PSY516 Final term 100 Solved MCQs

MCQs Set

1. **What does the F-ratio in ANOVA indicate?**
   - A) The mean difference between groups
   - B) The variance within groups
   - C) The variance between groups
   - D) The ratio of variance between groups to variance within groups
   - **Answer: D**
2. **When is a post hoc test used in ANOVA?**
   - A) Before ANOVA to check for normality
   - B) After finding a significant result with ANOVA
   - C) To replace ANOVA when assumptions are violated
   - D) To compare variances within groups
   - **Answer: B**
3. **What is the purpose of multiple regression analysis?**
   - A) To compare means between two groups
   - B) To explore the relationship between a continuous dependent variable and multiple independent variables
   - C) To assess normality
   - D) To check for autocorrelation
   - **Answer: B**
4. **What is the Durbin-Watson test used for in regression analysis?**
   - A) To assess multicollinearity
   - B) To test for normality
   - C) To check for autocorrelation in residuals
   - D) To compute effect size
   - **Answer: C**
5. **What does a VIF value above 10 indicate in regression?**
   - A) A strong correlation between variables
   - B) Multicollinearity among independent variables
   - C) No significant relationship
   - D) Homoscedasticity
   - **Answer: B**
6. **What does a p-value ≤ 0.05 in ANOVA suggest?**
   - A) There is no significant difference among group means
   - B) There is a statistically significant difference among group means
   - C) The data does not meet the assumptions of ANOVA
   - D) The model is not valid
   - **Answer: B**
7. **Which test is used to compare the ranks of a continuous variable across three or more independent groups?**
   - A) One-Way ANOVA

- B) Friedman Test
- C) Kruskal-Wallis Test
- D) Chi-Square Test
- **Answer: C**

8. **What is Spearman's correlation used for?**
   - A) To measure the linear relationship between two variables
   - B) To measure the relationship between two ordinal variables or when data do not meet the assumptions for Pearson's correlation
   - C) To assess the homogeneity of variance
   - D) To test for autocorrelation
   - **Answer: B**
9. **When should the Friedman Test be used?**
   - A) When comparing three or more related groups or conditions in a repeated-measures design
   - B) When comparing two independent groups
   - C) When the data is normally distributed
   - D) When the data is dichotomous
   - **Answer: A**
10. **What does the point-biserial correlation measure?**
    - A) The relationship between two continuous variables
    - B) The relationship between two ordinal variables
    - C) The relationship between a numerical and a dichotomous variable
    - D) The relationship between two dichotomous variables
    - **Answer: C**
11. **What is the main purpose of conducting a one-sample t-test?**
    - A) To compare means between two unrelated groups
    - B) To compare a sample mean to a hypothesized population mean
    - C) To assess correlations between variables
    - D) To test the independence of two variables
    - **Answer: B**
12. **Which test assesses the equality of variances between groups in an independent-samples t-test?**
    - A) Levene's Test
    - B) Durbin-Watson Test
    - C) ANOVA
    - D) Kruskal-Wallis Test
    - **Answer: A**
13. **Which of the following is an assumption of the Kruskal-Wallis Test?**
    - A) The data must be normally distributed
    - B) The dependent variable is nominal
    - C) The groups must have equal sample sizes
    - D) The data must be ordinal or continuous
    - **Answer: D**
14. **What does a high R-Square value indicate in multiple linear regression?**

- A) A strong predictive relationship between independent variables and the dependent variable
- B) The presence of multicollinearity
- C) The lack of fit in the model
- D) Homogeneity of variance
- **Answer: A**

