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SEAT No. :

P5136

[Total No. of Pages : 2

[5823]-208

First Year 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 non-programmable scientific calculator is allowed.
- 4) Use of statistical tables is allowed.
- 5) Symbols have their usual meaning unless otherwise stated.

Q1) Answer EACH of the following by selecting most appropriate option.

[1 mark each]

- a) IF $X \sim U(3, 8)$ then $F(5)$ is
 - i) $1/5$
 - ii) $3/5$
 - iii) $2/5$
 - iv) 1
- b) A random variable X has an exponential distribution with mean 5. Then variance of X is
 - i) 2.5
 - ii) 5
 - iii) 25
 - iv) 0
- c) A random variable X has Pareto distribution with $\alpha = 3$, then mean of X is
 - i) 3
 - ii) 9
 - iii) 1.5
 - iv) 0.75
- d) The probability of rejecting H_0 when it is true is called as
 - i) type I error
 - ii) Type II error
 - iii) level of significance
 - iv) standard error
- e) In a test of hypothesis problem, the sample size is 57, then this test is called as
 - i) small sample test
 - ii) small population test
 - iii) large sample test
 - iv) large population test

P.T.O.

Q2) Answer any TWO of the following: [5]

- a) Define exponential distribution with mean = 0. State its lack of memory property and give one example of this property.
- b) Describe procedure of testing mean of a population when sample size is large.
- c) Let X follows normal distribution with mean 2 and variance 16. If $Y = (3X + 2)$, find
 - i) $P(Y > 8)$ and
 - ii) $P(6 < Y < 9)$.

Q3) Answer any TWO of the following: [5]

- a) Describe procedure of drawing a sample of size n from $N(\mu, \sigma^2)$ using Box-Muller transformation.
- b) Define normal distribution. State any three properties of normal distribution.
- c) In a sample of 7 observations, the sum of squared deviations from the mean is 94.5. In another sample of 10 observations, the sum of squared deviations from the mean is 101.7. Test whether the two variances are significantly different at 10% level of significance.

Q4) Answer any ONE of the following.

a) i) Define each of the following. [5]

- Parameter
- Statistic
- Null hypothesis
- Alternate hypothesis
- Type II error

ii) Theory predicts that the proportion of beans in 3 groups A, B and C should be in the ratio 1 : 2 : 3. In an experiment on 300 beans, the frequencies in the 3 groups were 45, 105 and 150 respectively. Does the experiment support the theory at 5% level of significance? Justify your answer. [5]

b) i) Describe procedure of paired - t test. [5]

ii) A certain factory runs in two shifts. A sample of 100 articles selected from production of day shift gave 52 defective articles whereas a sample of 700 articles selected from production of night shift gave 45 defective articles. Can we conclude that proportion of defective articles in the day shift is significantly less than that of night shift at 5% level significance? [5]