



VINAYAKA MISSION'S RESEARCH FOUNDATION, SALEM
(Deemed to be University under section 3 of the UGC Act 1956)

Ph.D Entrance Test – November – 2025

Faculty of Physiotherapy

Instructions / Note:

1. Answer all the questions. Each question carries one mark.
2. No negative marks for wrong answers.
3. Read each question carefully and answer in the OMR sheet provided for each question with only blue/ black pen to fill the circles in the OMR Sheet.
4. Question number 1 - 35 questions belong to Research Methodology component and Question number 36-70 questions belong to the subject at PG level
5. Return the question paper along with the OMR sheet.

1. Which of the following best characterizes a well-formulated research problem in doctoral research?
 - A. It is broad enough to include multiple unrelated questions
 - B. It is specific, researchable, and grounded in theoretical and empirical gaps
 - C. It is based solely on the researcher's personal interest
 - D. It is limited to descriptive objectives without analytical depth
2. Which of the following statements best distinguishes basic research from applied research?
 - A. Basic research focuses on immediate practical outcomes, while applied research develops new theories.
 - B. Basic research aims to expand theoretical understanding, whereas applied research seeks to solve real-world problems using existing theory.
 - C. Both types of research ignore theoretical frameworks.
 - D. Applied research is less systematic than basic research.
3. In the structure of a research proposal, the framing of a hypothesis should _____
 - A. Be unrelated to the stated objectives
 - B. Be vague to allow flexibility in data interpretation
 - C. Be a precise, testable statement derived from theory and aligned with the research objectives
 - D. Replace the need for conceptual framework



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4. The primary purpose of a research design in a PhD study is to _____
- A. Provide a general idea of the topic without detailing methodology
 - B. Ensure logical, systematic, and valid procedures to answer the research questions
 - C. Replace data collection with theoretical discussion
 - D. Describe statistical tools without linking them to objectives
5. In doctoral-level research, the choice of a sampling frame is critical because _____
- A. It determines the validity and generalizability of the findings
 - B. It is unrelated to the target population
 - C. It only affects data collection costs
 - D. It ensures that sampling bias is intentionally included
6. In a PhD research study, the choice of data collection method should primarily be determined by _____
- A. The researcher's personal preference
 - B. Availability of time and funding only
 - C. The nature of the research problem, objectives, and type of data required
 - D. The popularity of the method in previous studies
7. In qualitative research, the most appropriate tool for collecting in-depth, contextual data is _____
- A. Closed-ended questionnaire
 - B. Focus group discussion or in-depth interview
 - C. Randomized control experiment
 - D. Online multiple-choice survey
8. Which of the following measures is least affected by extreme values in a dataset?
- A. Mean
 - B. Median
 - C. Range
 - D. Standard deviation
9. A p-value less than 0.05 in hypothesis testing indicates _____
- A. The null hypothesis is proven true
 - B. The observed result is likely due to chance
 - C. The observed data are unlikely under the null hypothesis, suggesting statistical significance
 - D. The alternative hypothesis is false



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10. A Type I error occurs when _____
- A. The null hypothesis is incorrectly rejected when it is true
 - B. The null hypothesis is not rejected when it is false
 - C. The sample size is too large
 - D. The test is underpowered
11. The interquartile range (IQR) is a measure of _____
- A. Central tendency
 - B. Dispersion
 - C. Shape of distribution
 - D. None of the above
12. Which of these is a parametric test?
- A. Mann-Whitney U test
 - B. Wilcoxon signed-rank test
 - C. Independent t-test
 - D. Kruskal-Wallis test
13. Non-parametric tests are preferred when _____
- A. The data are normally distributed
 - B. The sample size is extremely large
 - C. The data violate assumptions of parametric tests
 - D. You want to estimate means and variances
14. A 95% confidence interval (CI) for a mean difference that does *not* include 0 suggests _____
- A. No statistically significant difference
 - B. A statistically significant difference at ~5% level
 - C. That the p-value must be > 0.05
 - D. That the effect size is zero
15. Statistical power is the probability of _____
- A. Making a Type I error
 - B. Making a Type II error
 - C. Correctly rejecting the null when the alternative is true
 - D. Rejecting the alternative hypothesis
16. Type II error (β) means _____
- A. Rejecting the null when it is true
 - B. Failing to reject the null when the alternative is true
 - C. Rejecting the alternative when it is false
 - D. Accepting the null when it is true