15. **What does the Phi-coefficient measure?**
    - A) The relationship between two continuous variables
    - B) The relationship between two ordinal variables
    - C) The relationship between two dichotomous variables
    - D) The relationship between a continuous and an ordinal variable
    - **Answer: C**
16. **What is the primary advantage of ANOVA over multiple t-tests?**
    - A) ANOVA uses a lower alpha level
    - B) ANOVA allows simultaneous comparisons of multiple groups with a single test
    - C) ANOVA requires less data
    - D) ANOVA can handle non-parametric data
    - **Answer: B**
17. **What does a significant interaction effect in a two-way ANOVA suggest?**
    - A) Main effects of both independent variables are significant
    - B) The effect of one independent variable on the dependent variable depends on the level of the other independent variable
    - C) No difference between groups
    - D) The sample is normally distributed
    - **Answer: B**
18. **When is the Wilcoxon Signed Rank Test used?**
    - A) As an alternative to the independent-samples t-test
    - B) As a non-parametric alternative to the paired t-test
    - C) To measure correlation between ordinal variables
    - D) To test for multicollinearity
    - **Answer: B**
19. **What is an effect size?**
    - A) A measure of the sample size required for a study
    - B) A measure of the strength of the relationship between variables
    - C) A significance level
    - D) A test statistic
    - **Answer: B**
20. **What does the Mann-Whitney U test assess?**
    - A) The difference between two paired groups
    - B) The difference between two independent groups when data is not normally distributed
    - C) The correlation between two variables
    - D) The homogeneity of variance
    - **Answer: B**

21. **What is the purpose of the Pearson correlation coefficient (r)?**
    - A) To test for differences between means
    - B) To measure the linear relationship between two continuous variables
    - C) To analyze variance between groups
    - D) To determine the direction of causation
    - **Answer: B**
22. **Which of the following best describes a Type I error?**
    - A) Failing to reject a false null hypothesis
    - B) Rejecting a true null hypothesis
    - C) Accepting a false null hypothesis
    - D) Finding a non-significant result when there is an effect
    - **Answer: B**
23. **What is the null hypothesis in an independent-samples t-test?**
    - A) The means of two related groups are equal
    - B) The means of two independent groups are equal
    - C) The means of more than two groups are equal
    - D) There is a relationship between two variables
    - **Answer: B**
24. **What does the Shapiro-Wilk test assess?**
    - A) Homogeneity of variance
    - B) Normality of the distribution
    - C) Correlation between variables
    - D) Independence of observations
    - **Answer: B**
25. **Which of the following tests would you use for a repeated-measures design with non-parametric data?**
    - A) Friedman Test
    - B) Independent-Samples t-test
    - C) Pearson Correlation
    - D) Two-Way ANOVA
    - **Answer: A**
26. **What is the key assumption for using Pearson's correlation?**
    - A) Data must be ordinal
    - B) Variables should have a monotonic relationship
    - C) Data should be normally distributed and continuous
    - D) Both variables should be dichotomous
    - **Answer: C**
27. **What is the significance of a confidence interval that does not overlap in hypothesis testing?**
    - A) Indicates that the sample sizes are equal
    - B) Suggests a statistically significant difference between group means
    - C) Suggests homogeneity of variance
    - D) Confirms normality of data
    - **Answer: B**
28. **What does a significant main effect in ANOVA indicate?**

- A) There is no difference among group means
- B) There is a significant difference in the means for one independent variable while ignoring other variables
- C) There is a significant difference between two specific groups
- D) The interaction effect is significant
- **Answer: B**

29. **Which of the following tests would be most appropriate for comparing two means from the same group at two different times?**
    - A) Independent-Samples t-test
    - B) Repeated-Measures ANOVA
    - C) Paired-Samples t-test
    - D) Chi-Square Test
    - **Answer: C**
30. **What is homoscedasticity in regression analysis?**
    - A) The assumption that residuals are normally distributed
    - B) The assumption that residuals have constant variance
    - C) The assumption that predictors are independent
    - D) The assumption that data points are uniformly distributed
    - **Answer: B**
31. **What does the term "degrees of freedom" refer to in statistics?**
    - A) The number of independent values that can vary in a statistical calculation
    - B) The total number of samples used
    - C) The variability between groups
    - D) The effect size
    - **Answer: A**
32. **What is the primary difference between a one-tailed and two-tailed t-test?**
    - A) A one-tailed test checks for difference in any direction, a two-tailed test only in one direction
    - B) A two-tailed test checks for differences in any direction, a one-tailed test checks in one direction
    - C) Both tests are the same in purpose but differ in sample size requirements
    - D) One-tailed test requires normal distribution, two-tailed does not
    - **Answer: B**
33. **What does an eta squared (η^2) value represent in ANOVA?**
    - A) The difference between group means
    - B) The variance explained by a factor
    - C) The effect size between two groups
    - D) The degree of multicollinearity
    - **Answer: B**
34. **Which of the following describes the "power" of a statistical test?**
    - A) The likelihood of finding a significant result regardless of sample size
    - B) The probability of rejecting a false null hypothesis
    - C) The ability to minimize Type I errors
    - D) The alpha level of the test
    - **Answer: B**

