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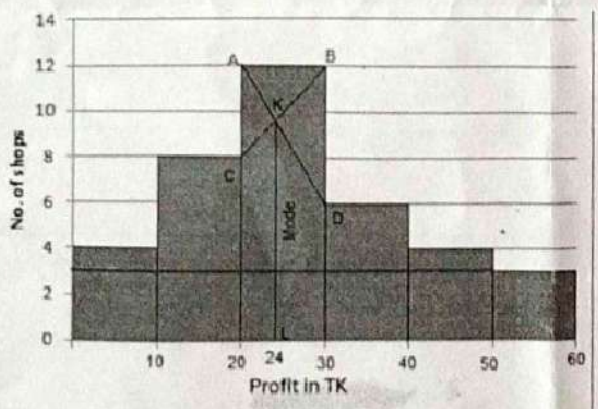
Daffodil International University

Faculty of Science & Information Technology
Department of Computer Science & Engineering
Mid Examination, Summer 2025
Course Code: STA 101, Course Title: Statistics and Probability
Level: 3 Term: 1 Batch: 64

Time: 01:30 Hrs **Marks: 25**

Answer ALL Questions [Optional]

[The figures in the right margin indicate the full marks and corresponding course outcomes. All portions of each question must be answered sequentially.]

1.	a)	**Distinguish** between interval and ratio level data with the common example of your daily life.	2	CO1
	b)	Determine what the key terms refer to the following study. Researcher wants to know the average amount of hours studied by students per week of DIU. He randomly selected 100 students of DIU and found the average amount of study hour of selected students. Hours spent by students are 10, 12,14,8 and so on. **Find** population, sample, statistic, variable, type of the data and data collection method (census/survey).	3	
2.	a)	 i)**Determine** the profit interval of the highest number of shops. **ii) Derive** profit interval has the least number of shops. **iii) Attain** the total number of shops are shown in the graph.	3	CO2
	b)	From the data of graph 2(a) **draw** an ogive curve and **show** the appropriate measures of central tendency that derived from the graph.	4	
	c)	Consider the following data set representing the weekly income (in dollars) of a group of employees: 400, 450, 500, 550, 600, 650, 700, 750, 800, 1200. If a new employee with a weekly income of 5000 dollars joins the group, **investigate** how this change will affect the mean, median, and mode.	3	
3.	a)	The midterm score of students: 5, 7, 10, 15, 16, 17, 17, 19, 21, 21, 22, 23, 23, 23, 24, 24, 25. Construct Modified Box-plot and **Select** the outlier if have any.	4	CO3

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	b)	Imagine two pizza restaurants. Restaurant A has a mean delivery time of 20 minutes with a variance of 25 minutes. Restaurant B has a mean delivery time of 40 minutes with a variance of 64 minutes. **Analyze** which restaurant in more consistency in respect of delivery time using relative measure of dispersion.	4	
	c)	For an age distribution second central moment is 43.21, third central moment is 47.18 and fourth central moment is 4478.94. **Examine** the shape characteristics of the distribution.	2	

Formula

Measures of Central Tendency

Mean

A.M= $\bar{x}=\frac{x_1+x_2+\cdots+x_n}{n}$

W.M= $\bar{x}=\frac{w_1x_1+w_2x_2+\cdots+w_nx_n}{w_1+w_2+\cdots+w_n}$

G.M=$\bar{x}=((x_1.x_2.x_3\ldots x_n))^{1/n}$

H.M=$\frac{n}{\frac{1}{x1}+\frac{1}{x2}+\cdots+\frac{1}{xn}}$

Median

If "n" is odd, $M_e= X_{(n+1)/2}$

If "n" is even, $M_e=\frac{1}{2}\left(X_{n/2}+X_{\frac{n}{2}+1}\right)$

Measures of Location

Quartile

$Q_i=\frac{i\times n}{4}$

Deciles

$D_i=\frac{i\times n}{10}$

Percentile

$P_i=\frac{i\times n}{100}$

Inner fence:

Q_1-1.5×IQR

&

Q_3 +1.5×IQR

Outer fence:

Q_1- 3×IQR

&

Q_3 + 3×IQR

Measure of Dispersion

Range= X_{max} - X_{min}

Mean Deviation, M.D $=\frac{\sum_{i=1}^{n}|x_i-\bar{x}|}{n}$

Population variance

$\sigma^2=\frac{\sum_{i=1}^{N}(x_i-\mu)^2}{N}$

Population standard deviation, $\sqrt{\sigma^2}$

Sample variance

$s^2=\frac{\sum_{i=1}^{N}(x_i-\bar{x})^2}{n-1}$

Population standard deviation, $\sqrt{s^2}$

Coefficient of variation for population, C.V= $\frac{\sigma}{\mu}\times 100$

Coefficient of variation for sample, C.V= $\frac{s}{\bar{x}}\times 100$

Shape of the distribution

Coefficient of Sknewness,

Sk= $\frac{3\times(Mean-Median)}{Standard\ deviation}$

Kurtosis $\beta_2=\frac{\mu_4}{\mu_2^2}$