Assignment IV

1. Discuss the rationale and method of Wilcoxon Matched pair signed rank test.

2. Describe rationale and procedure of Cochran Q test.

3. Discuss the function and procedure of Kruskal Wallis H test.

4. What do you mean by Friedman two way ANOVA test? Describe process of the test.

5. The weight (kg) of 5 people before they stopped smoking are as follows:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Before | 66 | 80 | 69 | 52 | 75 |
| After | 71 | 82 | 68 | 56 | 73 |

Use wilcoxon Matched pairs signed rank test for paired observations to test the hypothesis at 0.05 level of significance that giving up smoking has no effect on a person’s weight against the alternative hypothesis that one’s weight increases if he or she quits smoking.

Ans: T=3.5, insig.

6. To evaluate a speed of reading course, a group of 10 subjects were asked to read two comparable articles one before the course and one after the course. Their scores on reading test are as follows;

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Before course(X) | 57 | 80 | 64 | 7 | 90 | 59 | 76 | 98 | 70 | 83 |
| After course(Y) | 60 | 90 | 62 | 7 | 95 | 58 | 80 | 99 | 75 | 94 |

Test whether the course is beneficial using the Wilcoxon Matched pairs signed rank test at 5% level of significance.

Ans: T=4.5, sig.

7. Four objective questions are given to 5 students and the results of correct answer(1) and wrong answers(0) are arranged in the following table.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Objective Questions | Students | | | | |  |  |
| 1 | 2 | 3 | 4 | 5 |  |  |
| Q1 | 1 | 0 | 0 | 1 | 1 | 3 | 9 |
| Q2 | 0 | 1 | 1 | 0 | 1 | 3 | 9 |
| Q3 | 1 | 1 | 1 | 0 | 0 | 3 | 9 |
| Q4 | 0 | 0 | 1 | 0 | 1 | 2 | 4 |
|  | 2 | 2 | 3 | 1 | 3 | 11 | 31 |
|  | 4 | 4 | 9 | 1 | 9 | 27 |  |

Apply Cochran q test for testing the hypothesis that there is no significant difference betweenfourobjective questions with respect to the correct answers.

Ans: Q=0.529, insig.

8. Three diets P , Q and R are fed to 9 buffaloes, each diet for one month and the result of

Increasing (I) and decreasing (D) of milk given by different buffaloes are given in the following table.

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Diet | Buffaloes | | | | | | | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| P | I | D | I | D | I | I | D | D | I |
| Q | I | I | I | D | I | I | D | I | D |
| R | I | D | D | D | I | D | I | I | I |

Test whether the three diets are equally effective or not using Cochran Q test at  
α = 5%. Ans: Q=0.33, insig.

9. Following are the final examination marks of three group of students who were taught computer by three different methods;

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Method I | 94 | 88 | 91 | 74 | 87 | 97 |  |
| Method II | 85 | 82 | 79 | 84 | 61 | 72 | 80 |
| Method III | 89 | 67 | 72 | 76 | 69 |  |  |

Are all three methods equally effective? Use H test at 0.05 level of significance.

Ans: H=6.67, sig.

10. An agricultural experiment was conducted to compare the yield of wheat by using three types of chemical fertilizer nitrogen(N), phosphorous (P) and potash (K). Twelve plots of equal size were selected at random and divided into three groups of four each and planted wheat. Each group was randomly selected and the fertilizer was applied in the plots under the identical conditions. Then the yield of wheat recorded were given in the following table.

|  |  |  |
| --- | --- | --- |
| Chemical fertilizer | | |
| N | P | K |
| 122 | 81 | 80 |
| 80 | 80 | 82 |
| 138 | 79 | 65 |
| 121 | 65 | 58 |

Test whether the three types of fertilizers are equally effective or not. Use Kruskal Wallis test at 0.05 level of significance. Ans: P=0.008, sig.

11. A researcher wants to compare the teaching standard of three English medium schools on the basis of performance of the student’s final examination scores. The percentage of passers in I to IV grade in the schools are presented in the following table.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Grade | | | |
| I | II | III | IV |
| Alpha | 89 | 98 | 70 | 80 |
| Sigma | 45 | 76 | 40 | 55 |
| Gamma | 20 | 58 | 35 | 67 |

Test the performances of the schools with respect to pass percentage using Friedman’s test.

Ans: p=0.042, sig.

12. A survey was conducted in four Hospitals in a particular city to obtain the number of babies born over a 12 months period divided into four seasons to test the hypothesis that the birth rate is constant over all four seasons. The result of the survey are as follows:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Hospitals | Number of births | | | |
| Winter | Spring | Summer | Fall |
| A | 92 | 112 | 94 | 77 |
| B | 9 | 11 | 10 | 15 |
| C | 58 | 71 | 51 | 62 |
| D | 19 | 26 | 19 | 18 |

Analyze the data using Friedman’s test.

Ans: p=0.042, sig.