIDATES

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

TIME: 2 Hours

MMUST observes ZERO tolerance to examination cheating

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SECTION A: Answer all questions (30 Marks)

QUESTION ONE

- a) Define statistics, variable and population (3mks)
- b) Find the mode when the mean of a given data is 30.24 and median 28.33 (3mks)
- c) Use Pearson's correlation coefficient to determine the relationship between the following variables (6mks)

Production	1.23	1.23	2.40	2.40	3.50	3.50	4.00	4.00	5.70	5.70
Prices (000)	10	8	8	6.3	4.4	5.2	4.3	5.5	2.4	3.5

- d) Consider the following data
60 12 13 81 44 33 45 52 77 90 41 52 64 19 38 64 58 20
Use the data to compute;
 - i) Arithmetic mean (2mks)
 - ii) Harmonic mean (3mks)
 - iii) Geometric mean (3mks)
- e) Use the table below to find the value of x and E(x) (5mks)

X	-1	0	1	1	3	4	5	6	7
P(X)	0.01	X	0.20	0.11	0.03	0.08	0.02	0.13	0.22

- f) Four balls are to be drawn without replacement from a box containing 8 red and 4 white balls. If X denotes the number of red ball drawn, find the probability distribution of X. (5mks)

SECTION B: Answer any two questions (40 marks)

QUESTION TWO

- a) Define the following terms as used in probability (3mks)
 - i) Outcomes
 - ii) Events
 - iii) Sample Space
- b) The data of students who used the Wi-Fi in a certain university was as shown below.

Students (in 100)	10.00	50.00	30.25	26.98	124.52	14.23	17.45	204.03	86.15
Data (GB)	200	450	410	520	920	300	230	1000	629

Determine the effect of the number of student on data usage (7mks)

- c) Given that $P(x) = \begin{cases} \frac{e^{-\lambda}\lambda^x}{x!} & x = 0, 1, 2, \dots \\ 0 & \text{Otherwise} \end{cases}$ show that $E(x) = \lambda$ and $Var(x) = \lambda$ (10mks)

QUESTION THREE

- a) State and explain the importance of index numbers in computer business sector (10mks)
- b) If A and B are two events such that $P(A) = \frac{1}{2}$, $P(B) = \frac{1}{3}$ and $P(A \cap B) = \frac{1}{4}$ Find;
 - i) $P(A|B)$ (2mks)
 - ii) $P(B|A)$ (3mks)
 - iii) $P(A'|B)$ (3mks)
 - iv) $P(A'|B')$ (4mks)

QUESTION FOUR

- a) State three features of Binomial Distribution (3mks)
- b) A survey was conducted to determine the number of students taking a course in Physics from a computer science class. Assuming binomial distribution, a sample of 10 students was selected and found out that 23% of the sample were indeed doing physics. Find the following probabilities. (5mks)
- $P(x) \geq 1$
 - $2 \leq P(x) \leq 5$
 - $P(x) = 9$
- c) The weekly output in units of a manufacturing company has been recorded over the last 50 weeks and the data was as shown below.

74	66	65	55	48	52	63	65	80	70
56	50	65	75	67	65	81	70	63	53
76	68	50	65	60	45	65	55	71	64
65	60	51	68	76	55	70	64	45	66
68	77	63	65	52	64	40	66	55	71

Construct a frequency distribution table of class size 5 i.e. 40 – 45, 45 – 50 ... etc. and use the table to calculate the standard deviation and coefficient of variation (C.V) of the data (12mks)

QUESTION FIVE

- a) State and explain the methods used probability sampling (6mks)
- b) The following data represents the price and quantity of a certain commodity in 10 years.

Years	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Quantity (in Kgs)	10	15	12	17	13	16	24	14	22	20
Price (kshs. 00)	30	42	45	46	33	34	40	35	39	50

Taking **2010** as the base year, calculate; Paasches indices and Laspeyers indices (6mks)

- c) Use Spearman's Rank Correlation to find the relationship of the following data (8mks)

X	1.23	1.96	1.73	2.30	5.12	2.32	0.32	0.99	0.14
Y	19	61	12	78	11	51	60	45	90