



ZIMBABWE EZEKIEL GUTI UNIVERSITY

FACULTY OF SCIENCE, TECHNOLOGY, AGRICULTURE & FOOD
SYSTEMS DEVELOPMENT

DEPARTMENT OF DIGITAL TECHNOLOGY

EXAMINATION PAPER

COURSE CODE : BIS112
COURSE TITLE : APPLIED STATISTICS
SPECIAL REQUIREMENTS : None
DURATION : 3 Hours
LEVEL : 1.1
DATE : 2022

10 JUN 2024

INSTRUCTIONS TO CANDIDATES:

1. Answer all questions.
2. Show all the working
3. Calculators and slide rules are allowed
4. Each question carries 20 marks

Question 1

- a. Given the following data set 8, 11, 9, 10, 11, 11, 22, 21, 16, 16, 18, 22, 23, 11

Find the following

- i. Median [2]
- ii. Mode [1]
- iii. Mean [2]
- iv. Range [2]
- v. Upper Quartile [3]

- b. Define the following terms giving examples

- i. Variable [2]
- ii. Constant [2]
- iii. Discrete random variable [2]
- iv. Continuous random variable [2]
- v. Probability [2]

Question 2

- a. Given that A and B are events with $P(A) = 0.6$, $P(B) = 0.3$, and $P(A \cup B) = 0.6$.

Find the probability that:

- i. A does not occur [2]
- ii. A or B occurs; [2]
- iii. B does not occur; [3]
- iv. Neither A nor B occur [3]

- b. The information was copied from the forms and the ages listed as:

28 52 44 28 38 46 62 59 37 60
19 55 34 35 66 37 22 26 45 5
61 38 26 29 63 38 29 36 45 33
37 1 39 81 35 35 32 36 39 33

- i. Plot these data as a sorted stem-and-leaf diagram. [6]
- ii. Describe the shape of the distribution. [2]
- iii. Are there extreme /outlying values, if there which ones [2]

Question 3

a. Given the table below:

x	1	2	3	4	6
y	2	4	8	9	13

- i. Find the line of best fit in the form
[5]
- ii. Calculate the coefficient of correlation [4]
- iii. Find x if y is 10 [1]

b. A pair of fair dice is rolled. Let X denote the sum of the number of dots on the top faces.

- i. Construct the probability distribution of X in fair dice.
[4]
- ii. Find $P(X \geq 9)$. [3]
- iii. Find the probability that X takes an even value. [3]
- iv.

Question 4

Identify the sampling procedures that would be appropriate in the following situations explaining your reasoning and it will be carried out..

- i. A consumer protection body wishes to estimate the proportion of trains that are running late.
[5]
- ii. A health inspector wishes to investigate what proportion of people wear Spectacles. [5]
- iii. The head teacher of a large school wishes to estimate the average number of hours of homework done per week by the students. [5]
- iv. A marketing consultant wishes to investigate the proportion of households in a town that have a personal computer.
[5]

Question 5

a. Define the following terms:

- i. Nominal data [2]
- ii. Descriptive statistics [2]

b. The weight in Kilograms of people who watched the football match played last weekend are given below:

54, 55, 55, 56, 56, , 59, 59, 60, 61, 61, 61, 61, 63, 63, 64, 65, 63, 64, 64, 64, 66, 66, 67, 67, 68, 68, 68, 68, 69, 69, 69, 69, 70, 70, 70, 72, 72, 73, 74, 74, 74, 75, 75, 76, 76, 80, 75, 76, 74, 80.

- i. Using the scale of 10-50 and the class width of 6 make a table to present the data. [6]
- ii. Calculate the mean [2]
- iii. Calculate the standard deviation [6]
- iv. Present the data in a histogram [2]

THE END

FORMULA SHEET

Probability distribution

$$0 \leq P(A) \leq 1$$

$$\sum P(x) = 1$$

$$\text{Mean} = \mu = x' = \sum x * P(x)$$

$$E(X) = \sum x_i * P_i$$

$$\begin{aligned} \text{Variance} = \sigma^2 &= \text{Var}(x) = \sum x^2 * P(x) - \mu^2 \\ &= \sum [(x^2 - \mu)^2 * P(x)] \end{aligned}$$

$$\text{Standard deviation} = \sigma = \text{Sqrt}(\sigma^2)$$

Grouped Data

$$\text{Mean} = \sum f(x) / \sum f$$

$$\text{Mean deviation} = \sum f(|x - x'|) / \sum f$$

$$\text{Variance} = \sum f(|x - x'|)^2 / \sum f$$

$$\text{Standard deviation} = \text{Sqrt}(\text{variance})$$

Linear Regression and co-relation

$$y = ax + b$$

$$a = \frac{n \sum xy - (\sum x)(\sum y)}{n \sum x^2 - (\sum x)^2}$$

$$b = \frac{\sum y \sum x^2 - \sum x \sum xy}{n \sum x^2 - (\sum x)^2}$$

$$S_x = \text{Sqrt} [\sum x^2 - (\sum x)^2 / n] / n - 1$$

$$S_y = \text{Sqrt} [\sum y^2 - (\sum y)^2 / n] / n - 1$$

$$r = S_x * a / S_y$$

$$r = \frac{n(\sum xy) - (\sum x)(\sum y)}{\sqrt{[n \sum x^2 - (\sum x)^2][n \sum y^2 - (\sum y)^2]}}$$

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