

The Open University of Sri Lanka

B.Sc/B.Ed. DEGREE, CONTINUING EDUCATION PROGRAMME

CAT2 – Online Test 2021/2022

Level 05 - Applied Mathematics

ADU5305/ ADE5305– Statistical Inference

**Duration: - One Hour**

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**DATE: - 28-01-2023**

**Time: - 1.00 p.m. to 2.00 p.m.**

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**Answer all questions.**

1.

Assignment marks and final examination marks of a subject for randomly selected 15 students are given below. From the past experience it is reasonable to assume that Assignment mark and Final Mark follow normal distribution.

| Student Name    | A  | B  | C  | D  | E  | F  | G  | H  | I  | J  |
|-----------------|----|----|----|----|----|----|----|----|----|----|
| Assignment mark | 60 | 47 | 60 | 56 | 47 | 27 | 45 | 61 | 68 | 62 |
| Final Mark      | 67 | 54 | 53 | 49 | 47 | 35 | 30 | 77 | 57 | 54 |

- (i) Construct 95% confidence interval for mean of the final marks.
- (ii) Construct 95% confidence interval for variance of the final marks.
- (iii) Using suitable statistical test, test the validity of the claim that “Expected assignment mark is equal to the expected final examination mark for a randomly selected student”. Use 5% level of significance.

2.

In a process of a production, the production manager is interested in the proportion  $\theta$  of defective items produced. Suppose a random sample of 500 items (drawn with replacement) were tested. Suppose that 22 items were defective.

- (i) Construct a 95% confidence interval for  $\theta$ . Interpret the results.
- (ii) Comment on the claim that “95% of the produced items are not defective”
- (iii) Using a suitable statistical test comment on the claim that “proportion of defective items of the production process  $\theta$  is less than 0.05”

