UNIVERSITY OF NORTH BENGAL

B.Sc. General Part-II Examination, 2021

STATISTICS

PAPER-V (OLD SYLLABUS)

Full Marks: 50

ASSIGNMENT

The figures in the margin indicate full marks.
All symbols are of usual significance.

1. Answer **all** questions: 10×1 = 10

   (a) What is efficient estimator?

   (b) What are the sufficient conditions for consistency?

   (c) What are the different optimum properties of good point estimators?

   (d) What is Likelihood function?

   (e) What is power of a test?

   (f) What do you mean by interval estimation?

   (g) What is level of significance?

   (h) When a test is called unbiased?

   (i) What is type-I error?

   (j) What is unbiased estimator?

2. Answer **all** questions: 6×4 = 24

   (a) A simple random sample (x_1, x_2, x_3, x_4) of size 4 is drawn from an infinite population with mean μ and sd δ. Given the two estimators of μ as follows:

   $T_1 = (x_1 + 2x_2 + 3x_3 + 4x_4)/10$ and $T_2 = (x_1 + x_2)/3 + (x_3 + x_4)/6$. Which one is better? Why?

   (b) Prove that the sample variance s^2 is consistent estimate of the population variance σ^2 but it is not unbiased estimate of σ^2.

(c) On the basis of the random sample $x_1, x_2, \ldots, x_n$ of size n drawn from normal (μ, σ^2) population, find out the simultaneous estimation of μ and σ^2.

(d) In analysis of variance (ANOVA), prove that TSS = SSW + SSB.

3.   Answer **all** questions: $8 \times 2 = 16$

(a) (i)   Define likelihood function stating it is a function of which variable or variables. Find the MLE of the parameter of a Binomial population.

(ii)   Prove that $\sum_{i=1}^{n} \dfrac{(x_i - \bar{x})^2}{n}$ is not an unbiased estimator of population variance σ^2.

(b) (i)   Show that sample proportion defective is an unbiased estimator of population proportion defective.

(ii)   What do you mean by χ^2 goodness of fit test? A dice was thrown 60 times and the frequencies of the different faces were observed to be the following:

Face :	1	2	3	4	5	6	Total
Frequency :	6	10	8	13	11	12	60

Test if the dice is unbiased.

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