

Gurudas College
STATISTICS [General]
Semester-III, Paper-CC3/GE3
Practical Examination, 2021-22

Date of Examination: Jan 29, 2022

Time: 11am-1:30pm

Marks: 30

Attempt all the following questions

1. (a) Ten individuals are chosen at random from a normal population with unknown mean and unknown standard deviation; and their heights in inches are found to be 63, 66, 63, 67, 68, 69, 70, 71, 72, 71. Find 95% confidence interval for mean. (4)
- (b) A dietician wants to find the effect of special diet on systolic blood pressure (measured in mm of Hg). A random sample of seven persons were considered for this purpose. The persons were put on a special diet for three months. The data below give the systolic blood pressure (mm Hg) of these seven persons before and after the completion of this diet plan.

Before	210	180	195	220	231	199	224
After	193	186	186	223	220	183	233

Test at 5% level of significance whether the data support the dietician's belief that the special diet brings change in systolic blood pressure. (5)

- (c) Random samples of electric bulbs produced by 3 companies show the following data on life hours of these bulbs:

Company I	Company II	Company III
1500	1560	1550
1540	1530	1540
1520	1540	1535
	1545	1540
		1545

Find the ANOVA of this one classified data to test whether the average life of the bulbs produced by these 3 companies are equal or not. State clearly the

linear model, the Null hypothesis, Alternative hypothesis and the conclusion.

(6)

- (d) Consider the results given in the following table for an experimental involving six treatments in four randomised blocks. The treatments are indicated by numbers within parentheses.

Blocks	Yield for a randomised block experiment treatment and yield					
1	(1) 24.7	(3) 27.7	(2) 20.6	(4) 16.2	(5) 16.2	(6) 24.9
2	(3) 22.7	(2) 28.8	(1) 27.3	(4) 15.0	(6) 22.5	(5) 17.0
3	(6) 26.3	(4) 19.6	(1) 38.5	(3) 36.8	(2) 39.5	(5) 15.4
4	(5) 17.7	(2) 31.0	(1) 28.5	(4) 14.1	(3) 34.9	(6) 22.6

Test whether the treatments differs significantly. Also obtain the efficiency of this design relative to its layout as CRD.

(8)

- (e) Obtain the maximum likelihood estimator of the given function which is as follows:

$$f(x) = \theta \exp(-\theta x), \quad \text{where } x \geq 0; \theta > 0$$

(4)

- (f) X_1, X_2 and X_3 is a random sample of size 3 from a population with mean μ and variance σ^2 . T is the estimator used to estimate mean value μ where

$$T_3 = \frac{(\lambda X_1 + X_2 + X_3)}{3}$$

Find the value of λ such that T_3 is unbiased estimator for μ . With this value of λ is T_3 a consistent estimator?

(3)