PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

MSc DEGREE EXAMINATION DECEMBER 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 i) Define point estimation. Also explain consistency.

ii) If T_n is a consistent estimator of a parameter ϑ and g is continuous function, then prove that $g(T_n)$ is a consistent estimator of $g(\vartheta)$.

OR

b i) Derive the factorization theorem.

ii) Explain the distributions admitting sufficient statistic.

2 a State and prove the Cramer-Rao inequality.

b Establish Lehmann - Scheffe's theorem.

OR

c Describe Bhattacharya bounds,

d Establish Rao- Blackwell theorem.

3 a Explain the method of minimum chi-square.

b Describe the small and large sample properties of MLE.

OR

c Explain the method of moments.

d Discuss asymptotic normality and asymptotic efficiency.

4 a Define exponential family with an example.

b Explain Baye's estimators and posterior Baye's estimator.

OR

c Describe location invariant estimator and location parameter.

d Let Xi, X_2,....X,, be a random sample from a normal distribution with mean ϑ and variance 1. Find the Pitman estimator of ϑ for location.

5 a Consider sampling from the Bernoulli distribution with parameter $\vartheta = p[X = 1) = 1 - P[X = 0]$, Obtain the 95% confidence interval for ϑ for large samples.

b Explain unbiased confidence sets.

OR

C Find the shortest (1-2) confidence interval for the parameter ϑ of the uniform distribution U(0, ϑ) using a sample of n observations randomly drawn from the same.

d Describe large sample confidence interval.