SHIVAJI COLLEGE, UNIVERSITY OF DELHI

DEPARTMENT OF ECONOMICS

CONTINUOUS ASSESMENT-1I

ASSIGNMENT

(Academic Year- 2023-24)

Name of the Course: B.A.Economics (H) Semester: II

Name of the Paper: Intermediate statistics for economics Faculty Name: Ms. Kavita Yadav

Unique paper code: 2272101203 Maximum Marks: 20

Duration :

Date of Submission: 24th April '24

QUESTION-1

(a) A psychologist estimates the mean reaction time for a sample of n = 9 respondents.

(i) Calculate the width of the 90% confidence interval for true population variance σ^2.

(ii) Calculate the upper bound on sample size "n" so that the expected width of the confidence interval calculated in (i) does not exceed the true population variance σ'.

(b) A random sample of 20 workers in a village was found to have a mean daily income of Rs. 45 and a sample standard deviation of Rs. 8. Based on the sample data, the government wants to obtain an estimate of the minimum income earned by workers "w", which covers 99 percent of workers in the population. Calculate w. (Assume population distribution to be normal).

QUESTION-2

(a) A student is timed 20 times in the performance of a task, getting mean x 7.9 minutes and standard deviation s = 1.2 minutes. If the probability of a Type I error is to be at most 0.05, does this constitute evidence against the null hypothesis that the average time is less than or equal to 7.5 minutes? Find the p-value of the test.

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(b) Playing 10 rounds of golf every week, a golf professional averaged 71.3 with a standard deviation of 2.64. Test the null hypothesis that the consistency of his game is actually measured by standard deviation $\sigma = 2.40$, against the alternative hypothesis that he is less consistent. Use the level of significance 0.05. Assume that the distribution of his score every week, is approximately normal.

QUESTION-3

(a) A random sample of 1000 workers from South India shows that their mean wages are Rs. 47 per hour with a standard deviation of Rs. 28. A random sample of 1500 workers from North India gives a mean wage of Rs. 49 per hour with a standard deviation of Rs.40. Test if there is any significant difference between mean wages across North and South India for the population of workers at 1% level of significance.

(b) Two different computer processors are compared by measuring the processing speed for different operations performed by computers using the two processors. If 12 measurements with the first processor had a standard deviation of 0.1 GHz and 16 measurements with the second processor had a standard deviation of 0.15 GHz, can it be concluded that the processing speed of the second processor is less uniform? Use a = 0.05 level of significance. What assumptions must be made as to how the two samples are obtained?

QUESTION-4

(a) In a pilot process, almond milk was manufactured in n = 8 plants to yield (in litres) in a week.

26.8	32.5	29.7	24.6	31.5	39.8	26.5	19.9

Conduct a test of hypotheses with the intent of showing that the mean production is less than 36.2. Take level of significance a = 0.01 and assume a normal population. Based on your conclusion, what error could you have made? Explain in the context of the problem.

(b) Using the 95% confidence interval, for the mean reading time, following information is obtained:

N	Sample Mean	Sample Standard Deviation	95% Confidence Interval
15	6.009	1.078	(5.412, 6.606)

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(i) Decide whether or not to reject H_0: μ = 5.5 hours in favour of H_1: μ# 5.5 hours at level of significance a = 0.05.

(ii) Decide whether or not to reject H_0 μ 5.3 hours in favour of H_1: μ# 5.3 hours at level of significance a = 0.05.

(iii) Based on the example what is the relationship between tests for two- sided alternatives and confidence intervals?

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