



বিদ্যাসাগর বিশ্ববিদ্যালয়  
**VIDYASAGAR UNIVERSITY**

**Question Paper**

**B.Sc. General Examinations 2020**

**(Under CBCS Pattern)**

**Semester - III**

**Subject: STATISTICS**

**Paper: DSC 1C/2C/3C-T & DSC 1C/2C/3C-P**

**Introduction to Statistical Inference**

**Full Marks : 60 (Theory-40 + Practical-20)**

**Time : 3 Hours**

*Candidates are required to give their answer in their own words as far as practicable.*

*The figures in the margin indicate full marks.*

**THEORY**

Attempt any *two* questions from the following :

2×20=40

1. (i) Distinguish between a parameter and a statistic. Explain with examples. 4
- (ii) How can you test the equality of the two proportions of two independent binomial distributions? 10
- (ii) Describe any two principles of design of experiments. 6
2. (i) Explain the concept of null hypothesis and alternative hypothesis with an example of each. 6

- (in) Describe the analysis of variance for one way classified data under the fixed effects model. 8
- (ii) Write the probability density function of  $t$  distribution with  $n$  degrees of freedom and determine the shape of the curve for different degrees of freedom. 6
3. (i) Explain the concepts of treatment, plot and block in design of experiments. 6
- (i) Obtain the  $100(1-\alpha)\%$  confidence interval for the mean of a normal distribution when the population variance is unknown where  $\alpha$  denotes the level of significance. 6
- (ii) Describe briefly the Sign test stating clearly the assumptions made. 8
4. (i) Describe briefly the analysis of a randomized block design. 10
- (ii) What are the two types of errors that arise in testing of hypothesis? Discuss them. 6
- (ii) Distinguish between point estimation and interval estimation. 4

### PRACTICAL

Attempt any **one** question from the following : 1×20=20

1. (i) In a remote region in Washington state, an environmental biologist measured the pH levels of rainwater and obtained the following data for 16 rainwater samples on 16 different dates:

4.73	4.79	4.87	4.88	5.04	5.06	5.07	5.09
5.11	5.16	5.18	5.21	5.23	5.24	5.25	5.25

Is there reason to believe that the rainwater from this region is considered acidic (less than 5.2)? Use the sign test to perform the analysis. 10

- (ii) Three sides of an equilateral triangle were measured in inches by 5 pupils with the following results:

Sides	Pupils				
	A	B	C	D	E
a	5.44	5.41	5.43	5.42	5.43
b	5.43	5.41	5.42	5.43	5.44
C	5.45	5.42	5.43	5.43	5.44

Is there any significant difference between the pupils? 10

2. (i) In a sample of 380 men from a certain city 254 are found to be smokers. In another sample of 500 from a bigger city 342 are smokers. Do the data indicate that the cities are significantly different with respect to prevalence of smoking? Calculate the 95% confidence limits for the percentage difference in the population. 10

- i) The following are the cholesterol contents in milligrams per package which four laboratories obtained for 6 ounce packages of three very similar diet foods: 20

	Diet Food A	Diet Food B	Diet Food C
Laboratory 1	3.4	2.6	2.8
Laboratory 2	3.0	2.7	3.1
Laboratory 3	3.3	3.0	3.4
Laboratory 4	3.5	3.1	3.7

Perform an appropriate analysis of variance to the above data. 10

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