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II SEMESTER BCA(AI) EXAMINATION - MAY/JUNE 2026

SCHEME: Revised CBCS

BCA (Artificial Intelligence)

Probability and Statistics

Time: 3 Hours Max. Marks: 80

Instructions to Candidate: Answer both **Part-A** and **Part-B**.

PART - A

1. Answer ALL the questions. 2 x 8 = 16

a. Define Median. (CO1 LL1)

b. Define Standard Deviation. (CO1 LL1)

c. Give any two differences between Correlation and Regression. (CO2 LL1)

d. Define Regression Equation. (CO2 LL1)

e. Mention the types of Random Variable. (CO3 LL1)

f. What is Binomial Distribution? (CO3 LL1)

g. What is Sample Distribution? (CO4 LL1)

h. What does χ^2 measure in statistical analysis? (CO4 LL1)

PART – B

Answer any **TWO** sub questions from each main. 16 x 4 = 64

2. a) i) From the following data compute arithmetic mean by the direct method:

Marks	0-10	10-20	20-30	30-40	40-50	50-60
Number of Students	5	10	25	30	20	10

(4) (CO1 LL2)

ii) Find the value of quartile deviation and its coefficient,

Roll No	1	2	3	4	5	6	7
Marks	20	28	40	12	30	15	50

(4) (CO1 LL2)

b) Find the standard deviation for the following samples:

27, 60, 40, 30, 8, 12, 7 (CO1 LL2)

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c) Calculate the mean deviation and its coefficient for the two income groups, where Group I has five members and Group II has seven members, given below:

Group(I)	14,000	14,800	15,200	16,000	18,800	-	-
Group (II)	15,500	16,000	16,200	17,000	17,500	18,000	19,000

(CO1 LL2)

d) Calculate Pearson's coefficient of skewness

X	12.5	17.5	22.5	27.5	32.5	37.5	42.5	47.5
Y	28	42	54	108	129	61	45	33

(CO1 LL2)

3. a) Ten competitors in a beauty contest are ranked by three judges in the following order,

Judge I	1	6	5	10	3	2	4	9	7	8
Judge II	3	5	8	4	7	10	2	1	6	9
Judge III	6	4	9	8	1	2	3	10	5	7

Use the rank correlation coefficient to determine which pair of judges has the nearest approach to common tastes in beauty. (CO2 LL2)

b) Quotations of index numbers of security prices of a certain joint stock company are given below:

Year	1	2	3	4	5	6	7
Debenture Price	97.8	99.2	98.8	93.3	98.4	96.7	97.1
Share Price	73.2	85.8	78.9	75.8	77.2	87.2	83.8

Using rank correlation method, determine the relationship between debenture price and share prices. (CO2 LL2)

c) From the following data, obtain the two regression equations:

X	6	2	10	6	9
Y	9	7	5	8	7

(CO2 LL2)

d) Fit a parabolic curve to the data:

X	1	2	3	7
Y	6	11	19	27

(CO2 LL2)

a) i) From a bag containing 5 green, 20 black and 30 white balls, a ball is drawn at random. What is the probability of getting white and not white. **(4)** (CO3 LL2)

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ii) A problem in statistics is given to 5 students A, B, C, D, and E. Their chances of solving it are 1/2,1/3,1/4,1/5 and 1/6. What is the probability that the problem will be solved? (4) (CO3LL2)

b) State and Prove Conditional Probability Theorem. (CO3LL2)

c) Assume that the factory has two machines past records show that machine 1 produces 30% of the items of output and machine 2 produces 70% of the items. Further 5% of the items produced by machine 1 were defective and only 1% produced by machine 2 were defective. If a defective item is drawn at random, what is the probability that the defective item was produced by machine 1 or machine 2? (CO3 LL2)

d) i) Calculate the probability of picking a card that is a heart or a spade. Comment on your answer. (4) (CO3 LL2)

i) A bag contains 5 white and 4 black balls. Two balls are drawn at random, one after the other, without replacement. Find the probability that both balls drawn are black. (4) (CO3 LL2)

5. a) i) In a sample of 500 people from a village in Rajasthan, 280 are found to be rice eaters and the rest wheat eaters. Can we assume that both the food articles are equally popular? (4) (CO4 LL2)

ii) In 324 throws of a six-faced dice, odd points appeared 190 times. Would you say that the dice is fair at 5 percent level of significance? (4) (CO4 LL2)

b) Calculate standard error of mean from the following data showing the amount paid by 100 firms in Karnataka on the occasion of Ugadi:

Amount paid ('000)	29	39	49	59	69	79	89
Number of firms	2	3	11	20	32	25	7

(CO4 LL2)

PTO

c) A random sample of size 16 has 53 as mean. The sum of the squares of the deviations taken from mean is 125. Can this sample be regarded as taken from the population having 56 as mean? Obtain, 95% and 99% confidence limits of the mean of the population. (for v=15, $t_{0.05}$=2.13 for v=15, $t_{0.01}$=2.95). (CO4 LL2)

d) In an anti-malarial campaign in a certain area, quinine was administered to 1,624 persons out of a total population of 6,496.

The number of fever cases is shown below:

Treatment	Fever	No Fever	Total
Quinne	40	1,584	1,624
No quinine	440	4,432	4,872
Total	480	6,016	6,496

Discuss the usefulness of quinine in checking malaria. (CO4 LL2)

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