BACHELOR OF COMPUTER APPLICATIONS (BCA_NEW)

BCA_NEW /ASSIGN/SEMESTER-III

ASSIGNMENTS

(July, 2025 & January, 2026 Sessions)

MCS-208, MCSL-209, MCS-207, BCS-131, BCSL-135, BCS-040

SCHOOLOFCOMPUTERANDINFORMATIONSCIENCES
INDIRA GANDHI NATIONAL OPEN UNIVERSITY
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Important Notes

1. Submit your assignments to the Coordinator of your Study Centre on or before the due date.
2. Assignment submission before due dates is compulsory to become eligible for appearing in corresponding Term End Examinations. For further details, please refer to BCA Programme Guide.
3. To become eligible for appearing the Term End Practical Examination for the lab courses, it is essential to fulfill the minimum attendance requirements as well as submission of assignments (on or before the due date). For further details, please refer to the BCA Programme Guide.

Course Code	**:**	**BCS-040**
Course Title	**:**	**Statistical Techniques**
Assignment Number	**:**	**BCA_NEW(III)-040/Assignment/2025-26**
Maximum Marks	**:**	**100**
Weightage	**:**	**30%**
Last Date of Submission	**:**	**31st October,2025(For July 2025 Session)** **30th April, 2026 (For January 2026 Session)**

Note: This assignment has 8 questions of 80 marks (each question carries equal marks). Answer all the questions. The rest 20 marks are for viva voce. You may use illustrations and diagrams to enhance explanations.

Q1. The following table shows the distribution of response times (in milliseconds) for a web server over a period of 100 requests: **(10 Marks)**

Response Time (ms)	0-10	10-20	20-30	30-40	40-50	50-60
Number of Requests	8	15	25	30	12	10

(a) Calculate the Mean and Median response time.
(b) Calculate the Standard Deviation of the response times.
(c) Draw a Histogram for the given data.

Q2. To study the relationship between the number of hours spent studying per week and the marks obtained in an examination, a sample of 10 students was taken. The data is as follows: **(10 Marks)**

Study Hours (X)	5	8	10	12	15	4	7	9	11	14
Marks (Y)	55	70	75	80	90	50	65	72	78	85

(a) Calculate the Karl Pearson's coefficient of correlation between Study Hours and Marks.
(b) Determine the two regression equations (Y on X and X on Y).
(c) Predict the marks of a student who studies for 13 hours a week.

Q3.
(a) A software company has two divisions, A and B, developing mobile apps. Division A develops 60% of the apps, and Division B develops 40%. It is known that 5% of apps from Division A have bugs, while 8% of apps from Division B have bugs. If an app selected at random is found to have a bug, what is the probability that it was developed by Division A? **(5 Marks)**

(b) A call center receives an average of 4 calls per minute. Assuming a Poisson distribution, find the probability that in a given minute, the call center receives: **(5 Marks)**
(i) Exactly 2 calls.
(ii) At most 1 call.
(Given $e^{-4} \approx 0.0183$)

Q4. A manufacturer of LED bulbs claims that the average lifespan of their bulbs is 8000 hours. A random sample of 50 bulbs is tested, and it is found that their average lifespan is 7950 hours with a standard deviation of 120 hours.

Test the manufacturer's claim at a 5% level of significance. State your null and alternative hypotheses clearly. (Given $Z_{0.025} = 1.96$ for a two-tailed test). **(10 Marks)**

Q5. A survey was conducted to determine if there is a relationship between a person's age group and their preferred mode of online payment. The results are tabulated below: **(10 Marks)**

Age Group	UPI	Credit/Debit Card	Net Banking	Total
18-30	150	60	40	**250**
31-45	80	70	50	**200**
46-60	40	50	60	**150**
Total	**270**	**180**	**150**	**600**

Using the Chi-Square (χ^2) test, determine whether the preferred mode of payment is independent of the age group at a 5% level of significance.
(Given χ^2 critical value for 4 degrees of freedom at $\alpha=0.05$ is 9.488).

Q6.
(a) Explain the key differences between Simple Random Sampling, Stratified Sampling, and Cluster Sampling. Provide a suitable example for each to illustrate its application. **(5 Marks)**

(b) A random sample of size 100 is taken from a large population. The sample mean is found to be 150 and the population standard deviation is known to be 20. Construct a 95% confidence interval for the population mean. (Given $Z_{0.025} = 1.96$). **(5 Marks)**

Q7. An e-commerce company wants to test three different website layouts (Layout A, Layout B, Layout C) to see if they have a significant effect on the average time (in minutes) a user spends on the site. The following data was collected from different user groups:

Layout A	Layout B	Layout C
8	12	13
10	11	15
9	10	14
11	13	16
7	9	12

Perform a one-way ANOVA to test the hypothesis that there is no significant difference between the mean user session times for the three layouts at a 5% level of significance.
(Given F-critical value $F(2, 12)$ at $\alpha=0.05$ is 3.89). **(10 Marks)**

Q8.

(a) The quarterly sales (in thousands of units) of a company from 2022 to 2024 are given below. Calculate the 4-quarterly moving averages to determine the trend. **(5 Marks)**

Year	Q1	Q2	Q3	Q4
2022	30	40	36	44
2023	34	46	40	50
2024	38	52	46	56

(b) Explain the purpose of control charts in Statistical Quality Control (SQC). Differentiate between a p-chart and a c-chart with respect to the type of data they monitor. **(5 Marks)**