M.Sc. (Ag.) Examination, 2018

Semester-II

Agricultural Economics and Agricultural Statistics

Paper/Course- STAT-553

(Nonparametric Techniques)

Time: 3 Hours **Full Mark: 80**

Questions are of value as indicated in the margin

Answer *any five* questions

1. (a) What do you mean by nonparametric methods? What are the advantages and disadvantages of non-parametric methods?
   (b) Explain the terms parameter, statistic and estimator. 4+6+6=16
2. (a) Differentiate between parametric test and non-parametric test.
   (b) Explain one sample Wilcoxon Signed-Ranks sign test in details. 6+10 =16
3. (a) What indication can one get from the number of runs?
   (b) The win (W)-loss(L) record of a certain cricket team for their last 50 consecutive matches was as follows:

   WWWWWWLWWWWWWLWLWWWLLWWWW

   LWWWLLWWWWWWLLWWLLLWWLWWW

   Perform a test at 5% level of significance whether the sequence of wins and losses are random. 6+10=16
4. (a) What do you mean by analysis of variance (ANOVA)? Write the assumptions of ANOVA.
   (b) An experiment was conducted on 21 animals to determine the weight gain (in kg.) under different feed. The data are given below

   Feed 1: 3.50, 3.80, 3.57, 3.56, 3.81

   Feed 2: 3.79, 4.10, 4.11, 3.95, 4.25, 4.40

   Feed 3: 4.00, 4.50, 4.51, 4.75, 5.00

   Feed 4: 3.59, 3.82, 4.09, 3.96, 3.82

   Test at 5% level whether the 4 types of feed help in gaining same weight or not. 6+10=16
5. (a) To study the effect of strenuous job (physical strain), the plasma corticosteroid levels (in appropriate units) were observed in eight individuals, who are involved in such jobs, on weekdays (after they return from work) and weekends (on holidays when they relaxed at home), and the following data were obtained.

Subject	1	2	3	4	5	6	7	8
Weekdays (X_i)	62.1	38.0	57.5	59.1	45.3	71.1	52.8	42.2
Weekend(Y_i)	41.1	37.7	42.3	61.2	38.3	60.0	35.7	37.3

   Perform a test at 5% level if the plasma corticosteroid level is higher on weekdays.
   (b) How to resolve the problem of zero difference in sign test? 12+4=16

P.T.O.

6. (a) Discuss Chi-square test for goodness of fit.

   (b) The following figures show the distribution of digits in numbers chosen at random from a telephone directory:

Digits	0	1	2	3	4	5	6	7	8	9
Frequency	1026	1107	997	966	1075	933	1107	972	964	853

   Test at 5% level whether the digits may be taken to occur equally frequently in the directory. 6+10=16

7. (a) What are the basic steps involved in any nonparametric test of hypothesis?

   (b) Discuss different types of errors related to test of hypothesis.

   (c) What assumptions are generally made for a nonparametric test? 6+5+5=16

8. Write short notes on (***any two***)

   (a) Test for randomness

   (b) Scale of measurements

   (c) Asymptotic relative efficiency

   (d) Chi-square test for independence of attributes 2×8=16

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