

M.Sc. (Ag.) Examination, 2019
Semester – II
Agricultural Economics and Agricultural Statistics
Course: STAT 553
(Nonparametric Techniques)

Time: Three Hours

Full Marks: 80

Questions are of value as indicated in the margin

Answer **any five** questions

1. What do you mean by scale of measurements? Explain in details about different scales for measuring data. 4+12=16
2. (a) How one can judge the relative performance of two tests?
(b) What are the location parameters? Explain one sample sign test in details. 5+3+8=16
3. (a) Define a run and length of a run in a sequence of symbols with example.
(b) The following data were obtained on the genders of twenty-five customers standing in a queue in front of a bank cash counter, recorded in accordance with the time of their arrival:
M M F M M M F F M M M F M M M F M M M F F F M M F
Perform a test at 5% level of significance whether the customers arrive in a random order with respect to their gender. 6+10=16
4. (a) Define statistical hypothesis. Also define null and alternative hypotheses.
(b) Explain Kruskal-Wallis method of analysis for a one-way classified data. 6+10
5. (a) A random sample of 10 diabetic patients is selected to see the effect of reducing blood sugar level of a new drug. Their fasting blood sugar levels (gm/ml.) are measured initially (before) and after using the drug for three months.

Fasting blood sugar (gm/ml.)

Patient	1	2	3	4	5	6	7	8	9	10
Before (X_i)	125	132	137	128	140	160	155	145	132	152
After (Y_i)	110	135	125	132	140	142	148	127	132	140

Perform a test at 1% level to see if the new drug is effective in reducing blood sugar level.

- (b) How to resolve the problem of zero difference in sign test?
- (c) Discuss the situations where Friedman's test can be used. 8+4+4=16
6. Explicate Mann-Whitney-Wilcoxon U-test for testing the hypothesis that two populations are identical. 16
7. (a) Write down the need of nonparametric statistical methods over parametric statistical methods.
(b) What are the advantages of nonparametric methods?
(c) What are the basic steps involved in any nonparametric test of hypothesis? 5+5+6=16
8. Write short notes (**any two**) : 2×8=16
 - (a) Test for randomness
 - (b) Chi-square test for goodness of fit
 - (c) Analysis of Variance problem
 - (d) Errors in testing of hypothesis and power of a test