PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

BSc DEGREE EXAMINATION MAY 2018
(Fourth Semester)

Branch- **STATISTICS**

STATISTICAL INFERENCE -1

Time : Three Hours Maximum : 75 Marks

SECTION-A (20 Marks!
Answer **ALL** questions
ALL questions carry **EQUAL** marks ($10 \times 2 = 20$)

1 State the Cramer-Rao inequality.

2 What is difference between estimator and estimate?

3 State Neyman's Factorization Theorem.

4 Mention any one application of Rao- block well theorem.

5 Define maximum likelihood estimation.

6 State the properties of MLE.

7 What do mean by interval estimation?

8 What do you mean by posterior distribution.

9 Define order statistics.

10 Provide any two limitations of non-parametric methods.

SECTION - B (25 Marks!
Answer ALL Questions
ALL Questions Carry **EQUAL** Marks ($5 \times 5 = 25$)

11 a Define the following terms and give one example for each
(i) Unbaisedness and (ii) Efficiency.

OR

b Show that if T is an unbiased estimator of 0, then T is a biased estimator of 0^2.

12 a State and establish a sufficient condition for consistency of an estimator.

OR

b Find the sufficient estimator for the parameter X of a Poisson distribution based on a random sample of size n.

13 a Briefly explain the method of moments.

OR

b Find the method of moment estimator of © in population, given by
$f(x, p) = e^{‘(x'e)}$,x>0.

14 a X is distributed normally n = 10, x = 119 and **S** = 2.1. Construct a 99% confidence interval for the mean of the parent population.

OR

b Define standard error and explain its use.

15 a What is the use of median test? Explain the procedure briefly.

OR

b Give the step-by-step procedure uses in sign test.

SECTION - C (30 Marks)

Answer any THREE Questions

ALL Questions Carry EQUAL Marks (3 x 10 = 30)

16 Prove that for a random sample (xl, x2, ... ,xn) of size n draw from a given large population (p, **a**), S = — X $_{n}$$^{-1}$$_{i-1}$(xi-x) is not an unbiased estimator of the population cr^2.

17 State and prove Rao - Blackwell theorem.

18 Find the MLE for the parameter P of the binomial distribution B(N, P), where N is very large but finite, on the basis of sample of size n. Also find its variance.

19 Obtain 100 (l-a)% confidence interval for c^2 when 0 is known in normal distribution.

20 Describe the chi-square test for goodness of fit.

Z-Z-Z END