

(i) Printed Pages : 4

Roll No.

(ii) Questions : 9

Sub. Code :

0	2	4	2
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Exam. Code :

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B.A./B.Sc. (General) 3rd Semester

1125

STATISTICS

Paper—201 : Statistical Inference

Time Allowed : Three Hours]

[Maximum Marks : 65

Note :— (1) Attempt **five** questions in all, selecting **two** questions from each section and Question No. 1 is compulsory.

(2) All questions carry marks as indicate.

(3) Log tables and statistical tables may be provided on demand.

(Compulsory Question)

1. Distinguish between the following with suitable example :

(i) Statistic and Parameter

(ii) Estimate and Estimator

(iii) Point estimation and Interval estimation

(iv) Two types of Errors in Hypothesis testing

(v) Size of test and Power of the test

(vi) Null hypothesis and Alternative hypothesis 6×2

(vii) Define Attribute. 1

SECTION—I

2. (a) Explain the method in inference to estimate the parameter. Also give all important properties of this method.
- (b) Let X_1, X_n be a random sample of size n from Uniform distribution with parameter a and b i.e. $U(a, b)$. Obtain estimates of a and b . 8,5
3. (a) Discuss the following terms giving one example of each :
- (i) Sufficient Estimator
 - (ii) Efficient Estimator
 - (iii) Unbiased Estimator.
- (b) Let X_1, X_2, \dots, X_n be iid r.v. with $E(X_i) = \mu$ & $E(|X_i|^2) < \infty$. Show that $T(X_1, X_2, \dots, X_n) = \frac{2}{n(n+1)} \sum ix_i$ is a consistent of estimator of μ . 8,5
4. Define t distribution. Derive its probability density function. Write down its properties. What is the distribution of t^2 ? 13
5. Obtain the Expectation and Standard Error of Sample Mean and Sample Proportion for a random sample of size n drawn from a population of size N , with replacement and without replacement. 13

SECTION—II

6. (a) Describe the test for equality of the means of two normal populations with unknown variances. Obtain $100(1 - \alpha)\%$ confidence interval for the difference of two population means.

- (b) The scores of 10 candidates prior and after training are given below :

Prior : 84 48 36 37 54 69 83 96 90 65

After : 90 58 56 49 62 81 84 86 84 75

Is the training effective ? Also construct 95% confidence interval. 7,6

7. (a) Describe approximate tests for one and two binomial proportions. Obtain $100(1 - \alpha)\%$ confidence interval for the same. Let $\alpha = 0.05$.
- (b) In a survey of 300 adult automobile drivers, 123 said they regularly wear seat belts. Can we conclude from these data that in the sampled population the proportion who regularly wear seat belts is not 0.50 ? Let $\alpha = .05$. Construct 95% confidence intervals for true population proportion p . 8,5
8. (a) How is Fisher's Z-transformation applicable in testing problems relating to the correlation coefficient ? Also obtain 99% confidence interval for the population correlation coefficient.
- (b) The correlation coefficient between brothers' height and sisters' height for 53 brother-sister pair was found to be 0.585. Test the significance of the population correlation coefficient. Let $\alpha = 0.05$. 8,5
9. (a) Explain problem of testing independence of attributes for $r \times c$ contingency table. Also derive chi-square test for 2×2 contingency table when the cell frequency is less than five.

- (b) After correcting 50 pages of the proof of a book, the proof reader finds that there are on the average, 2 errors per 5 pages. How many pages would one expect to find with 0, 1, 2, 3 and 4 errors, in 1000 pages of the first print of the book ? Test at the 0.05 level of significance whether the error per page is a random variable having the Poisson distribution.

8,5