Tribhuvan University

Institute of Science and Technology

2067

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Bachelor Level/First Year/ Second Semester/ Science — Full Marks: 60
Computer Science and Information Technology (STA. 159) — Pass Marks: 24
(STATISICS II) — Time: 3hours

Candidates are required to give their answers in their own words as far as practicable.
The figures in the margin indicate full marks.

All notations have the usual meanings.

Group A (2 x 10 = 20)

Answer any two questions

1. Describe a situation where cluster sampling is appropriate for drawing random sample. Clearly state the procedure of drawing a random sampling in cluster sampling plan. In a sampling without replacement of n clusters from a population of N clusters each containing M elements, derive an unbiased estimator of the parameter $\bar{\bar{Y}}$, population mean per element and also derive the variance of the estimator.

2. (a) Explain the terms: a random sample, sampling frame, sampling error and non-sampling error.
   (b) Explain the terms: factor, experimental units, treatment and experimental error.

3. What do you mean by Randomized Block Design (RBD)? Write and explain the statistical model for RBD. Give the statistical analysis of RBD with one observation per cell.

Group B

Answer any eight questions (8 x 5 = 40)

4. The following table summarizes population size (N_h) and population variance (S_h^2) related to four strata. If the required sample size is 4000, what are the sample sizes that would be drawn from each stratum for (a) proportional allocation and (b) optimum allocation assuming the survey cost per unit is same in each stratum.

h	1	2	3	4
N_h	14000	3000	1500	1500
S_h^2	34	94	175	319

5. Describe the procedure of drawing a linear systematic sample of size n from a population consisting of N units when N = n x k where k is a positive integer. Write down the problem of drawing a linear systematic sample of size 4 from a population consisting of 17 units, numbered from 1 to 17.