35. **When should the Phi-coefficient be used?**
    - A) When both variables are continuous
    - B) When both variables are ordinal
    - C) When both variables are dichotomous
    - D) When one variable is numerical and the other is ordinal
    - **Answer: C**
36. **What is the purpose of Tukey's HSD test in ANOVA?**
    - A) To test for homogeneity of variances
    - B) To compare all possible pairs of means to find significant differences
    - C) To replace ANOVA in case of violations of assumptions
    - D) To check for normality
    - **Answer: B**
37. **What does the p-value represent in hypothesis testing?**
    - A) The power of the test
    - B) The probability of observing the data assuming the null hypothesis is true
    - C) The effect size
    - D) The confidence interval
    - **Answer: B**
38. **What type of test is a chi-square test?**
    - A) A parametric test
    - B) A test for comparing means
    - C) A non-parametric test for testing associations between categorical variables
    - D) A regression test
    - **Answer: C**
39. **When is a two-tailed test appropriate?**
    - A) When predicting the direction of the effect
    - B) When no specific direction of the effect is predicted
    - C) When comparing the variances of two samples
    - D) When both variables are categorical
    - **Answer: B**
40. **What is the primary purpose of an independent-samples t-test?**
    - A) To compare the means of two related groups
    - B) To compare the means of two independent groups
    - C) To measure the correlation between two variables
    - D) To analyze variance between more than two groups
    - **Answer: B**
41. **What does a Cohen's d measure in a t-test?**
    - A) The difference between variances
    - B) The effect size of the difference between two means
    - C) The p-value of a hypothesis test
    - D) The standard error of the mean
    - **Answer: B**
42. **Which assumption must be met for using the repeated-measures ANOVA?**
    - A) Independence of samples
    - B) Sphericity

- C) Equal variances between groups
- D) Data is nominal
- **Answer: B**

43. **What is the main characteristic of a non-parametric test?**
    - A) It requires a normal distribution
    - B) It is used for small sample sizes only
    - C) It does not require assumptions about the data distribution
    - D) It can only be used for large sample sizes
    - **Answer: C**
44. **Which of the following is an example of a dichotomous variable?**
    - A) Age in years
    - B) Income level (Low, Medium, High)
    - C) Gender (Male, Female)
    - D) Test scores
    - **Answer: C**
45. **What is a Type II error in hypothesis testing?**
    - A) Accepting a true null hypothesis
    - B) Rejecting a false null hypothesis
    - C) Rejecting a true null hypothesis
    - D) Failing to reject a false null hypothesis
    - **Answer: D**

46. **What is the primary use of the Mann-Whitney U test?**
    - A) To test for differences between means of related groups
    - B) To test for differences between means of two independent groups when the data is not normally distributed
    - C) To assess linear regression models
    - D) To analyze the homogeneity of variances
    - **Answer: B**
47. **Which test is appropriate for comparing the means of three or more related groups?**
    - A) Independent-Samples t-test
    - B) One-Way ANOVA
    - C) Repeated-Measures ANOVA
    - D) Chi-Square Test
    - **Answer: C**
48. **What does a significant Levene's test indicate?**
    - A) The data are normally distributed
    - B) The variances across groups are not equal
    - C) The variances across groups are equal
    - D) There is a correlation between two variables
    - **Answer: B**
49. **Which of the following is an assumption of the two-way ANOVA?**
    - A) Normality of the data
    - B) Homoscedasticity
    - C) Equal variances within each group

