REV-01
BPT/112/37/42

2025/06

SET C

BACHELOR OF PHYSIOTHERAPY
FOURTH SEMESTER
BIOSTATISTICS
BPT – 404

[USE OMR SHEET FOR OBJECTIVE PART]

Duration: 3 hrs. **Full Marks: 70**

Objective

Time: 30 min. **Marks: 20**

Choose the correct answer from the following: ***1×20=20***

1. The sum of the absolute deviations from the median is smallest when compared to:
   a. Mean
   b. Mode
   c. Range
   d. Standard deviation

2. The Chi-square test is used to:
   a. Compare means of two samples
   b. Test for correlation between two variables
   c. Test independence or goodness of fit in categorical data
   d. Predict the value of a dependent variable

3. Which of the following types of data is suitable for a Chi-square test?
   a. Ordinal data
   b. Interval data
   c. Nominal data
   d. Ratio data

4. The Chi-square test is a type of:
   a. Parametric test
   b. Non-parametric test
   c. One-tailed test only
   d. Regression test

5. Correlation does NOT imply:
   a. Association
   b. Direction
   c. Causation
   d. Relationship

6. The value of the correlation coefficient (r) lies between:
   a. 0 and 1
   b. -1 and + 1
   c. -100 and + 100
   d. 0 and ∞

7. Pearson's correlation coefficient is appropriate when:
   a. Variables are nominal
   b. The relationship is nonlinear
   c. The data is ordinal
   d. Both variables are interval/ratio and the relationship is linear

8. Which method is used to determine the rank correlation?
   a. Pearson's r
   b. Spearman's rho
   c. Chi-square test
   d. ANOVA

9. If the correlation coefficient is -0.9, it indicates:
   a. Strong negative linear relationship
   b. Weak positive linear relationship
   c. No relationship
   d. Strong nonlinear relationship

10. The mean of 10, 20, 30, 40, and 50 is:
    a. 20
    b. 30
    c. 40
    d. 50

11. The median of the dataset {3, 8, 2, 6, 7, 5, 9} is:
    a. 3.5
    b. 6
    c. 7.5
    d. None of these

12. The mode of {2, 4, 4, 6, 8, 6, 6, 10} is:
    a. 4
    b. 8
    c. 6
    d. 10

13. In a positively skewed distribution, which of the following is the correct order?
    a. Mean > Median > Mode
    b. Median > Mean > Mode
    c. Mode > Median > Mean
    d. Mean = Median = Mode

14. If all values in a dataset are the same, then which of the following is true?
    a. Mean = Median ≠ Mode
    b. Mean = Median = Mode
    c. Mean ≠ Median ≠ Mode
    d. Only the mean is defined

15. Which of the following measures of dispersion is least affected by extreme values?
    a. Range
    b. Variance
    c. Interquartile range
    d. Standard deviation

16. Which measure of dispersion gives a better understanding of the spread when the data are skewed?
    a. Range
    b. Interquartile range
    c. Standard deviation
    d. Variance

17. Which of the following is true for a dataset with a higher variance?
    a. Data values are closely clustered around the mean
    b. Data values are spread out from the mean
    c. There are no outliers
    d. Data has no variation

18. The coefficient of variation is calculated as:
    a. (Mean/Standard deviation) × 100
    b. (Standard deviation/Mean)×100
    c. (Median/Range) × 100
    d. (Variance/Mean) × 100

19. The weighted mean is used when:
    a. All observations have equal importance
    b. Some observations are more important than others
    c. Data is normally distributed
    d. There are outliers in the data set

20. Which measure of dispersion is most appropriate for nominal data?
    a. Range
    b. Standard deviation
    c. Variance
    d. None of these

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Descriptive

Time : 2 hrs. 30 min. **Marks : 50**

[Answer question no.1 & any four (4) from the rest]

1. What do you mean by Biostatistics? Discuss different application of biostatistics. **2+8=10**

2. **a.** Define different measures of central tendency. **6+2+2 =10**

   b. Which measure is the best Measure of central tendency and why?

   c. Find arithmetic mean of 10 first even numbers of natural number.

3. **a.** Discuss uses of median and mode **4+6=10**

   Find the Median height of the following frequency distribution table along with the cumulative frequencies are given below:

Class Intervals	Frequency	Cumulative Frequency
135- 140	4	4
140 – 145	7	11
145 – 150	18	29
150 – 155	11	40
155 – 160	6	46
160 – 165	5	51

4. **a.** What do you mean by dispersion of data? **2+5+3 =10**

b. Define three absolute measures of dispersion.

c. Distinguish between Absolute and Relative measures of dispersions.

5. **a.** Define three relative measures of dispersion. **5+5=10**

b. A physiotherapist measures the **range of motion (in degrees)** for two groups of patients undergoing different rehabilitation treatments for knee injuries. Group A received **manual therapy**, while Group B received **exercise therapy**. The physiotherapist recorded the range of motion for 10 patients in each group.

Group A (Manual Therapy): 95, 100, 97, 102, 98, 101, 99, 103, 96, 100

Group B (Exercise Therapy): 90, 92, 89, 95, 93, 91, 94, 90, 88, 92

Calculate the coefficient of variation for both groups and determine which group shows greater variability in range of motion after treatment.

6. Define and classify variables with suitable examples. Distinguish between quantitative and qualitative variables and explain their subtypes—discrete, continuous, nominal, and ordinal. Use at least two examples for each subtype and explain why they belong to that category. **3+7=10**

7. **a.** Differentiate between positive and negative correlation using appropriate examples. Illustrate how these can be identified using a scatter diagram. **5+5=10**

b. Using Karl Pearson's Coefficient of Correlation method, calculate and interpret the degree of correlation between the following two variables:

X: 16, 20, 24, 28, 32

Y: 30, 40, 25, 35, 45

8. **a.** What is categorical variable? **10**

b. Define Chi-square statistics.

c. Discuss different application of Ch-square test.

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