16U331 (Pages: 2) Name: ……………………

Reg. No………………….…

THIRD SEMESTER B.Sc. DEGREE EXAMINATION, NOVEMBER 2017

(Regular/Supplementary/Improvement)

(CUCBCSS-UG)

CC15UST3C03 - STATISTICAL INFERENCE

(Statistics-Complementary Course)

(2015 Admission onwards)

Time: Three Hours Maximum: 80 Marks

Section A.

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

1. Any measurable function of the sample values is called ....
2. M.G.F of a Chi square random variable with 5 degrees of freedom is ....
3. The frequency curve of students '*t*' distribution is symmetric about t = ...
4. Maximum likelihood estimator of the parameter of an exponential with mean $\theta$is........
5. The test for goodness of fit is based upon ....distribution
6. If T_n is a consistent estimator of θ, then as 'n' tends to infinity $V(T_n)$ tends to........
7. *t* distribution with '1'degree of freedom reduces to........
8. Rejection of H_0 when H_0 s true is called........
9. ----------- is a biased but consistent estimator of where is the variance of a normally distributed population.
10. The test the equality of variances is based upon ………. distribution.

(10x1=10Marks)

Section B.

Answer ***all*** questions. Each question carries 2 marks

11. Define power of a test
12. Distinguish between simple and composite hypothesis.
13. Briefly explain method of moment estimation.
14. Define likelihood function.
15. Explain interval estimation
16. State Neymann – Pearson lemma.
17. Distinguish between large sample and small tests with examples.

(7x2=14 Marks)

Section C.

Answer ***any three*** questions. Each question carries 4 marks

18. Derive the sampling distribution of mean of samples taken from a Normal population.
19. State and prove the reproductive property of Chi-square distribution.

20. Explain the method of constructing 95% confidence interval for the proportion 'p' of possessing a characteristic in a population
21. Derive the mean of 'F' distribution.

22. Show that sample mean is a sufficient estimator of θ where θ is the parameter of a population

with density $f(x, \theta) = \theta e^{-\theta x}, x > 0$

(3x4=12Marks)

Section D.

Answer ***any four*** questions. Each question carries 6 marks

23. Derive the interrelationship between *t* , F and distribution.
24. Let be three independent observations drawn from a population with mean μ and variance σ^2. Define estimators , , and . Compare the efficiencies of t_1, t_2 and t_3.
25. Explain paired *t* test .
26. Prove if T is an unbiased estimator of θ , T^2 is a biased estimator of θ^2 but if T is a consistent estimator of θ then T^2 is also a consistent estimator of θ^2.
27. If X is uniformly distributed in the interval (0, 1) , then show that is a variate with 2 d.f.
28. The means of two random samples of sizes 1000 and 2000 are 67.5 and 68.0 inches respectively. If the standard deviations of the samples are 4.5 and 3.8 respectively, examine whether means of the respective populations are significantly different.

(4x6=24Marks)

Section E

Answer ***any two*** questions. Each question carries 10 marks

29. Let Z and be independent random variables and follow according to N(0, 1) and distributions with 'n' degrees of freedom respectively. Derive the distribution of
30. Explain the desirable properties of a good estimator with examples.
31. a) If Z ~ N(0, 1), Show that follows Chi square distribution with 1 degree of freedom

    b) Explain the testing procedure for testing the equality of means in small sample case (Both variances unknown case).

32. a) Thirteen observations taken from a normal population are 126,132, 113, 143, 126, 135 141, 137, 134, 133, 138, 129, 142 Based in this can we conclude that the population mean is greater than 125.

b) Explain the Chi square test for goodness of fit

(2x10=20Marks)

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