WORKSHEET STATISTICS WORKSHEET-8

**Q-1 to Q-12 have only one correct answer. Choose the correct option to answer your question.**

1. In hypothesis testing, type II error is represented by β and the power of the test is 1−β then β is:

a. The probability of rejecting H0 when H1 is true

**b. The probability of failing to reject H0 when H1 is true**

c. The probability of failing to reject H1 when H0 is true

d. The probability of rejecting H0 when H1 is true

2. In hypothesis testing, the hypothesis which is tentatively assumed to be true is called the

a. correct hypothesis **b. null hypothesis**

c. alternative hypothesis d. level of significance

3. When the null hypothesis has been true, but the sample information has resulted in the rejection of the null, a \_\_\_\_\_\_\_\_\_ has been made

a. level of significance b. Type II error

c. critical value **d. Type I error**

4.For finding the p-value when the population standard deviation is unknown, if it is reasonable to assume that the population is normal, we use

a. the z distribution **b. the t distribution with n - 1 degrees of freedom**

c. the t distribution with n + 1 degrees of freedom d. none of the above

5. A Type II error is the error of

a. accepting Ho when it is false b. accepting Ho when it is true

**c. rejecting Ho when it is false** d. rejecting Ho when it is true

6. A hypothesis test in which rejection of the null hypothesis occurs for values of the point estimator in either tail of the sampling distribution is called

a. the null hypothesis b. the alternative hypothesis

c. a one-tailed test **d. a two-tailed test.**

7.In hypothesis testing, the level of significance is

a. the probability of committing a Type II error

**b. the probability of committing a Type I error**

c. the probability of either a Type I or Type II, depending on the hypothesis to be tested

d. none of the above

8. In hypothesis testing, b is

a. the probability of committing a Type II error **b. the probability of committing a Type I error**

c. the probability of either a Type I or Type II, depending on the hypothesis to be test d. none of the above

9. When testing the following hypotheses at an α level of significance H0: p = 0.7 H1: p > 0.7 The null hypothesis will be rejected if the test statistic Z is

**a. z > zα** b. z < zα c. z < -z d. none of the above

10. Which of the following does not need to be known in order to compute the P-value?

a. knowledge of whether the test is one-tailed or two-tail b. the value of the test statistic

**c. the level of significance** d. All of the above are needed

11. The maximum probability of a Type I error that the decision maker will tolerate is called the

**a. level of significance**  b. critical value

c. decision value d. probability value

12. For t distribution, increasing the sample size, the effect will be on

a. Degrees of Freedom b. The t-ratio

c. Standard Error of the Means d**. All of the Above**

**Q-13 to Q-15 are subjective answers type questions. Answers them in their own words briefly.**

13. What is Anova in SPSS?

Ans: ANOVA stands for Analysis of Variance, which is a statistical method used to test for differences between two or more groups or conditions. ANOVA can be used to test hypotheses about the means of two or more populations, and to determine whether the differences between the means are statistically significant.

In SPSS (Statistical Package for the Social Sciences), ANOVA is a commonly used statistical procedure that allows researchers to test for differences between the means of two or more groups, and to determine whether these differences are statistically significant. SPSS provides several different types of ANOVA, including one-way ANOVA, factorial ANOVA, and repeated measures ANOVA.

One-way ANOVA is used when there is only one independent variable with two or more levels or groups. Factorial ANOVA is used when there are two or more independent variables, each with two or more levels or groups, and the researcher is interested in testing the effects of each independent variable, as well as any interactions between them. Repeated measures ANOVA is used when the same group of participants is measured on the same dependent variable under different conditions or at different time points.

SPSS provides a user-friendly interface for performing ANOVA, allowing researchers to enter their data, specify the analysis they want to run, and interpret the results of the analysis. The output of an ANOVA in SPSS typically includes a summary of the main effects and interactions, as well as information about the statistical significance of the differences between the means of the groups or conditions being compared.

14. What are the assumptions of Anova?

Ans: ANOVA (Analysis of Variance) is a statistical method used to compare means between two or more groups or conditions. In order to use ANOVA, there are several assumptions that must be met. These assumptions include:

1. Independence: The observations within each group or condition must be independent of each other. This means that the values for each group or condition must not be influenced by the values of other groups or conditions.

2. Normality: The distribution of the dependent variable within each group or condition should be approximately normal. This assumption can be checked by examining the histogram or normal probability plot of the residuals (the differences between the observed values and the predicted values).

3. Homogeneity of variances: The variance of the dependent variable should be equal across all groups or conditions. This assumption can be checked by examining the plot of the residuals versus the fitted values.

4. Random sampling: The samples should be selected randomly from the population, or at least the groups or conditions should be comparable.

If these assumptions are not met, the results of the ANOVA may not be reliable, and other statistical methods may be more appropriate.

Additionally, there are some other considerations when using ANOVA, such as the need for balanced designs (i.e., equal sample sizes in each group), and the potential for outliers or influential observations to affect the results.

15. What is the difference between one way Anova and two way Anova?

Ans: One-way ANOVA and two-way ANOVA are both statistical methods used to compare means between groups or conditions, but they differ in terms of the number of factors or independent variables they consider.

One-way ANOVA compares means between two or more groups or conditions that are defined by a single factor or independent variable. For example, if we wanted to compare the mean scores on a test for students in different grade levels (e.g., 5th grade, 6th grade, 7th grade), we would use a one-way ANOVA with "grade level" as the independent variable. One-way ANOVA tests for differences in means between groups, but does not allow us to examine the effects of multiple factors simultaneously.

In contrast, two-way ANOVA compares means between groups or conditions that are defined by two independent variables or factors. For example, if we wanted to compare the mean scores on a test for students in different grade levels who were taught by different teachers, we would use a two-way ANOVA with "grade level" and "teacher" as the independent variables. Two-way ANOVA allows us to examine the effects of multiple factors simultaneously, as well as any interactions between those factors.

In summary, the main difference between one-way ANOVA and two-way ANOVA is the number of independent variables or factors that are considered. One-way ANOVA compares means between groups or conditions defined by a single factor, while two-way ANOVA compares means between groups or conditions defined by two independent variables or factors.