

**July 2021**  
**Bachelor of Computer Applications (BCA) Examination**

Second Semester  
**STATISTICS – II**  
 BCA-202

[Max. Marks 40  
 [Min. Marks 13

**Special Note : Word limit for answer of each question is 250 to 300 words.**

**Note : Attempt all the five questions. All questions carry equal marks.**

1. State and prove the necessary and sufficient condition for unbiased estimator to be UMVUE.

OR

State and prove Cramer-Rao inequality for multi-parameter case and hence establish the inequality for the case of single parameter.

2. Distinguish between the following :

- (a) Simple and composite hypothesis
- (b) Null and alternative hypothesis
- (c) One-tailed and two-tailed test
- (d) Acceptance and rejection region.

OR

The mean of a certain procedure process is known to be 50 with a standard deviation of 2.5. The production manager may welcome any change in mean value towards higher side but would like to safeguard against decreasing values of mean. He takes a sample of 12 items that gives a mean value of 48.5. What inference should the manager take for the production process on the basis of sample results ? Use 5% level of significance for the purpose. (Given  $Z = -1.645$ ).

3. Memory capacity of 9 students was tested before and after training. State at 5% level of significance whether the training was effective from the following scores :

Student	:	1	2	3	4	5	6	7	8	9
Before	:	10	15	9	3	7	12	16	17	4
After	:	12	17	8	5	6	11	18	20	3

(Given  $t_{0.05} = -1.860$ )

OR

The following figures relate to the number of units of an item produced per shift by two workers A and B for number of days :

A	:	19	22	24	27	24	18	20	19	25		
B	:	26	37	40	35	30	30	40	26	30	35	45

Can it be inferred that worker A is more stable compared to worker B ? (Given  $F_{0.05} = 3.35$ )

P. T. O.

4. Briefly describe the different non-parametric tests. Also point out their limitation. Explain the significance of each such test.

OR

The median age of tourists who has come to India is claimed to be 40 years. A random sample of 18 tourists gives the following ages :

24, 18, 37, 51, 56, 38, 45, 45, 29, 48, 39, 26, 38, 43, 62, 30, 66, 41.

Test the hypothesis using 5% level of significance. (Given  $Z = -1.96$ )

5. Explain the meaning of the following in context of Research design :
- Extraneous Variables
  - Confounded Relationship
  - Experimental and Control Groups
  - Treatments.

OR

To test the significance of variance in the retail prices of a commodity in three principal cities, Mumbai, Kolkata and Delhi, four shops were chosen at random in each city and the prices who lack confidence in their mathematical ability observed in rupees were as follows :

Mumbai	:	16	8	12	14
Kolkata	:	14	10	10	6
Delhi	:	4	10	8	8

Do the data indicate that the price in the three cities are significantly different ?

(Given  $F_{0.05} = 4.26$ )

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