PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

MSc DEGREE EXAMINATION MAY 2018
(Third Semester)

Branch - STATISTICS

STATISTICAL INFERENCE -I

Time: Three **Hours** **Maximum: 75 Marks**

Answer ALL questions
ALL questions carry EQUAL marks (5 x 15 = 75)

1 a Define sufficient statistics and mention its significance. Explain with examples the procedures of verifying whether given statistics posses these properties.

b Prove that consistency is invariant under continuous transformations.

OR

c State and prove the Factorization theorem.

d Describe the following : (i) minimal sufficiency (ii) sufficient statistics

2 a State and prove Kiefer - Chapman - Robbins inequality.

b Write a detailed note on Bhattacharya bounds.

OR

c Describe the following : (i) Efficiency (ii) UMVUE

d State and prove Lehman - Scheffe's theorem.

3 a Write a short note on method of moments.

b Prove that the **minimum chi-square estimate of 0 is that values** 0(0 e 0) **satisfying C(0) < C(0), for all 0 e ©.**

OR

c Let Xi, X_2, ...X_n be a sample from U $0 - -, 0 \frac{+}{2}\frac{-}{2}$ The likelihood function is

$L(0;x_1,x_2,....x_n) = j_0$ **if** $0 - - \frac{1}{} < \min(xi,...x_n) < \max(xj(xj,x_n)x \leq) 0 y + +^1$

otherwise

Find MLE of 0.

d Write down the small and large sample properties of MLE.

4 a Explain the location and scale invariant estimators with examples.

OR

b Obtain the posterior distribution of 0 in the Bemoullis (0) distribution employing the Jeffreys non informative prior to 0. Also, find the Bayes estimator for 0 under squared error loss function.

c Describe Pitmann estimator.

5 a Discuss the large sample confidence interval.

b Obtain the 100(l-a)% shortest length confidence interval for 0 for the case of uniform (0, 0) distribution.

OR

c Define the following :
(i) lower confidence limit (ii) confidence bounds

d Explain briefly uniformly most accurate confidence bounds.