



End Term (Even) Semester Examination May-June 2025

Roll no.....

Name of the Program and semester: **B.Pharm. VIII Sem**
Name of the Course: **Biostatistics & Research Methodology**
Course Code: **BP 801T**
Time: **3-hour**

Maximum Marks: 75

Note:

- (i) This question paper contains three sections
- (ii) All the sections are compulsory
- (iii) All questions should cover COs of the course as per syllabus coverage.

Section-A

MULTIPLE CHOICE QUESTION

20 X 1 = 20 MARKS

S.N.	CONTENTS	
1.	Biostatistics refers to.....: a) Analysis of Data b) Interpretation of Data c) Representation of Data d) Collection, Analysis, Interpretation & Representation of Data	CO-1
2.	If 5 pharmacists recorded the number of cough syrups dispensed as 10, 15, 15, 20, and 30, what is the median a) 15 b) 20 c) 10 d) 30	
3.	Which measure of dispersion tells how much data values deviate from the mean? a) Median b) Mode c) Standard Deviation d) Frequency	
4.	Karl Pearson's correlation coefficient ranges between: a) 0 and 100 b) -1 and +1 c) -10 and +10 d) 1 and 10	
5.	In a pharmaceutical study, which regression model would you use to predict tablet dissolution based on multiple excipients? a) Simple linear regression b) Multiple regression c) Binomial regression d) Exponential regression	CO-2
6.	One-way ANOVA is suitable when: a) Comparing the effect of a drug at different times b) Testing the difference in the same group c) Comparing more than two drug formulations d) Evaluating a single dose response	



End Term (Even) Semester Examination May-June 2025

7.	The null hypothesis in a drug efficacy test assumes that: a) The drug is effective b) The drug has no effect c) The patients will improve d) Side effects are present	
8.	In a clinical trial with fewer than 30 subjects, which type of sample is it? a) Large sample b) Small sample c) Population d) Infinite sample	
9.	Which test is the non-parametric alternative to the independent t-test? a) Kruskal-Wallis test b) Mann-Whitney U test c) Friedman test d) ANOVA	CO-3
10.	Research design is important because it: a) Increases plagiarism b) Creates confusion c) Provides a structured plan to answer research questions d) Reduces sample size unnecessarily	
11.	A histogram is best used to represent: a) Categorical data b) Discrete frequency data c) Continuous frequency distribution d) Pie chart distribution	
12.	Cohort studies are mainly characterized by: a) Randomization b) Following a group over time to observe outcomes c) Conducting laboratory experiments d) Simulating results on a computer	
13.	WHO guidelines for herbal drug evaluation primarily focus on: a) Marketing strategies b) Quality, safety, and efficacy c) Cost analysis d) Branding	CO-4
14.	Stability testing of herbal drugs is conducted to check: a) Market demand b) Color and flavour only c) Shelf life and chemical consistency over time d) Packaging design	
15.	In industrial clinical trial design, why is software-like DESIGN OF EXPERIMENTS (DOE) crucial? a) It automates the trial completely b) It helps in systematic planning and analysis to identify significant factors c) It replaces human decision making d) It is only used for marketing purposes	
16.	If the results showed that the p-value for binder concentration is < 0.05 , what is the correct interpretation?	



End Term (Even) Semester Examination May-June 2025

	<ul style="list-style-type: none"> a) Binder concentration does not influence tablet hardness b) Binder concentration significantly influences tablet hardness c) Binder concentration should be removed from the model d) Compression force is more important 	
17.	What is a historical design in RSM? <ul style="list-style-type: none"> a) A design based on pre-existing or past experimental data b) A design used in history research only c) A method using only center points d) A randomized design for clinical trials 	
18.	In the context of pharmaceutical formulations, RSM is best used when: <ul style="list-style-type: none"> a) Only main effects are of interest b) You expect nonlinear relationships between formulation variables and response c) You need to minimize experimental runs d) You do not need to consider interactions 	
19.	In a 2^2 factorial design, how many experimental runs are needed (excluding replicates)? <ul style="list-style-type: none"> a) 2 b) 4 c) 6 d) 8 	CO-5
20.	Which of the following tools helps visualize interactions in factorial experiments? <ul style="list-style-type: none"> a) Scatter plot b) Contour plot c) Box plot d) Line graph 	

Section B

Short Questions: Attempt any seven questions.

7x5 = 35 marks

SN	QUESTIONS	CO's
1.	Elucidate the Mean, Median & Mode of the Daily Production of Tablets in pharmaceutical Firm. Please mention Results and interpretation with labelling of each parameter? Daily Production: 430, 360, 515, 480, 395, 512	CO 1
2.	State the relevance in details of Karl Pearson Coefficient, Standard Deviation associated with Clinical Data?	CO 1
3.	Elaborate the terms with pharmaceutical examples (i) sampling, (ii) Null Hypothesis, (iii) Alternative Hypothesis, (iv) Error-I & (v) Error-II type?	CO2
4.	Patient ID Iron Supplement Diet Type Hemoglobin Level (g/dL) P1 Oral Normal Diet 10.2 P2 Oral Normal Diet 10.5 P3 Oral Iron-Rich Diet 11.8 P4 Oral Iron-Rich Diet 12.1 P5 IV Normal Diet 11.0 P6 IV Normal Diet 10.7 P7 IV Iron-Rich Diet 12.4 P8 IV Iron-Rich Diet 13.1 P9 Oral Iron-Rich Diet 11.9 P10 IV Normal Diet 11.2	CO 2



End Term (Even) Semester Examination May-June 2025

	In above Data, The effect of iron supplement type on hemoglobin levels, The effect of diet type, Any interaction between the supplement and diet through Two Way ANOVA.	
5.	Explain in brief with Flow diagram (i) Mann-Whitney U Test (ii) Cross Sectional Studies	CO 3
6.	For acquiring funding of 25 Lakh, the students need to design a Research Project based on Enumeration of Cancer prevalence in Clement town?	CO 3
7.	Explain the Design of Experiments to understand the prevalence of Anemic patients, using 2^k factorial. Herein $k=8$?	CO 4
8.	A clinical researcher needs statistical tool for 25K. Enumerate 5 different types of statistical tools in tabular representation and identify which tool is better to procure?	CO4
9.	Illustrate in brief about optimization techniques required in pharmaceutical techniques?	CO 5

Section C

Long questions: Attempt any two questions

2x10 = 20 marks

SN	QUESTIONS							CO's
1	Number of students	A	B	C	D	E	F	CO1
	Biostatistics (X)	90	75	68	85	57	75	
	Pharmacology (Y)	82	74	67	79	58	72	
	In a class 6 students got marks in Biostats & pharmacology, Calculate the Arithmetic Mean, Mode & Karl Pearson Coefficient and identify the level of correlation? Clearly mention the Results and Conclusion?							
2	A pharmaceutical company wants to compare the effectiveness of three different formulations of a drug on reducing blood pressure. Data from clinical trials is collected for all three groups. Which parametric test is most appropriate to analyze this data and why? If the test reveals a significant difference, how would you determine which formulation is most effective using Least Significant Difference (LSD)? Discuss the assumptions that must be met to perform this test.							CO2
3	Elucidate in brief about Various terms: (i) Cohorts Studies (ii) Observational Studies (iii) Double Blind Studies (iv) Sample Size calculation (v) ANOVA (One & Two way)?							CO3