



K24U 0938

Reg. No. :

Name :

IV Semester B.Sc. Degree (C.B.C.S.S. – Supplementary/One Time Mercy
Chance) Examination, April 2024
(2014 to 2018 Admissions)

COMPLEMENTARY COURSE IN STATISTICS FOR MATHEMATICS/
COMPUTER SCIENCE
4C04STA : Statistical Inference

Time : 3 Hours

Max. Marks : 40

Instruction : Use of calculators and statistical tables are permitted.

PART – A
(Short Answer)

Answer **all 6** questions.

(6×1=6)

1. Define standard error.
2. What is the difference between parameter and statistic ?
3. Define estimator.
4. What do you mean by sufficient estimator ?
5. Distinguish between simple and composite hypothesis.
6. Define confidence coefficient.

PART – B
(Short Essay)

Answer **any 6** questions.

(6×2=12)

7. Derive the sampling distribution of mean of samples from a normal population.
8. Define t and F distribution.
9. Define unbiasedness of an estimator. Also obtain unbiased estimator for p when $X \rightarrow B(n, p)$.

P.T.O.



10. Explain the method of moments for estimation.
11. Obtain the 95% confidence interval for the mean (when σ is known) of a normal population $N(\mu, \sigma)$.
12. Define critical region and power of the test.
13. A random sample of 600 oranges taken from a large consignment contained 60 bad oranges. Is it justifiable to reject the claim that less than 5% of oranges are bad ?
14. Explain chi-square test of independence of two attributes.

PART - C
(Essay)

Answer **any 4** questions.

(4×3=12)

15. Prove that :
 - 1) Square of a random variable is F random variable.
 - 2) F variable is the ratio of two chi-square.
16. What are the sufficient conditions for consistency ? Also show that sample mean is consistent estimator for the population mean.
17. Suppose in a survey of 400 people from one city 188 preferred brand A soap to all others and in a sample of 500 people from another city 210 preferred the same product. Prepare 95% confidence interval for $p_1 - p_2$ where p_1 is the proportion preferring brand A soap in the first city and p_2 be the proportion preferring brand B soap in the second city.
18. Explain :
 - 1) null and alternative hypothesis.
 - 2) one tailed and two tailed test.
19. Memory capacity of 9 students were tested before and after training. Examine whether the training was effective or not from the following scores.

Before :	10	15	9	3	7	12	16	17	4
After :	12	17	8	5	6	11	18	20	23



20. Time taken by workers in performance a job by method I and II are given below.

Method I	20	16	26	25	23	
Method II	28	33	42	35	32	34

Does the data show that the variance of time distribution by the two methods do not differ significantly ?

PART – D
(Long Essay)

Answer any 2 questions.

(2x5=10)

- 21. Define chi-square distribution. Obtain its mean variance and moment generating function.
- 22. Explain maximum likelihood method of estimation. Also find maximum likely estimate for a and b for a rectangular distribution with probability density function $f(x) = 1/b - a, a \leq X \leq b$.
- 23. The hypothesis $H_0 : \theta = 2$ is accepted against $H_1 : \theta = 5$ if $x \leq 3$ where X has an exponential distribution with mean θ . Find probability of type I and type II errors.
- 24. Fit a Poisson distribution to the following data and test the goodness of fit.

X :	0	1	2	3	4	5	6
f :	275	72	30	7	5	2	1

