UPES
End Semester Examination, May 2023
Course: Biostatistics and Research Methodology
Semester : VIII
Program: B. Pharma   Duration : 03 Hours
Course Code: BP801T   Max. Marks: 75

Instructions: Attempt all questions.

SECTION A
(20Qx1M=20 Marks)

S. No.		Marks	COs
Q 1	We must arrange the data before calculating: a. Mean b. Median c. Mode **d.** Standard deviation	**1**	**CO1**
Q 2	The sum of squares of deviations about mean is: a. Zero b. Maximum c. Minimum d. All of the above	**1**	**CO1**
Q 3	Which distribution can be used if number of trials is infinitely large: (a) Poisson distribution (b) Normal Distribution (c) Bernoulli distribution (d) Binomial distribution	**1**	**CO3**
Q 4	Calculate the variance of a frequency distribution if the standard deviation is 16.	**1**	**CO2**
Q 5	Define degree of freedom and level of significance.	**1**	**CO3**
Q 6	Calculate the coefficient of correlation, if the regression coefficient of y on x is (1.14) and regression coefficient of x on y is (0.71).	**1**	**CO2**
Q 7	Find range and coefficient of range from the data below: Lowest blood pressure is 120 and highest blood pressure is 148	**1**	**CO2**
Q 8	For a Binomial distribution, find q if mean is 7 and variance is 11	**1**	**CO3**
Q 9	Mention two differences between mean deviation and standard deviation	**1**	**CO3**
Q 10	Write the steps to create one way ANOVA table on Excel.	**1**	**CO3**

Q 11	Give name of software used for factorial design of experiment.	1	CO4
Q 12	What is independent variable?	1	CO4
Q 13	Why is randomization done in experiments?	1	CO4
Q 14	What is null hypothesis?	1	CO4
Q 15	What is standard deviation?	1	CO4
Q 16	In observational studies no treatment is done. (True/False)	1	CO5
Q 17	What are various phases of clinical trials.	1	CO5
Q 18	Define sample.	1	CO5
Q 19	Define experimental studies.	1	CO5
Q 20	SPSS is used for population data analysis. (True/False)	1	CO5

SECTION B (20 Marks)
(2Qx10M=20 Marks)

Attempt 2 Question out of 3

Q 1	Three types of antibiotics were used in curing a disease. It was experimented on three groups of patients in three cities. Can you conclude that at 5% level of significance whether the averages of different varieties of antibiotics show any significant difference in curing the disease?	10	CO3

A	B	C
20	18	25
21	20	28
23	17	22
16	25	28
20	15	32

(Tabulated $F_{0.05}$ for $(2, 12)$ degree of freedom is 3.88)

Q2.	Discuss Factorial Designs in details using 2X2 factorial design as Example	10	CO4

Q3.	If probability of recovery for severe PEM with infection is 0.4 and 5 children are with severe PEM infection. Find out the probability that: **(a)** Five will recover **(b)** Four will recover **(c)** Four or more will recover	10	CO3

SECTION-C (35 Marks)
(7Qx5M=35 Marks)

Attempt 7 Question out of 9

Q 1	In a trivariate distribution $$\sigma_1 = 3, \sigma_2 = 4, \sigma_3 = 5, r_{23} = 0.4, r_{13} = 0.6, r_{12} = 0.7$$ Determine the regression equation of x_1 on x_2 and x_3 if the variated are measured from their means.	5	CO2

Q 2	Find if there is any significant correlation between the heights and weights given below:	5	CO2

Height (in inches)	57	59	62	63	64	65	55	58	57
Weight (in lbs.)	113	117	126	126	130	129	111	116	112

Q 3	Calculate the mean deviation about mean and its coefficient of protein intake of 400 families.	5	CO1

Protein intake/consumption unit/day	15-25	25-35	35-45	45-55	55-65	65-75	75-85
No. of families	30	40	100	110	80	30	10

Q 4	Find the median for the following data:	5	CO1

Weight of student (lbs.)	90-100	100-110	110-120	120-130	130-140	140-150	150-160	160-170
No. of students	10	37	65	80	51	35	18	4

Q 5	Two types of drugs were used on 5 *and* 7 patients for reducing their weight. Drug A was imported and drug B indigenous. The decrease in the weight after using the drugs for six months was as follows:	5	CO3

Drug A	10	12	13	11	14	-	-
Drug B	8	9	12	14	15	10	9

Is there a significant difference in the efficacy of two drugs? If not, which drug should you buy? Use the values below and apply $'t'$ test for the analysis.
$n_1 = 5, n_2 = 7, \sum x = 60, \sum y = 77, \sum(x - \bar{x})^2 = 10, \sum(y - \bar{y})^2 = 44,$
(**Tabulated $t_{0.05}$ for 10 degree of freedom is 2.223**)

Q 6	What is randomization? Discuss in detail the role of randomization in statistics.	5	CO4
Q 7	Discuss in detail about observational studies.	5	CO4
Q 8	Write a note on confounding and blocking of the experiments	5	CO5
Q 9	Write a note on factorial designing	5	CO6