

L-8/2050
RESEARCH METHODOLOGY AND STATISTICS-I
(Semester-IV)

Time : Two Hours]

[Maximum Marks : 54

Note : Attempt any *four* questions. All questions carry equal marks.

I. Describe the procedure of stratified random sampling. Under what conditions is stratified random sampling preferred to simple random sampling and why ?

II. Discuss the various sources of collecting secondary data.

III. (a) Calculate median from the following data :

Marks (below)	10	20	30	40	50	60
No. of students	5	20	40	50	55	60

(b) What do you mean by dispersion ? State one property of standard deviation which you consider to be most important one.

IV. (a) Find the number of observations from the data

$$r = 0.5, \sum (x - \bar{x})(y - \bar{y}) = 120 \quad \sum (x - \bar{x})^2 = 90, \\ \sigma_y = 12.$$

(b) The two regression lines are $x + 2y = 5$ and $2x + 3y = 8$. Find the means of the two series.

- V. Three varieties A, B, C of a crop are tested in a randomised block design with four replications. The plot yields in pounds are as follows :

A6	C5	A8	B9
C8	A4	B6	C9
B7	B6	C10	A6

Analyse the experimental yield and state your conclusion. Given the table value of F for $\nu_1 = 2$ and $\nu_2 = 6$ at 5% level of significance is 5.14 and for $\nu_1 = 3$ and $\nu_2 = 6$ is 4.76.

- VI. (a) Describe a test of significance for a large sample.
 (b) In an experiment on immunization of cattle from tuberculosis, the following results were obtained

	Affected	Not affected
Inoculated	12	26
Not inoculated	16	06

Calculate χ^2 and discuss the effect of vaccine in controlling susceptibility to tuberculosis (Given 5% value of χ^2 for one degree of freedom = 3.84).

- VII. (a) For a random sample of size 10 from a normal population, the mean is 12.1 and the standard deviation is 3.2. Is it reasonable to suppose that the population mean is 14.5 ? Test at 5% level.
 (Given $t_{0.025,9} = 2.262$).
 (b) Discuss the procedure of testing hypothesis.

VIII. Write note on the following :

- (a) Principles and techniques of thesis writing.
- (b) Use of computers in statistics.

IX. (a) What is the need of sampling ?

- (b) Discuss sampling and non sampling errors.
 - (c) Distinguish between primary and secondary data.
 - (d) What do you understand by discrete and continuous variables.
 - (e) State the various measures of central tendency.
 - (f) Why there are two regression lines ?
 - (g) Define normal distribution.
 - (h) Discuss the principles of experimentation.
 - (i) Explain type-I and type-II errors.
 - (j) Define completely randomized design.
 - (k) Write the formula for the calculation of rank correlation co-efficient.
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