Seat No. : _____

NC-113

November-2021

B.Sc., Sem.-V

CC-302 : Statistics
(Sampling Distribution)

Time : 2 Hours] **[Max. Marks : 50**

SECTION – I

Attempt any **THREE** questions out of **EIGHT** questions.

1. (A) Define and derive Chi-square distribution. **7**
   (B) State and prove the additive property of Chi-square distribution. **7**

2. (A) State and prove mean and variance of Chi-square distribution. **7**
   (B) Let x and y be two independent Chi-square variates with m and n degrees of freedom respectively. Show that $u = \frac{x}{x+y}$ is distributed as β type-I distribution with (m/2, n/2) d.f. **7**

3. (A) Define student's t distribution and derive its probability density function. **7**
   (B) Prove variance of t distribution. **7**

4. (A) Explain odd ordered central moments of t-distribution. **7**
   (B) Derive pdf of Fisher's t-distribution. **7**

5. (A) Write a note on Fishsr's Z-distribution. **7**
   (B) Obtain MGF OF Z-distribution and derive its mean and variance. **7**

6. (A) Define F- distribution. Derive its probability density function. **7**
   (B) Explain how F distribution is related with Chi-square distribution and t-distribution. **7**

7. (A) What is transformation of variate ? Also write general formula and uses of transformation of variates. **7**
   (B) Explain $\sin^{-1}$ transformation of the square root of Binomial proportion. **7**

8. (A) Explain Logarithmic transformation. **7**
   (B) Explain square root transformation of the Poisson variate. **7**

SECTION – II

9. Attempt any **eight** : **8**

(1) Chi square distribution has _____ parameter.

(A) 1 (B) 2

(C) 3 (D) 4

(2) The mean of Chi square distribution with n degree of freedom is _____.

(A) m (B) n

(C) o (D) p

(3) The variance of Chi square distribution with n degree of freedom is _____.

(A) 4n (B) 5n

(C) 6n (D) 2n

(4) Variance of t distribution with n degree of freedom is _____.

(A) n/(n-4) (B) n/(n-6)

(C) n/(n-8) (D) n/(n-2)

(5) Student's t distribution curve is symmetrical about mean it means that

(A) odd order moment is zero (B) even order moment is zero

(C) Both of the above (D) None of the above

(6) The relationship between the mean and variance of chi square with n degree of freedom is _____.

(A) Mean = 2 variance (B) Mean = variance

(C) 2 mean = variance (D) None of the above

(7) The range of F variate is

(A) $-\infty$ to ∞ (B) 0 to ∞

(C) ∞ to 0 (D) None of the above

(8) F distribution is applied for _____.

(A) Testing the equality of two population variances

(B) The equality of two or more population means

(C) Testing the equality of two or more population means

(D) All of the above

(9) Equality of two population means can be treated by

(A) t test (B) f test

(C) chi square (D) Z test

(10) Mode of F distribution is always _____ unity.

(A) less or more than (B) more or less than

(C) less than (D) more than

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