3/6

1601E1157

Candidate's Seat No :_____

MCA (Rep) Sem.-2 Examination

Data Analytics

January-2025

Time : 3-00 Hours] **[Max. Marks : 50**

Instructions:

- **Write both the Sections in the separate answer book.**
- **Both Sections having equal weightage.**
- **Draw Diagrams wherever necessary.**
- **Make Assumptions wherever necessary.**

Section – I

Q.1 The probability of a student passing in science is ¾ and the of the student passing in both science and maths is ½. [9] (6)

a. What is the probability of that student passing in maths knowing that he passed in science?
b. Are the two events mutually exclusive?
c. Are the two events independent?

OR

Q. 1 Three coins are tossed simultaneously. We represent P as the event of getting at least 2 heads. Similarly, Q represents the event of getting no heads and R is the event of getting heads on the second coin. Which of these is mutually exclusive?

Q.2 Consider the following hypothesis test: [12]

$H_0: \mu \geq 20$
$H_a: \mu < 20$

A sample of 50 provided a sample mean of 19.4. The population standard deviation is 2.

a. Compute the value of the test statistic.
b. What is the *p*-value?
c. Using $\alpha = .05$, what is your conclusion?
d. What is the rejection rule using the critical value? What is your conclusion?

Q.3 Write properties of Binomial distribution. A university found that 20% of its students withdraw without completing the introductory statistics course. Assume that 20 students registered for the course. Assuming Binomial probability distribution. [7]

Section – II

Q.4 Solve the following: (Any 3) [9]

1. What is Correlation? Explain its types and write its formula.
2. Calculate the probability density function of normal distribution using the following data. x = 3, μ = 4 and σ = 2.
3. Find the mean, variance and standard deviation for the following data: 6,7,10,12,13,4,8,12.
4. Write about four graphical methods with code.

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Q.5 Answer in brief: 16 Marks

1. Explain Simple Linear Regression. With example explain method of getting value of m and c for best fit line. Explain the evaluation parameters like R2, RSME and RSE.
2. Explain various trends in time series. What is moving average method of forecasting? Give example.

OR

1. 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?
2. On average, 30 – minute television sitcoms have 22 minutes have 22 minutes of programming (CNBC, February 23, 2006). Assume that the probability distribution for minutes of programming can be approximated by a uniform distribution from 18 minutes to 26 minutes.
   a. What is the probability a sitcom will have 25 or more minutes of programming?
   b. What is the probability a sitcom will have between 21 and 25 minutes of programming?
   c. What is the probability a sitcom will have more than 10 minutes of commercials or other non – programming interruptions?