# BB.Pharm Even Semester Examination, May, 2025

## PHARMACEUTICAL SCIENCES

(8th Semester)

**Course No: BP-801T**

*(Biostatistics and Research Methodology)*

FM: 75

Time: 3 Hours

*The figures in the right margin indicate full marks for the question*

**I. A Multiple Choice Questions 1x10=10**

1. Which of the following is an example of self-plagiarism in pharmaceutical research?

   a) Using another researcher's data without citation

   b) Copying an article without permission

   c) Republishing one's own previous research as a new study

   d) Paraphrasing a competitor's study

2. When determining the average potency of a batch of antibiotics, which measure of central tendency is most affected by extreme values?

   a) Mean b) Median

   c) Mode d) Standard deviation

3. A correlation coefficient (r) of +0.9 between tablet hardness and disintegration time means ____

   a) Perfect positive correlation

   b) Strong positive correlation

   c) Strong negative correlation

   d) No correlation

4. Type I error occurs when:

   a) Null hypothesis is false and is not rejected

   b) Null hypothesis is true and is rejected

   c) Alternative hypothesis is false and rejected

   d) Alternative hypothesis is true and accepted

5. The degrees of freedom for a paired t-test with n = 12 pairs is:

   a) 24 b) 11

   c) 10 d) 12

6. In one-way ANOVA, the source of variation includes ___

   a) Between groups only

   b) Within groups only

   c) Both between and within groups

   d) Interaction terms

7. What is the null hypothesis in a two-sample t-test?

   a) The means of two populations are equal



9. Determine the mode of the given dataset.A pharmacokinetic study was conducted to measure the peak plasma concentration (Cmax in ng/mL) of a newly formulated drug. The results obtained from a sample of patients are given below:

| Plasma concentration | 50 | 55 | 60 | 65 | 70 | 75 | 80 | 85 | 90 | 95 |
|---|---|---|---|---|---|---|---|---|---|---|
| No of patients (f) | 5 | 10 | 23 | 25 | 28 | 35 | 40 | 24 | 14 | 8 |

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**II. Long answers (Answer two out of three questions) 10x2=20**

1. A pharmaceutical scientist measured the dissolution times (in minutes) for a new tablet formulation: 35, 40, 42, 38, 41, 44, 39, 36, 47, 46, 43, 49, 37, 34, 46. Compute the Mean, Standard Deviation and Coefficient of Variation. (2+5+3)

2. What is research. What is the need of research. Discuss the types of research. (2+3+5)

3. Explain different types of hypothesis. Explain type I and type II errors, level of significance and P value. (4+2+2+2)

**III Short answers (Answer seven out of nine questions) 5x7=35**

1. Explain correlation, types of correlation and its applications. (3+2)

2. Discuss the applications of SPSS and MINITAB in data analysis. (2+3)

3. Explain ANOVA and its applications.

4. Write note on plagiarism.

5. Give an account on graphical presentation of data.

6. Explain about the report writing.

7. Explain the types of clinical study design.

8. A state has 1000 pharma companies and average 1 factory has closed during 1 year. If there will be 2000 pharma companies, then what will be the probability of 5 company will be closed?



b) Variances are equal

c) Medians are equal

d) Distributions are skewed

8. What is the minimum number of groups required for the Kruskal-Wallis test?

a) 1 b) 2

c) 3 d) 4

9. Wilcoxon Rank Sum Test compares:

a) Medians of related groups

b) Means of independent groups

c) Sum of ranks between two groups

d) Standard deviations of related samples

10. Normal distribution is also known as

a) Bell-shaped curve

b) U-distribution

c) Poisson curve

d) Discrete distribution

**I. B. Objective type 2x5=10**

1. Define Range with an example.

2. List the different Measures of Central Tendency.

3. Define Sample Size Determination.

4. Define standard error of mean.

5. List the different phases of clinical trials.