- D) Independence of observations
- **Answer: D**

50. **What does a correlation coefficient of -0.8 signify?**
    - A) A strong positive correlation
    - B) A weak positive correlation
    - C) A strong negative correlation
    - D) No correlation
    - **Answer: C**
51. **What is the purpose of the Kolmogorov-Smirnov test?**
    - A) To compare means between two groups
    - B) To assess whether a sample comes from a population with a specific distribution
    - C) To measure correlation between variables
    - D) To test for homogeneity of variances
    - **Answer: B**
52. **Which of the following tests is used to examine the relationship between two dichotomous variables?**
    - A) Pearson Correlation
    - B) Spearman Correlation
    - C) Phi Coefficient
    - D) Point-Biserial Correlation
    - **Answer: C**
53. **What is the primary purpose of a confidence interval in statistics?**
    - A) To determine the sample size
    - B) To estimate the precision of a sample statistic in predicting the population parameter
    - C) To test the hypothesis
    - D) To measure the effect size
    - **Answer: B**
54. **What is the characteristic of a one-tailed hypothesis test?**
    - A) It tests for a difference in both directions
    - B) It tests for a difference in only one direction
    - C) It requires a larger sample size
    - D) It always uses an alpha level of 0.01
    - **Answer: B**
55. **What does a "significant difference" mean in the context of hypothesis testing?**
    - A) The observed difference is likely due to sampling error
    - B) The observed difference is unlikely to have occurred by chance alone
    - C) The null hypothesis is always true
    - D) There is no difference between groups
    - **Answer: B**
56. **Which test would you use to compare the medians of two independent groups when data is not normally distributed?**
    - A) Independent-Samples t-test
    - B) Wilcoxon Signed-Rank Test

- C) Mann-Whitney U Test
- D) Repeated-Measures ANOVA
- **Answer: C**

57. **What does the term "homogeneity of variance" refer to in ANOVA?**
    - A) Equal variances between groups
    - B) Different variances between groups
    - C) Equal sample sizes between groups
    - D) The normality of distributions
    - **Answer: A**
58. **What is a "null hypothesis"?**
    - A) A statement predicting a significant effect or relationship
    - B) A statement that there is no effect or relationship
    - C) A hypothesis that always gets rejected
    - D) A hypothesis that confirms the research hypothesis
    - **Answer: B**
59. **What does a confidence level of 95% mean?**
    - A) The probability that the true population parameter lies outside the confidence interval is 95%
    - B) The probability that the true population parameter lies within the confidence interval is 95%
    - C) The chance of Type I error is 95%
    - D) The study results are 95% significant
    - **Answer: B**
60. **Which correlation measure should be used for two ordinal variables?**
    - A) Pearson Correlation
    - B) Spearman Correlation
    - C) Phi Coefficient
    - D) Point-Biserial Correlation
    - **Answer: B**
61. **What does "effect size" measure in the context of hypothesis testing?**
    - A) The sample size
    - B) The significance level
    - C) The strength or magnitude of a phenomenon
    - D) The direction of a relationship
    - **Answer: C**
62. **What is the primary use of a two-tailed test?**
    - A) To check for a difference in only one direction
    - B) To check for any significant difference regardless of direction
    - C) To test the null hypothesis directly
    - D) To replace a chi-square test
    - **Answer: B**
63. **What does the F-test in ANOVA compare?**
    - A) Means within a group
    - B) Variances between two groups
    - C) Variances within and between groups

- D) Standard deviations of samples
- **Answer: C**

64. **When is the Kruskal-Wallis test used?**
    - A) When data is normally distributed
    - B) When comparing more than two groups with ordinal data
    - C) When testing for correlations
    - D) When checking for homogeneity of variances
    - **Answer: B**
65. **What is an "alternative hypothesis"?**
    - A) The hypothesis stating that there is no effect or relationship
    - B) The hypothesis that contradicts the null hypothesis
    - C) A hypothesis that is always true
    - D) A secondary hypothesis to consider
    - **Answer: B**
66. **What does the term "statistical significance" imply?**
    - A) The results occurred purely by chance
    - B) The results are likely to be due to a true effect rather than random chance
    - C) The study design was flawed
    - D) The null hypothesis cannot be rejected
    - **Answer: B**
67. **Which test is best for determining if there is a significant association between two categorical variables?**
    - A) Chi-Square Test
    - B) Independent-Samples t-test
    - C) Pearson Correlation
    - D) Paired-Samples t-test
    - **Answer: A**
68. **What is a "point estimate" in statistics?**
    - A) An interval estimate of a parameter
    - B) A single value given as an estimate of a population parameter
    - C) A measure of spread around a mean
    - D) The sum of squared deviations
    - **Answer: B**
69. **What is the standard error of the mean (SEM)?**
    - A) A measure of variability around a single observation
    - B) A measure of the accuracy of the sample mean as an estimate of the population mean
    - C) A measure of the correlation between two variables
    - D) The average deviation from the mean
    - **Answer: B**
70. **Which test would you use for testing the normality of a dataset?**
    - A) Shapiro-Wilk Test
    - B) Levene's Test
    - C) Mann-Whitney U Test
    - D) Spearman Correlation

