

**BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(END SEMESTER EXAMINATION)**

**CLASS: B.PHARM.
BRANCH: PHARMACY**

**SEMESTER: VIII
SESSION: SP 2025**

SUBJECT: BP801T BIOSTATISTICS & RESEARCH METHODOLOGY

TIME: 3.00 Hours

FULL MARK: 75

INSTRUCTIONS:

1. The missing data, if any, may be assumed suitably.
2. Before attempting the question paper, be sure that you have got the correct question paper.
3. Tables/Data hand book/Graph paper etc. to be supplied to the candidates in the examination hall.
4. This question paper consists of (03) three parts. Read the part wise instructions before attempting the questions.

PART-I

Objective types questions (Instruction: Answer all questions)

Q1. (10 x 2 = 20 Marks)

- A. What do you mean by ANOVA?
- B. Define exhaustive event in probability?
- C. "Median is a positional average, and it does not depend upon the extreme values." Justify the statement with a suitable example.
- D. What do you mean by Median?
- E. Define Standard Deviation.
- F. Differentiate applied and fundamental research.
- G. Where and how simple randomization technique can be used?
- H. Differentiate between Parametric Testing & Nonparameteric Testing
- I. Write about the following:
 - a. Statistical Power of study
 - b. Power of Study
- J. Write the formula for Sample size.

PART-II

Short Answers

(Instruction: Answer seven out of nine questions)

(7 x 5 = 35 Marks)

- Q2. A bag contains 3 red, 6 white and 7 blue balls. What is the probability that two balls are white and blue?
- Q3. If a coin is tossed 5 times, using binomial distribution find the probability of:
(a) Exactly 2 heads
(b) At least 4 heads.
- Q4. Twenty people were attacked by a disease and only 18 survived. Will you reject that the survival rate, if attacked by this disease is 85% in favour of the hypothesis that it is more at 5% level. (Use Large sample test). Z at 5% level of significance = 1.645.

Q5. Calculate the mean for the following frequency distribution:

Class-interval	0 - 8	8 - 16	16 - 24	24 - 32	32 - 40	40 - 48
Frequency	8	7	16	24	15	7

- Q6. Explain the significance of the research. Elaborate on the criteria of good research.
- Q7. Briefly discuss different steps of the research process.
- Q8. a. From a sample of 50 pieces of mechanical component, sample mean is found to be 30 with an average diameter of approx. 28cm and SD is found from the sample to be 0.25cm. Test the hypothesis that the mean is average diameter of the mechanical component is atleast 27cm.
b. A random sample of 400 members is found to have a mean of 4cm. Can it be reasonably regarded as a sample from a large population whose mean is 5.5cm and variance of 4.
- Q9. a. A random sample of size 40 from a normal population gives a sample mean of 4.2 and sample standard deviation of 6. Test the hypothesis that the population mean is 4.4
b. A BP measuring instrument claims that it can measure upto 300mmHg. In 100 trials, the obtained measuring ability of measuring BP is upto 250mmHg, with a SD of 20. Is the claim justified?

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- Q10. a. A random sample of 60 items of fruits gives a mean of 6.2 and variance 10.24. Can it be regarded as drawn from a normal population with mean 5. Use 1% level of significance
- b. A sample of 64 glass rods is taken from a manufacturer under a new process and tested their bearing strength. The mean breaking strength of the sample is found to be 47.8 lbs and standard deviation is 10lbs. Test the claim that the average breaking strength of the rod is atleast 50lbs. Use 5% LOS

PART-III

Long Answers

(Instruction: Answer two out of three questions)

(2 x 10 = 20 marks)

- Q11. Variance is not independent of change of scale. Justify the statement with suitable equation.
- Q12. Discuss how blinding in clinical research helps in removing bias. Explain different techniques of blinding and the process of assessing the efficacy of blinding.

Q13. Answer the following:

- a. Write the formula for Wilcoxon rank sum test
- b. Write the formula for Kruskal-Wallis Test
- c. A group of students from the same class are studying in two different section A & B. 6 students from section A and 8 students from section B are given a test. The marks obtained by them are given below:

Section A	Section B
50	67
75	63
88	89
54	88
63	74
35	63
	78
	78

Test the hypothesis that the average marks of both the samples are equal using Rank sum test.

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