**M.PHIL. DEGREE EXAMINATION, APRIL 2016.**

**(STATISTICS)**

**I YEAR — I SEMESTER**

**Major Paper II — ADVANCED STATISTICAL INFERENCE**

**Time : 3 hours Max. marks : 75**

**SECTION-A( 5 × 15 = 75)**

**Answer any *FIVE* questions.**

1. (a)State and prove a criterion for determining sufficient statistics. (10)

(b) Let X1, X2, …, Xn be iid B(1, p) random variables. Show that T = is a complete sufficient statistic. (5)

2. (a) State and prove a necessary and sufficient condition for an unbiased

estimator to be a UMVUE. (10)

(b) Prove that UMVUE is unique almost surely. (5)

3. State and prove Lehmann-Scheffe theorem. Using this theorem obtain UMVUE of

µ and σ2 based on a sample of size ‘n’ from Normal distribution. (15)

4. State and prove generalization of the fundamental Neyman Pearson lemma. (15)

5. (a) Show that the family of uniform densities on [0, θ] has an MLR in max1 ≤ i ≤ n xi. (5)

(b) For the one-parameter exponential family, find a UMPT of the hypothesis

Ho: θ ≤ θ1 or θ ≥ θ2 (θ1 < θ2) against H1: θ1 < θ < θ2. (10)

6. (a) Let X1, X2, …, Xn be a sample from N(µ, σ2), where both µ and σ2 are

unknown. For testing Ho: µ ≤ µo, σ2 > 0 against H1: µ > µo, σ2 > 0, obtain UMPUT. (10)

(b) Explain Similar Test and Neyman Structure. (5)

7. Describe Wilcoxon Signed-Ranks test and give an example. (15)

8. Describe Chi-square Test of Independence and give an example. (15)