- **Answer: A**

71. **What is the primary use of partial correlation?**
    - A) To measure the linear relationship between two variables without controlling for any other variables
    - B) To measure the relationship between two variables while controlling for the effect of a third variable
    - C) To compare the means of three or more groups
    - D) To assess the variance between variables
    - **Answer: B**
72. **What does "multicollinearity" refer to in regression analysis?**
    - A) High correlation between a dependent variable and an independent variable
    - B) High correlation among independent variables
    - C) No correlation between variables
    - D) The dependent variable does not change
    - **Answer: B**
73. **What is the main characteristic of ordinal data?**
    - A) Data with equal intervals between values
    - B) Data that can be ordered or ranked
    - C) Data with a natural zero point
    - D) Data that is continuous and normally distributed
    - **Answer: B**
74. **Which test is used to compare the variances of two groups?**
    - A) Chi-Square Test
    - B) F-Test
    - C) Kruskal-Wallis Test
    - D) Pearson Correlation
    - **Answer: B**
75. **What is a "critical value" in hypothesis testing?**
    - A) The point beyond which the null hypothesis is rejected
    - B) The sample mean
    - C) The calculated test statistic
    - D) The observed value
    - **Answer: A**
76. **What is the purpose of the coefficient of determination (R^2)?**
    - A) To test the null hypothesis
    - B) To measure the strength and direction of a linear relationship between two variables
    - C) To measure the proportion of the variance in the dependent variable that is predictable from the independent variable(s)
    - D) To calculate the standard deviation
    - **Answer: C**
77. **Which test assesses whether the residuals of a regression are normally distributed?**
    - A) Durbin-Watson Test
    - B) Shapiro-Wilk Test
    - C) Kolmogorov-Smirnov Test

- D) Levene's Test
- **Answer: B**

78. **What is a "two-way ANOVA" used for?**
    - A) To compare the means of two groups
    - B) To test the effect of one independent variable on one dependent variable
    - C) To examine the effects of two independent variables on one dependent variable, including their interaction
    - D) To assess correlations
    - **Answer: C**
79. **Which method is used to control for experiment-wise Type I error rate in ANOVA?**
    - A) Bonferroni Correction
    - B) Tukey's HSD
    - C) Levene's Test
    - D) Pearson Correlation
    - **Answer: A**
80. **What does "heteroscedasticity" mean in the context of regression analysis?**
    - A) Variance of residuals is constant
    - B) Variance of residuals differs across levels of an independent variable
    - C) The correlation between variables is strong
    - D) Residuals are normally distributed
    - **Answer: B**

81. **What does the term "sphericity" refer to in repeated-measures ANOVA?**
    - A) The normality of the dependent variable
    - B) The equality of variances of the differences between all possible pairs of groups
    - C) The correlation between dependent variables
    - D) The linear relationship between variables
    - **Answer: B**
82. **Which test is suitable for testing the association between two ordinal variables?**
    - A) Pearson Correlation
    - B) Chi-Square Test
    - C) Spearman Rank Correlation
    - D) Independent-Samples t-test
    - **Answer: C**
83. **What is the goal of the "least-squares" method in regression analysis?**
    - A) To minimize the sum of absolute errors
    - B) To maximize the correlation between variables
    - C) To minimize the sum of the squared differences between observed and predicted values
    - D) To test the normality of residuals
    - **Answer: C**
84. **What does a significant F-ratio in ANOVA indicate?**
    - A) All group means are equal
    - B) At least one group mean is significantly different from the others

- C) The variances within groups are equal
- D) The data is normally distributed
- **Answer: B**

