

ALLAMA IQBAL OPEN UNIVERSITY, ISLAMABAD
(Department of Statistics)

WARNING

- 1. PLAGIARISM OR HIRING OF GHOST WRITER(S) FOR SOLVING THE ASSIGNMENT(S) WILL DEBAR THE STUDENT FROM AWARD OF DEGREE/CERTIFICATE, IF FOUND AT ANY STAGE.**
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Statistical Inference (8417)

Semester: Autumn 2026

Level: BBA

Total Marks: 100

Pass Marks: 50

ASSIGNMENT No. 1

- Q. 1 (a) Define Statistical Inference. Explain the scope and importance of statistical methods in business, economics, and scientific research with suitable examples.
(b) Discuss the primary and secondary methods of data collection. Explain the merits and demerits of each method.

(10+10)

- Q. 2 (a) What is Median? Explain its advantages and disadvantages. Discuss different situations in which the median is preferred over the arithmetic mean.
(b) The following table shows the monthly incomes of employees in a company:

Income Group (Rs.)	Number of Employees
10,000–19,999	8
20,000–29,999	14
30,000–39,999	20
40,000–49,999	12
50,000–59,999	6

Calculate Median

(10+10)

- Q. 3 (a) Explain the concept of Sampling Distribution. Discuss the relationship between sample size and standard error.
(b) A random sample of 100 students from a university produced an average score of 72 marks. Assume the population standard deviation is 15 marks. Construct a 99% confidence interval for the population mean. Interpret the result.

(10+10)

- Q.4 (a) Define Null Hypothesis and Alternative Hypothesis. Explain the steps involved in hypothesis testing.
(b) A manufacturer claims that the average weight of rice bags produced by a machine is 50 kg. A sample of 49 bags gave a mean weight of 48.5 kg. The population standard deviation is known to be 4 kg. Test at 5% level of significance whether the machine is producing bags with the claimed average weight. **(10+10)**

Q.5 (a) Differentiate between one-sample and two-sample hypothesis testing. Discuss their applications. (08+12)

(b) The following data represent the marks obtained by two groups of students taught by different teaching methods:

A	65	70	68	72	75	78	74	69
B	60	62	64	66	68	65	63	61

Test whether there is a significant difference between the mean marks of the two groups. Interpret the result.

(10+10)

ASSIGNMENT No. 2

Total Marks: 100

Pass Marks: 40

Q. 1 A nutritionist claims that a newly designed diet program helps reduce body weight more effectively than a conventional diet plan. Two independent random samples of participants followed the two diet programs for eight weeks. The following results were obtained:

Group	Sample Size	Mean Weight Loss (kg)	Standard Deviation
New Diet Program	90	7.8	2.4
Conventional Diet	85	6.1	2.0

Test whether there is a significant difference between the mean weight losses at 5% level of significance.

(20)

Q.2 A survey was conducted to determine whether there is an association between educational qualification and preference for online learning platforms. The following data were collected from a random sample of respondents:

Qualification	Platform X	Platform Y	Platform Z	Total
Undergraduate	35	30	25	90
Graduate	40	45	25	110
Total	75	75	50	200

Apply the Chi-Square test of independence at 5% level of significance.

(20)

Q.3 A manufacturing firm wants to study whether workers' training hours are related to their production output. The following data were collected for 10 employees:

Employee	1	2	3	4	5	6	7	8	9	10
Training Hours	5	7	8	10	12	14	15	17	18	20
Production Output	55	60	63	68	72	75	78	82	85	90

i) State the dependent and independent variables. Estimate the regression line between training hours and production output.

ii) Calculate the coefficient of correlation.

(10+10)

Q.4 The following data represent the annual profit (in million rupees) of a company from 2015 to 2024:

Year	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Profit	30	34	36	40	44	47	50	54	57	61

- i) Fit a straight-line trend equation using the least squares method.
- ii) Estimate the trend values for each year and forecast the profit for the year 2025. (10+10)

Q.5 A researcher wants to determine whether there is a significant difference in the performance ratings of employees working in three different departments. The performance scores are given below:

Department A 78 80 82 79 81

Department B 70 72 71 73 74

Department C 85 87 88 86 89

Apply the Kruskal-Wallis nonparametric test at 5% level of significance. (20)