

**JK Lakshmipat University Jaipur**  
**INSTITUTE OF ENGINEERING & TECHNOLOGY**  
End Term Examination (Regular & Backlog), November 2024  
BCA, Semester III, 2022-2023

Roll No.....

Course Name: Statistical Computing

Time: 2.5 hours

Max. Marks: 30

Course Code: AS1106

**Instructions to students:**

1. Use of scientific calculator is allowed.
2. Do not write anything other than your roll number on the question paper. All the best!!!!

|                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                              |           |          |           |             |      |      |      |                |
|------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|-----------|----------|-----------|-------------|------|------|------|----------------|
| Q.1                          | In a cafe, the customer arrives at a mean rate of 2 per min. Find the probability of arrival of 5 customers in 1 minute using the Poisson distribution.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 02<br>[CO3]                  |           |          |           |             |      |      |      |                |
| Q.2                          | On average, every one out of 10 telephones are found busy. Six telephone numbers are selected at random. Find the probability that four of them will be busy.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 03<br>[CO3]                  |           |          |           |             |      |      |      |                |
| Q.3                          | The speeds of cars are measured using a radar unit, on a motorway. The speeds are normally distributed with a mean of 90 km/hr and a standard deviation of 10 km/hr. What is the probability that a car selected at chance is moving at more than 100 km/hr?                                                                                                                                                                                                                                                                                                                                                                                                                              | 03<br>[CO3]                  |           |          |           |             |      |      |      |                |
| Q.4                          | <p>A real estate investor buys a parcel of land for \$150,000. He estimates the probability that he can sell it for \$200,000 to be 0.40, the probability that he can sell it for \$160,000 to be 0.45 and the probability that he can sell it for \$125,000 to be 0.15. What is the expected profit for this purchase?</p> <table><tr><td>Outcome (net profit or loss)</td><td>\$50,000</td><td>\$10,000</td><td>-\$25,000</td></tr><tr><td>Probability</td><td>0.40</td><td>0.45</td><td>0.15</td></tr></table>                                                                                                                                                                         | Outcome (net profit or loss) | \$50,000  | \$10,000 | -\$25,000 | Probability | 0.40 | 0.45 | 0.15 | 03<br>[CO1 &3] |
| Outcome (net profit or loss) | \$50,000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | \$10,000                     | -\$25,000 |          |           |             |      |      |      |                |
| Probability                  | 0.40                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 0.45                         | 0.15      |          |           |             |      |      |      |                |
| Q.5                          | <p>From viewing tapes of previous games, a football coach identifies the following four tendencies regarding the next opponent:</p> <p>a) 70% of the plays are runs to the right (R).</p> <p>b) 30% of the plays are runs to the left (L).</p> <p>c) When the play goes to the right, offensive player X has a balanced stance (B) 20% of the time and</p> <p>d) a shifted stance (S) 80% of the time.</p> <p>Write each item above in probability notation, using the letters R, L, S and B</p> <p>Create a probability table with columns R and L, and rows S and B. Also, compute the following probabilities:</p> <p>a. <math>P(L   B) =</math></p> <p>b. <math>P(R   B) =</math></p> | 04<br>[CO1,2 &3]             |           |          |           |             |      |      |      |                |

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                           |               |            |     |     |    |    |    |       |    |               |    |    |    |    |    |               |    |               |
|---------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|---------------|------------|-----|-----|----|----|----|-------|----|---------------|----|----|----|----|----|---------------|----|---------------|
| Q.6                       | <p>If <math>F</math> is the force required to lift a load, by means of a pulley, fit a linear expression <math>F = a + bW</math> using the method of least squares against the following data:</p> <table><tr><td>W</td><td>50</td><td>70</td><td>100</td><td>120</td></tr><tr><td>F</td><td>12</td><td>15</td><td>21</td><td>25</td></tr></table>                                                                                                                                                                                                                                                                                                                                                                                                                                     | W                         | 50            | 70         | 100 | 120 | F  | 12 | 15 | 21    | 25 | 05<br>[CO1&4] |    |    |    |    |    |               |    |               |
| W                         | 50                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 70                        | 100           | 120        |     |     |    |    |    |       |    |               |    |    |    |    |    |               |    |               |
| F                         | 12                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 15                        | 21            | 25         |     |     |    |    |    |       |    |               |    |    |    |    |    |               |    |               |
| Q.7                       | <p>The following data relate to advertisement expenditure (in lakh of rupees) and their corresponding sales ( in crores of rupees)</p> <table><tr><td>Advertisement expenditure</td><td>40</td><td>50</td><td>38</td><td>60</td><td>65</td><td>50</td><td>35</td></tr><tr><td>Sales</td><td>38</td><td>60</td><td>55</td><td>70</td><td>60</td><td>48</td><td>30</td></tr></table> <p>Estimate the sales corresponding to advertising expenditure of Rs. 30 lakh.</p>                                                                                                                                                                                                                                                                                                                  | Advertisement expenditure | 40            | 50         | 38  | 60  | 65 | 50 | 35 | Sales | 38 | 60            | 55 | 70 | 60 | 48 | 30 | 05<br>[CO1&4] |    |               |
| Advertisement expenditure | 40                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 50                        | 38            | 60         | 65  | 50  | 35 |    |    |       |    |               |    |    |    |    |    |               |    |               |
| Sales                     | 38                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 60                        | 55            | 70         | 60  | 48  | 30 |    |    |       |    |               |    |    |    |    |    |               |    |               |
| Q.8                       | <p>A researcher wants to investigate the relationship between the number of hours students' study per week and their scores on a mathematics exam. She collects data from a sample of five students, which is summarized in the following table:</p> <table><tr><td>Participant</td><td>Hours Studied</td><td>Exam Score</td></tr><tr><td>1</td><td>2</td><td>70</td></tr><tr><td>2</td><td>3</td><td>75</td></tr><tr><td>3</td><td>4</td><td>80</td></tr><tr><td>4</td><td>5</td><td>85</td></tr><tr><td>5</td><td>6</td><td>90</td></tr></table> <p>a) Calculate the Pearson correlation coefficient <math>r</math> for the data.<br/>b) Interpret the value of <math>r</math> in terms of the strength and direction of the relationship between hours studied and exam scores.</p> | Participant               | Hours Studied | Exam Score | 1   | 2   | 70 | 2  | 3  | 75    | 3  | 4             | 80 | 4  | 5  | 85 | 5  | 6             | 90 | 05<br>[CO1&4] |
| Participant               | Hours Studied                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Exam Score                |               |            |     |     |    |    |    |       |    |               |    |    |    |    |    |               |    |               |
| 1                         | 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 70                        |               |            |     |     |    |    |    |       |    |               |    |    |    |    |    |               |    |               |
| 2                         | 3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 75                        |               |            |     |     |    |    |    |       |    |               |    |    |    |    |    |               |    |               |
| 3                         | 4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 80                        |               |            |     |     |    |    |    |       |    |               |    |    |    |    |    |               |    |               |
| 4                         | 5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 85                        |               |            |     |     |    |    |    |       |    |               |    |    |    |    |    |               |    |               |
| 5                         | 6                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 90                        |               |            |     |     |    |    |    |       |    |               |    |    |    |    |    |               |    |               |