

6E922

COURSE No. USTTC-301(CBCS)

Time: 3 Hours

BA/B.Sc Statistics, Semester 3

Title: Statistical Inference

Max Marks: 80

Section A

(3x5=15)

Attempt all questions

Q1 Define methods of moments and its properties.

Q2 Explain Wilcoxon Sample test for unpaired data.

Q3 Define F-distribution with its properties.

Q4 Explain two types of error.

Q5 Explain confidence interval.

Section B

(7x5=35)

Attempt all questions

Q1 Find the unbiased estimator of

(a) P (b) P^2 (c) $(P + 2)$ in case of binomial distribution.

Q2 Explain NP Lemma.

Q3 Define chi square distribution. Obtain its mean, variance and m. g. F. .

Q4 Explain the concept of non-parametric tests and write the advantages and disadvantages of non parametric tests over parametric tests.

Q5 The heights of 10 males of given locality are found to be 70, 67, 62, 68, 61, 68, 70, 64, 64, 66 inches. Is it reasonable to believe that the average height is greater than 64 inches? Test at 5% significance level assuming that for 9 degrees of freedom $P(t > 1.83) = 0.05$.

Section C

(15x2=30)

Attempt any two questions

Q1 Two groups of married men selected and were given marital adjustment rating scale. Do you find any significant difference between the marital adjustments of the two groups by applying median test? ($0.05 = 31.41$ and $0.01 = 37.566$)

Group (A): 9,9,9,12,15,17,17,19,20,22,24,27. Group (B): 4, 5,7,7,12,16,19,19,22.

Q2 Derive Chi-square distribution and its relation with f-distribution.

Q3 Let x_1, x_2, \dots, x_n be a random sample from normal population $N(\theta, \sigma^2)$ distribution, where σ^2 is known. Find the best critical region testing $H_0: \theta = \theta_0$ against $H_1: \theta = \theta_1$.

Q4 Define different methods of estimation and explain steps used for obtaining M.L.E.

(b) Let x_1, x_2, \dots, x_n be a random sample from normal population $N(\mu, \sigma^2)$. Find the M.L.E of μ when σ^2 is known.

Q5 A random sample of 10 boys had the following I.Q.'s: 70, 120, 110, 101, 88, 83, 95, 98, 107, 100. Do these data support the assumption of a population mean I.Q. 100? Find a reasonable range in which most of the mean I.Q. values of samples of 10 boys lie. [$(t_{0.05})$ at 9 d.f = 2.262].