Inferential Statistics-Sem 3

Unit 1: Introduction to Inferential Statistics

1. What is inferential statistics? How is it different from descriptive statistics?
2. Explain population and sample with examples.
3. What are the basic assumptions in inferential statistics?
4. Define sampling distribution. Explain the central limit theorem.
5. Write short notes on:
    - Standard error
    - Estimation

Unit 2: Estimation Theory

1. What is point estimation? How does it differ from interval estimation?
2. What are the properties of a good estimator?
3. Derive the confidence interval for the mean (known variance).
4. Find the confidence interval for proportion with an example.
5. Solve a problem on constructing 95% confidence interval for a population mean.

Unit 3: Hypothesis Testing

1. Define the following terms:
    - Null hypothesis
    - Alternative hypothesis
    - Level of significance
    - Type I and Type II errors
2. Explain the steps in hypothesis testing.
3. Perform a one-sample t-test with an example.
4. Perform a two-sample z-test for difference of means.
5. When do we use t-test, z-test, and chi-square test?

Unit 4: Chi-Square Test and ANOVA

1. What is the Chi-Square test? Explain goodness of fit test with an example.

2. Explain the test for independence using Chi-Square.
3. What is ANOVA? When is it used?
4. Perform a one-way ANOVA test and interpret the result.
5. State assumptions of ANOVA and derive the F-ratio formula.

Unit 5: Non-Parametric Tests

1. Differentiate between parametric and non-parametric tests.
2. Explain the Sign Test with an example.
3. What is the Mann–Whitney U Test? Give steps and an example.
4. Discuss the Kruskal-Wallis test.
5. Write short notes on:
    - Wilcoxon signed-rank test
    - Applications of non-parametric tests in real-world data

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- **Frequently Asked 10 Marks Questions**
    - Describe hypothesis testing procedure with a real-life example.
    - Explain Chi-Square test for independence with a table and calculation.
    - Derive and explain the formula for confidence interval for population mean.
    - Write in detail about one-way ANOVA and how it's used.
    - Compare different types of statistical tests: t-test, z-test, chi-square, ANOVA.