BRAINWARE UNIVERSITY

Term End Examination 2023-2024
Programme – B.Tech.(CSE)-AIML-2023/B.Tech.(CSE)-DS-2023
Course Name – Probability & Statistics
Course Code - BSCM202/BSCD202
(Semester II)

Full Marks : 60 **Time : 2:30 Hours**

[The figure in the margin indicates full marks. Candidates are required to give their answers in their own words as far as practicable.]

Group-A
(Multiple Choice Type Question) 1 x 15=15

1. *Choose the correct alternative from the following :*

(i) Identify the measure of central tendency that is the most likely to be influenced by extreme values in the data set.

a) Mode b) Median
c) Mean d) Geometric mean

(ii) In regression analysis, the variable that is used to predict the variable is the_____. Select the correct answer:

a) response, or dependent, variable b) independent variable
c) intervening variable d) is usually x

(iii) If C.V of series A is more that of series B, then B is , Select the correct option

a) More Stable b) more variable
c) same d) None of these

(iv) Examine if A and B are mutually exclusive events , then

a) $P(A \cap B) = P(A).P(B)$ b) $P(A \cap B) = P(A)+P(B)$
c) $P(A \cap B) = 0$ d) None of these

(v) A box contains 20 electric bulbs, out of them 4 are defective. Two bulbs are chosen at random from this box.Calculate the probability that at least one of these is defective is

a) 5/9 b) 6/9
c) 7/9 d) None of these

(vi) A fair six-sided die is rolled.Calculate the probability of rolling an even number, given that the number rolled is less than 5

a) 1/2 b) 1/3
c) 1/4 d) 1/6

(vii) Select the notation of standard normal distribution.

a) N(0,0) b) N(0,1)

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(viii) The variance of Uniform distribution is , Select the correct option

a) $\frac{b-a}{12}$ b) $\frac{(b-a)^2}{12}$

c) $\frac{a+b}{2}$ d) None of these.

(ix) Identify the correct statement for the normal distribution.

a) It is always positively skewed b) It is always negatively skewed

c) It is symmetric and bell-shaped. d) None of these

(x) Let E(T1)=θ=E(T2), T1,T2 are linear functions of the sample observations. Recognize, if Var(T1)≤Var(T2) then:

a) T1 is an unbiased linear estimator b) T1 is BLUE

c) T1 is a consistent linear unbiased estimator d) T1 is consistent best linear unbiased estimator.

(xi) Suppose 10 coin is tossed and the outcomes are: H, H, T, T, T, T, T, H, T, H. Estimate the MLE of p, probability of success (getting head).

a) 0.4 b) 0.5

c) 0.7 d) 0.3

(xii) Three companies A, B and C supply 25%, 35% and 40% of the notebooks to a school. Past experience shows that 5%, 4% and 2% of the notebooks produced by these companies are defective. If a notebook was found to be defective, Estimate the probability that the notebook was supplied by A.

a) 44/69 b) 25/69

c) 31/69 d) 67/69

(xiii) Identify the distribution used in ANOVA test from the following.

a) F-test b) T-test

c) Z-test d) Chi square test

(xiv) Select the correct answer.A result is called "statistically significant" if _____.

a) The null hypothesis is true b) The alternative hypothesis is true

c) The p-value is less or equal to the significance level. d) The p-value is larger than the significance level.

(xv) If F-DATA= 0.9, the result is statistically significant _____. Select the correct answer.

a) Always b) Sometimes

c) Never d) Not possible to conclude

Group-B

(Short Answer Type Questions) 3 x 5=15

2. Define correlation coefficient. (3)

3. Enumerate the arithmetic mean for the values (3)

Wages in Rs.	10-20	20-30	30-40	40-50	50-60	60-70
No. of person	5	10	30	20	15	10

4. Illustrate Bayes' theorem. (3)

5. If a random variable X has the pdf (3)

$f(x)=1/4, -2<x<2$

0, elsewhere

Identifv the value of $P\{(2x+3)>5\}$.

6. Explain population and sample with example. (3)

OR

Explain parameter and statistic with example. (3)

Group-C

(Long Answer Type Questions) 5 x 6=30

7. Suppose that a random sample of size 10 drawn from a Normal population, has mean 40 and s.d 12.Estimate a 99% confidence limits for the population mean.(Given $t_{.005}=3.25$) (5)

8. Enumerate the correlation coefficient: (5)

x	10	12	13	16	17	20	25
y	19	22	24	27	29	33	37

9. It is observed that 50% of mails are spam. There is a software that filters spam mail before reaching the inbox. It accuracy for detecting a spam mail is 99% and chances of tagging a non-spam mail as spam mail is 5%. If a certain mail is tagged as spam calculate the probability that it is not a spam mail. (5)

10. Illustrate the mean and variance of Uniform distribution. (5)

11. Describe that the numerical value of correlation coefficient lies between (-1,1) (5)

12. A dice is thrown 400 times and 'four' resulted 60 times. Do the data justify that the hypothesis of an unbiased dice. (5)

OR

A sample of nine plastic nuts yielded an average diameter of 3.1 cm with sample standard deviation of 1.0 cm. It is assumed from design and manufacturing requirements that the population mean of nuts is 4.0 cm. Evaluate the mean diameter of plastic nuts being produced. (5)

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