

Paper IV — RESEARCH DESIGN AND BIostatistical INFERENCE

Time : Three hours

Maximum : 100 marks

Candidates are required to give their answers in their own words with illustrations.

SECTION A — (20 × 1 = 20 marks)

Answer ALL the questions.

1. What do you mean by comparative experiment?
2. The measurement of the variable under study on different experimental units are termed as _____.
3. List the two causes of variation.
4. Treatments allocated at random to the experimental units over the entire experimental material is known as _____ design.
5. What do you mean by sampling error?
6. What is null hypothesis?
7. If the Type II error is 60%, its complement is known as the _____ of the test.
8. Define standard error.

9. What is point estimate?

10. Specify critical ratio in testing of hypothesis.

11. Give the formula for chi-square test.

12. List the applications of chi-square test.

13. What do you mean by one tailed test?

14. What is t-distribution?

15. What is the method of maximum likelihood?

16. Define parameter.

17. Briefly state confidence limits with an example.

18. Differentiate null and alternate hypothesis.

19. When Kruskal-Wallis Test is used?

20. What is Man Whitney U test?

SECTION B — (5 × 6 = 30 marks)

Answer any FIVE questions only.

21. Briefly state with the formula the estimation of missing value in randomised block design.

22. Explain in detail the statistical inference.

23. Calculate 95% confidence interval for the correlation coefficient between age and percentage of fat for 18 individuals determined as 0.7921.

24. Specify the steps involved in the procedure of tests of significance.

25. Using Chi-square test, test the goodness of fit of the number of yeast cells counted in a haemocytometer as compared to theoretical values obtained by a Poisson distribution, details as follows:

No. of yeast cells in square	0	1	2	3	4	5-6
Observed	103	143	98	42	8	6
Expected	106	141	93	41	14	5

26. Explain the application of chi-square test.

27. Discuss the standard error of mean as a parameter to assess variability.

SECTION C — (5 × 10 = 50 marks)

Answer any FIVE questions only.

28. Explain in detail the principles of experimental design.

29. Elaborately discuss about Latin square design.

30. In a health survey of school children it is found that the mean haemoglobin level of 55 boys is 10.2 per 100 ml with a standard deviation of 2.1 Can we consider this group as taken from a population with a mean of 11.0g/100 ml?

31. Twelve pre-school children were given a supplement of multi purpose food for a period of four months. Their skin fold thickness (in mm) was measured before the commencement of the programme and also at the end. The values obtained are given below. Test if there is any change in their skin fold thickness.

Serial No.	1	2	3	4	5	6	7	8	9	10	11	12
At the beginning	6	8	8	6	5	9	6	7	6	6	4	8
At the end	8	8	10	7	6	10	9	8	5	7	4	6

32. Discuss about the relationship between universe, sample and sampling distribution.

33. Elaborate on the properties of good estimator.

34. Briefly state the applications of different non-parametric tests.