Reg. No…….. Name…… **19U429**

B.Sc. DEGREE END SEMESTER EXAMINATION MARCH/APRIL 2019

SEMESTER – 4: STATISTICS (COMMON FOR MATHEMATICS AND COMPUTER APPLICATION)

COURSE: 15U4CPSTA4-15U4CRCST4, STATISTICAL INFERENCE

(Common for Regular 2017 admission and improvement 2016/ supplementary 2016/2015 admission)

Time: Three Hours Max. Marks: 75

(Use of Scientific calculators and Statistical tables permitted)

PART A

*Answer **all** questions. Each question carries **1** mark.*

1. Distinguish between parameter and statistic.
2. What are the desirable properties of a good estimator?
3. Who formulated the method of moments?
4. What do you understand by point estimation?
5. What is meant by statistical hypothesis?
6. Which hypothesis decides whether a test is one tailed or two tailed?
7. Explain standard error.
8. State Cramer-Rao inequality.
9. Distinguish between null and alternative hypotheses
10. Write the mathematical model for one way classification.

PART B

*Each question carries **3** marks. Maximum marks from this part is **15***

11. What are the conditions to be satisfied for conducting the analysis of variance?
12. Define Estimation. Distinguish between Estimators and Estimates
13. Define statistical test.
14. What are significance level and power of a test?
15. What do you mean by a sufficient estimator? Also State Neyman's condition for sufficiency.
16. Discuss in brief the terms null hypothesis and alternative hypothesis.
17. What is the context under which paired sample t test is used?

PART C

*Each question carries **5** marks. Maximum marks from this part is **20***

18. Explain the method of moments for estimation of parameters with an example.
19. Find the mle for the parameter θ of a Poisson distribution from 6 sample values, where the six observations are 2,8,0,6,2 and 3.
20. Explain the test procedure for testing the hypothesis $H_0 : \mu = \mu_0$ when
    (i) The population mean is known (ii) The population mean is unknown.

21. Describe the method of maximum likelihood estimation of parameters. State the important properties of method of maximum likelihood estimator.
22. Samples of sizes 10 and 14 were taken from two normal populations with standard deviations 3.5 and 5.2 and the sample means were found to be 20.3 and 18.6. Test whether the means of the two populations are the same at 5% level.
23. Explain two important application of t distribution in small sample test.

PART D

*Each question carries **10** marks. Maximum marks from this part is **30***

24. A random sample of 150 colonies was taken from New Delhi city and the average population per colony was found to be 440 with a standard deviation 32. Another sample of 250 colonies from the same city gave an average population 480 per colony with a standard deviation of 56. Is the difference between the averages of two samples statistically significant?
25. A die is thrown 132 times and the frequencies of the occurrence of faces from 1 to 6 are 15, 20, 25, 15, 29, and 28 respectively. Examine whether the die is unbiased.
26. Random samples of sizes 500 and 400 are found to have means 11.5 and 10.9 respectively. Can the samples be regarded as random samples drawn from the same population whose standard deviation is 5?
27. (a) Describe how you would test the equality of means of two normal populations when the sample size is small and the populations variances unknown.

    (b) Explain the procedure for testing the goodness of fit.