



BRAINWARE UNIVERSITY

Term End Examination 2025-2026

Programme – B.Physiotherapy-2021/B.Physiotherapy-2022

Course Name – Biostatistics and Research Methodology

Course Code - BPTE803A

(Semester VIII)

Full Marks : 60

Time : 2:30 Hours

[The figure in the margin indicates full marks. Candidates are required to give their answers in their own words as far as practicable.]

Group-A

(Multiple Choice Type Question)

1 x 15=15

1. Choose the correct alternative from the following :

- (i) Select the property of the quantitative approach in research.
 - a) It is subjective and focuses on attitudes and opinions
 - b) It generates numerical data that can be analysed with formal methods
 - c) It focuses on understanding abstract concepts and theories
 - d) It requires open-ended interviews and projective techniques
- (ii) Select the meaning of sampling frame.
 - a) The list of statistical tools to be used in the study
 - b) A list of items in the population from which the sample will be drawn
 - c) A list of participants who have agreed to participate
 - d) The final report containing the results of the study
- (iii) A shopkeeper notices that in a week, 2 XL shirts, 15 L shirts, 10 M shirts and 3 S shirts are sold. Choose the measure of central tendency that he or she should use decide which size shirt is most frequently sold.
 - a) Mean
 - b) Mode
 - c) Median
 - d) None of these
- (iv) Choose the range of the dataset: 4,6,3,1,9,4,9,7,6.
 - a) 4
 - b) 8
 - c) 1
 - d) 9
- (v) If we reject the null hypothesis, we might be making _____. Select the correct option.
 - a) Only Type I error
 - b) Only correct decision
 - c) Both Type I error and Correct decision
 - d) None of these
- (vi) Choose the typical contents of a 'bibliography'.
 - a) A list of books, articles, and other resources referenced in the research
 - b) A summary of research findings
 - c) Graphs and charts for data analysis
 - d) A list of participants in the study
- (vii) Choose the primary role of a 'database management system' (DBMS) in research.

- a) To process data into a usable format
b) To store and retrieve research data efficiently
c) To create data visualizations
d) To encrypt research data for security
- (viii) Choose the true statement about population.
a) It is always small and easy to access
b) It includes every individual or item relevant to the study
c) It refers only to human subjects in research
d) It must be selected randomly
- (ix) Choose a potential disadvantage of convenience sampling.
a) It leads to a sample that is representative of the entire population
b) It is time-consuming and costly
c) It may introduce bias and not represent the population well
d) It can only be used in qualitative research
- (x) Choose the meaning of sampling error.
a) The difference between the sample statistics and the population parameters
b) The error made when selecting individuals for a sample
c) The error in the sampling frame
d) The error due to improper survey techniques
- (xi) Choose the meaning of "statistic" in statistics.
a) A value that describes a sample
b) A value that describes the entire population
c) A parameter that is calculated using census data
d) A random error
- (xii) Choose the scenario when t-distribution is most commonly used.
a) The population variance is known and the sample size is large
b) The sample size is large and the sample mean is close to the population mean
c) The population follows a uniform distribution
d) The sample size is small and the population variance is unknown
- (xiii) In sampling theory, the "law of large numbers" suggests that _____. Choose the correct option.
a) The sample mean will equal the population mean as the sample size increases
b) Small samples are sufficient for accurate inferences
c) Larger samples have less variability
d) The sampling error increases as the sample size increases
- (xiv) In a sampling distribution, the mean of the sample means is equal to _____. Choose the correct option.
a) The population median
b) The population mean
c) The standard error of the population
d) The sample variance
- (xv) Choose the primary use of chi-square distribution.
a) Estimating population parameters
b) Testing hypotheses about population proportions
c) Testing the goodness of fit or independence of categorical data
d) Comparing sample means

Group-B

(Short Answer Type Questions)

3 x 5=15

2. Describe the connection between statement of purpose and the objectives of a research problem in guiding research. (3)
3. Explain Chi-square statistic. (3)
4. Explain arithmetic mean. (3)
5. Explain why standard deviation is a more reliable measure of dispersion than range when analyzing muscle strength data using Excel in physiotherapy studies. (3)
6. Summarize one-sided hypothesis test. (3)

OR

Summarize the concept of p-value and significance level in testing of hypothesis. (3)

Group-C

(Long Answer Type Questions)

5 x 6=30

7. Explain the basic principles of research design. (5)
8. Consider the following scenarios: i) Studying the effect of a new fertilizer on plant growth ii) Testing the impact of different teaching methods on student performance iii) Testing the effectiveness of a new drug on reducing blood pressure Analyse the use of the principles of replication and randomization. (5)
9. Explain five differences between questionnaires and schedules. (5)
10. Explain the differences between a priori power analysis and post hoc power analysis in G*power. (5)
11. A fertilizer mixing machine is set to give 12 kg of nitrate for every quintal bag of fertilizer. Ten 100 kg bags are examined. The percentage of nitrate are: 14, 11, 13, 12, 13, 12, 13, 11, 13, 12. Justify if there is a reason to believe that the machine is defective. Critical value for t-distribution for 9 d.f. is 2.262. (5)
12. Summarize any five characteristics of a hypothesis. (5)

OR

In a study of women with knee osteoarthritis receiving exercise therapy, the mean mobility score for 76 patients is 70.7 with a standard deviation of 14.6. Test whether the population mean mobility score is below 75. Use $\alpha = 0.01$. Critical value is -2.638. (5)

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