

Total No. of Questions : 5]

SEAT No. :

PA-1009

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[5902]-28

F.Y. B.Sc. (Computer Science)

STATISTICS

CSST 122 : Continuous Probability Distributions and Testing of Hypothesis

(2019 Pattern) (Semester - II) (Paper - II)

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

- 1) All questions are compulsory.
- 2) Figures to the right indicate full marks.
- 3) Use of calculator and statistical tables is allowed.
- 4) Symbols and abbreviations have their usual meaning.

Q1) Choose the most appropriate alternative for each of the following: [1 each]

- a) If X and Y are independent normal variates such that $X \rightarrow N(5,9)$ and $Y \rightarrow N(4,25)$ then the distribution of $X + Y$ is
 - i) $N(1, 16)$
 - ii) $N(9,16)$
 - iii) $N(9, 34)$
 - iv) $N(1,16)$
- b) While checking the equality of two population variances the test statistic follows
 - i) chi-square-distribution
 - ii) t-distribution
 - iii) normal distribution
 - iv) F-distribution
- c) Type - I error is
 - i) acceptance of H_0 when it is false
 - ii) rejection of H_0 when it is true.
 - iii) acceptance of H_1 when it is false
 - iv) rejection of H_1 when it is true.

P.T.O.

- d) To draw a random sample of normal distribution, which of the following methods is useful
- Square root transformation
 - Log transformation
 - Box Muller transformation
 - Inverse transformation

Q2) Attempt any Five of the following: **[5×2=10]**

- State the lack of memory property of exponential distribution with mean θ .
- State mean and variance of Pareto distribution with parameter α .
- Let X follows continuous Uniform distribution over (5, 10), find mean and variance of X.
- Distinguish between parameter and statistic.
- Define the terms 'Level of Significance' and 'Critical Region'.
- State the test statistic along with its distribution under H_0 for testing the independence of two attributes.
- State any two properties of normal distribution.
- State any two advantages of simulation.

Q3) Attempt any TWO of the following: **[2×4=8]**

- The life time of a certain battery is a random variable which has an exponential distribution with mean 320 hours. Find the probability that such a battery will last at most 160 hours. Also, find the probability that such a battery will last between 640 to 960 hours.
- Describe the large sample test for testing $H_0 : \mu_1 = \mu_2$ against the alternative $H_1 : \mu_1 > \mu_2$.
- Describe the Chi-square test for independence of two attributes in 2×2 contingency table.

Q4) Attempt any TWO of the following: **[2×4=8]**

- A circuit is said to be fault-free if 50% of the outputs are "ones". To test Whether the given circuit is fault-free 100 inputs were given and 37 of them resulted in output as "one" and remaining in "zero". At 1% level of significance, test whether the circuit is fault-free.

- b) Explain F-test for testing $H_0 : \sigma_1^2 = \sigma_2^2$ against the alternative $H_1 : \sigma_1^2 \neq \sigma_2^2$.
- c) Define Uniform distribution over (a, b). State its distribution function. Also describe the procedure of drawing a random sample from it.

Q5) Attempt any ONE of the following:

[1×5=5]

- a) Explain the paired t-test and state the underlined assumptions.
- b) The table below gives the number of customers visiting a certain Post office on various days of the week:

Days	Mon	Tue	Wed	Thurs	Fri	Sat
No. of books issued	120	130	110	115	135	110

Test whether the customers visiting the post office are uniformly distributed over a week. Use 5% level of significance.