85. **When should a Bonferroni correction be applied?**
    - A) When conducting a single hypothesis test
    - B) When performing multiple comparisons to control the Type I error rate
    - C) When analyzing the correlation between two variables
    - D) When the data is non-parametric
    - **Answer: B**
86. **What does "homogeneity of regression slopes" mean in ANCOVA?**
    - A) The assumption that regression slopes are equal across groups
    - B) The assumption that group means are equal
    - C) The assumption that data is normally distributed
    - D) The assumption that the residuals have constant variance
    - **Answer: A**
87. **Which test is appropriate for examining the difference in medians across multiple groups?**
    - A) Kruskal-Wallis Test
    - B) ANOVA
    - C) Independent-Samples t-test
    - D) Paired-Samples t-test
    - **Answer: A**
88. **What is "multivariate normality" in the context of multivariate analysis?**
    - A) All variables are normally distributed independently
    - B) The joint distribution of all variables follows a normal distribution
    - C) Each variable is binary
    - D) Each pair of variables has a linear relationship
    - **Answer: B**
89. **What is the purpose of Tukey's HSD post hoc test?**
    - A) To adjust for unequal sample sizes
    - B) To control for Type I error in multiple comparisons
    - C) To measure the homogeneity of variances
    - D) To calculate effect sizes
    - **Answer: B**
90. **What does a p-value of 0.03 indicate in hypothesis testing?**
    - A) There is a 3% probability that the null hypothesis is true
    - B) There is a 3% probability that the observed data occurred by random chance
    - C) The results are not statistically significant
    - D) The null hypothesis should always be accepted
    - **Answer: B**
91. **Which of the following is true for a "Type I error"?**
    - A) Failing to reject a true null hypothesis
    - B) Rejecting a true null hypothesis
    - C) Rejecting a false null hypothesis
    - D) Accepting a false null hypothesis

- **Answer: B**

92. **What is a "confidence interval" in statistical analysis?**
    - A) An interval within which the true population parameter is expected to lie with a certain level of confidence
    - B) A measure of variance between groups
    - C) The range of the dependent variable
    - D) A way to visualize the correlation between variables
    - **Answer: A**
93. **What does a significant main effect but no significant interaction effect in two-way ANOVA suggest?**
    - A) There is a combined effect of both independent variables on the dependent variable
    - B) Each independent variable has a significant impact on the dependent variable independently of the other
    - C) There is no significant difference between groups
    - D) The data is normally distributed
    - **Answer: B**
94. **Which statistical test should be used to analyze the difference in scores of the same group of individuals before and after an intervention?**
    - A) Independent-Samples t-test
    - B) Paired-Samples t-test
    - C) Chi-Square Test
    - D) Mann-Whitney U Test
    - **Answer: B**
95. **What does the term "standard deviation" measure?**
    - A) The mean of a dataset
    - B) The difference between the highest and lowest values
    - C) The average amount of variation or dispersion from the mean
    - D) The correlation between two variables
    - **Answer: C**
96. **What is the purpose of using an Analysis of Covariance (ANCOVA)?**
    - A) To compare group means while controlling for one or more covariates
    - B) To test for interactions between categorical variables
    - C) To calculate effect sizes for multiple groups
    - D) To assess normality in data
    - **Answer: A**
97. **What does "coefficient alpha" measure in psychometrics?**
    - A) The correlation between variables
    - B) The internal consistency reliability of a test
    - C) The effect size of an intervention
    - D) The mean difference between groups
    - **Answer: B**
98. **What is the interpretation of a 95% confidence interval that ranges from 2.1 to 5.3?**
    - A) There is a 95% chance that the true value is exactly 2.1
    - B) There is a 95% chance that the true value is between 2.1 and 5.3

- C) The study results are 95% significant
- D) The p-value is less than 0.05
- **Answer: B**

99. **When is a "mixed-design ANOVA" used?**
    - A) When comparing more than two independent groups
    - B) When analyzing repeated measures within the same group and comparing it to another group
    - C) When testing for homogeneity of variances
    - D) When all data is categorical
    - **Answer: B**

100. **What does the term "interaction effect" refer to in a two-way ANOVA?**

- A) The combined effect of two or more independent variables on the dependent variable that differs depending on the level of one of the variables
- B) The overall effect of one independent variable ignoring the other
- C) The effect of the dependent variable on the independent variable
- D) The correlation between two variables
- **Answer: A**

