Reg. No.....

THIRD SEMESTER B.Sc. DEGREE EXAMINATION, NOVEMBER 2014

(UG-CCSS)

Complementary Course—Statistics

ST 3C 03—STATISTICAL INFERENCE

Time : Three Hours **Maximum : 30 Weightage**

Part A

Answer **all** *questions.*
Each question carries $^1/_4$ ***weightage.***

Fill in the blanks :

1. Moment generating function of Chi-square distribution with 10 degrees of freedom is _____
2. If X has F-distribution with (n, m) degrees of freedom, then the distribution of $\frac{1}{X}$ is _____
3. Probability of first kind of error is called _____
4. Range of variation of Student's t-distribution is _____

State True *or* **False :**

5. Population variance is an example for a statistic.
6. Bias of an estimator is always positive.
7. Consistency is a large sample property.
8. Equality of variances of two normal populations can be tested by F-statistic.

Choose the correct answer :

9. Student's *t* distribution is :
   (a) Positively skewed. (b) Negatively skewed.
   (c) Symmetric. (d) None of the above.
10. If T is a consistent estimate of 0, then :
   (a) T is a consistent estimator 0^2.
   (b) T^2 is a consistent estimator of O.
   (c) T^2 is a consistent estimator of 0 – 1.
   (d) None of the above.
11. In large sample test for testing the equality of proportions, the test statistic follows :
   (a) Normal distribution. (b) t-distribution.
   (c) F-distribution. (d) Chi-square distribution.

12. The maximum likelihood estimator are necessarily :

(a) Unbiased. (b) Sufficient.

(c) Most efficient. (d) None of the above.

(12 x ¼ = 3 weightage)

Part B

Answer **all** *nine questions.*
Each question carries 1 ***weightage.***

13. 13.Distinguish between parameter and statistic.
14. Define Student's t-statistic.
15. What do you meant by standard error ?
16. If X_1, X_2, is a random sample of size three taken from a population with mean μ and variance a^2, compare the efficiencies of the estimators $X_1 + X_2$ and $3X_1 - 2X_9$.
17. State the Fisher Neyman factorization theorem for sufficiency.
18. What are the properties satisfied by maximum likelihood estimator ?
19. Estimate the parameters of the binomial distribution if the mean of the sample is 6 and variance 3/2.
20. Distinguish between simple and composite hypothesis.
21. What do you meant by two sided test ?

(9 x 1 = 9 weightage)

Part C

Answer any **five** *questions.*
Each question carries **2** ***weightage.***

22. Define chi-square statistic and give its probability density function
23. State the relation between chi-square and F-distribution.
24. Discuss the applications t-distribution
25. If T is an unbiased estimate of a parameter μ, check whether T^2 is unbiased for $\mu^{\hat{}}$.
26. Obtain the maximum likelihood estimator of the parameter λ of Poisson distribution based on the sample values 6, 2, 1, 9, 4, 2,3.
27. Describe the method moments estimation.
28. Explain the general procedure for parametric interval estimation.

(5 x 2 = 10 weightage)

Part 1)

Answer any two questions.
Each question carries **4 weightage.**

29. **What are the desirable properties to be satisfied by a good estimate ? Give *one* example each of estimates possessing each of the desirable properties.**

30. **Obtain the most powerful test for testing $H_0 : 0 = \theta_0$ against $H_0 : 0 = 0_1$, where 0 is the parameter of a distribution having pdf $f(x) = \theta x^{\theta}$, $0 < x < 1$, $0 > 0$.**

31. **Explain Chi-square test for goodness of fit.**

(2 x 4 8 weightage)