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17. Which of the following statements is true regarding parametric vs non-parametric tests?
- A. Parametric tests always have less power than non-parametric tests
 - B. Non-parametric tests require the data to be normally distributed
 - C. Parametric tests make more assumptions and (when assumptions hold) often have greater power
 - D. Non-parametric tests can only test medians, never means
18. Specificity is _____
- A. $\text{True positives} \div (\text{true positives} + \text{false negatives})$
 - B. $\text{True negatives} \div (\text{true negatives} + \text{false positives})$
 - C. $\text{False negatives} \div (\text{false negatives} + \text{true positives})$
 - D. $\text{True positives} \div (\text{true positives} + \text{false positives})$
19. Negative predictive value (NPV) is _____
- A. $\text{True negatives} \div (\text{true negatives} + \text{false positives})$
 - B. $\text{True negatives} \div (\text{true negatives} + \text{false negatives})$
 - C. $\text{True positives} \div (\text{true positives} + \text{false negatives})$
 - D. $\text{False positives} \div (\text{false positives} + \text{true negatives})$
20. A very small p-value (e.g., $p < 0.001$) necessarily indicates _____
- A. A very large effect size
 - B. That the result is scientifically/practically important
 - C. That the null hypothesis is false
 - D. That the data are highly inconsistent with the null hypothesis model
21. The standard deviation (SD) of a dataset is _____
- A. A measure of central tendency
 - B. A measure of dispersion
 - C. The square of the variance
 - D. The same as the range
22. In inferential statistics, if the 95% CI for the difference between means is (-0.5, 1.2) _____
- A. The difference is statistically significant at 5% level
 - B. We can reject the null hypothesis of no difference at $\alpha=0.05$
 - C. We cannot reject the null hypothesis of no difference at $\alpha=0.05$
 - D. The effect size is zero



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23. An effect size of 0.8 (Cohen's d) is typically interpreted as _____
- A. Small
 - B. Medium
 - C. Large
 - D. Negligible
24. In designing a study you aim for $\beta = 0.20$ (i.e., 80% power). If you increase sample size (keeping effect size and α constant), the β will _____
- A. Increase
 - B. Decrease
 - C. Stay the same
 - D. Become equal to α
25. In data visualization, a *histogram* differs from a *bar chart* in that _____
- A. Both display categorical data
 - B. A histogram displays continuous data with adjacent bars, while a bar chart displays categorical data with separated bars
 - C. A histogram has gaps between bars
 - D. Both are used for frequency of nominal data
26. When interpreting research results, statistical significance should be complemented with ____
- A. Data entry speed
 - B. Theoretical relevance and effect size
 - C. Researcher intuition
 - D. Sample demographic details only
27. An *abstract* in a PhD thesis or journal manuscript should _____
- A. Contain detailed tables and figures
 - B. Include citations and references
 - C. Briefly summarize the research problem, objectives, methodology, key findings, and conclusions
 - D. Discuss limitations in depth
28. Which of the following correctly matches *citation styles* with their disciplines?
- A. APA – Engineering; IEEE – Social Sciences
 - B. MLA – Psychology; APA – Literature
 - C. APA – Psychology and Education; MLA – Humanities; IEEE – Engineering
 - D. Chicago – Medical Sciences; APA – History



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29. The *primary purpose* of regression analysis in research is to _____
- A. Describe relationships between categorical variables
 - B. Predict the value of a dependent variable based on one or more independent variables
 - C. Compare mean differences between groups
 - D. Rank variables according to importance
30. The *coefficient of determination* (R^2) in regression analysis indicates _____
- A. The proportion of total variation in the dependent variable explained by the independent variables
 - B. The mean of squared errors
 - C. The correlation between independent variables
 - D. The significance of the intercept
31. In correlation analysis, *Pearson's r* assumes that _____
- A. Data are ordinal and non-normal
 - B. Variables are continuous, normally distributed, and have a linear relationship
 - C. Data are categorical and non-parametric
 - D. There is no homoscedasticity
32. In ANOVA (Analysis of Variance), the F-statistic represents _____
- A. The ratio of within-group variance to between-group variance
 - B. The ratio of between-group variance to within-group variance
 - C. The sum of all mean squares
 - D. The difference between means directly
33. In exploratory factor analysis (EFA), the eigenvalue represents _____
- A. The degree of correlation between observed variables
 - B. The proportion of total variance explained by each factor
 - C. The mean score of a factor
 - D. The loading value of a variable
34. Reliability in research measurement primarily refers to _____
- A. The degree to which a test measures what it intends to measure
 - B. The consistency or stability of measurement across time and items
 - C. The theoretical foundation of a construct
 - D. The accuracy of data entry



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35. In Structural Equation Modeling (SEM), the measurement model _____
- A. Specifies the relationships among observed and latent variables
 - B. Tests only the correlation between two observed variables
 - C. Ignores latent constructs
 - D. Deals exclusively with mean comparisons

