M.Phil.DEGREE EXAMINATION, FEBRUARY 2018.

Statistics

I YEAR I SEMESTER

Major- Paper II -Advanced Statistical Inference

Time : 3 Hours Max. Marks :75

SECTION A – (5 × 15 = 75 marks)

Answer any *FIVE* questions

1. a. State and Establish Basu's theorem.

b. Let be a random sample from . Find a minimal

sufficient statistic and examine whether it is complete.

2. a. State and establish Neymann Fisher factorization theorem.

b. Let  be a random sample from . Obtain

minimal sufficient statistic

3. a. State and establish Lehmann Scheffe theorem.

b. Show that the family of is complete.

4. a. State and prove the sufficient part of generalized Neymann Pearson Lemma.

b. Let be iidrandom sample from .Find UMPT

for testing  against .

5. a. Write short notes on (i) Locally most powerful test. (ii) Similar test.

b. Let . Derive UMP test of size =0.05 for testing

against

6. a. Construct UMPT of level  for testing  against

, when a random sample of size n is drawn from one parameter

exponential family.

b. Let  be a random sample from . Find UMP unbiased

size test for  against .

7. a. Explain Siegel Tukey test.

b. Two potential suppliers of streetlighting equipment, A and B, presented their

bids to the city manager along with the following data as a random sample of

life length in months.

A: 35, 66, 58, 83, 71

B: 46, 56, 60, 49

Test whether the life length of suppliers A and B have equal variability.

8. a. Explain Friedman test for two way analysis of variance by ranks.

b. An ongoing problem on college campuses is the instructor evaluation form. Toaid in   
the interpretation of the results of such evaluations, a study was made to determine   
whether any relationship exists between the stage of a student’sacademiccareer and   
his attitude with respect to whether the academic work load in his courses was lighter than it should be, at the appropriate level, or heavier than itshould be. A stratified random sample yielded the following results:

|  |  |  |  |
| --- | --- | --- | --- |
|  | Sophomore | Junior | Senior |
| Believe work load is lighter than it should be | 5 | 8 | 11 |
| Believe work load is at the appropriate level | 30 | 35 | 40 |
| Believe work load is heavier than it should be | 25 | 17 | 9 |

(a) Test the null hypothesis that there is no association between the stage of a

student’s program and his attitude with respect to the appropriateness of the

academic work load in his courses.

(b) Measure the degree of association.

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