Name:

Enrolment No:

UPES

End Semester Examination, May 2023

Course: Biostatistical Methods in Clinical Research **Semester: IV**

Program: Int. B. Sc- MSc Clinical Research **Time: 03 hrs.**

Course Code: HSCR2022 **Max. Marks: 100**

SECTION A
(5Qx4M=20Marks)

	Instructions: All questions are compulsory.	**Marks**	**CO**
Q 1	Mean of 100 items is found to be 30. If at the time of calculation two items are wrongly taken as 32 *and* 12 instead of 23 *and* 11, find the correct mean.	**4**	**CO2**
Q 2	Evaluate coefficient of variation with the help of following values: $n = 10, \quad \bar{x} = 61, \quad \sum (x - \bar{x})^2 = 526$	**4**	**CO2**
Q 3	Define the following: **a.** Null hypothesis **b.** Alternate hypothesis **c.** Level of significance **d.** Degree of freedom	**4**	**CO4**
Q 4	From the following frequency distribution, compute the value of harmonic mean. Marks: 10, 20, 25, 40, 50 No. of students: 20, 30, 50, 15, 5	**4**	**CO1**
Q 5	Use appropriate example to define the following: **a.** Positive and Negative correlation **b.** Simple and multiple correlation **c.** Partial and total correlation **d.** Linear and non-linear correlation **e.** Rank correlation	**4**	**CO3**

SECTION B
(4Qx10M= 40 Marks)

	Section B contains 4 questions. Q9 has internal choice	**Marks**	**CO**
Q 6	Obtain the regression lines of y *on* x and x *on* y from the following data and estimate the blood pressure (BP) when the age (in years) is 50. Hence find the coefficient of correlation. Age: 56, 42, 72, 36, 63, 47, 55, 49, 38, 42, 63, 60 BP: 147, 125, 160, 118, 149, 128, 150, 145, 115, 140, 152, 155	**10**	**CO3**
Q 7	Following are the scores of ten students in a class and their IQ: Students: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10 Scores: 35, 40, 25, 55, 85, 90, 65, 55, 45, 50 I.Q.: 100, 100, 110, 140, 150, 130, 100, 120, 140, 110 Calculate Spearman's coefficient of rank correlation.	**10**	**CO3**

Q 8 Apply step deviation method to calculate the standard deviation from the data recorded on the number of pods per plant in moth bean.

No. of pods per plant	15-17	18-20	21-23	24-26	27-29	30-32	33-35	36-38	39-41	42-44
No. of plants	2	2	4	5	7	9	6	4	3	2

10 **CO2**

Q 9 Represent the following data by a pie-diagram showing family budget of two families:

Items of expenditure	**Family A**	**Family B**
Food	1800	2200
Clothing	800	1200
House Rent	1200	2100
Fuel and Electricity	800	1000
Miscellaneous	400	500
Total	**5000**	**7000**

10 **CO1**

OR

Find the missing frequency in the following distribution if N is 100 and median is 30.

Marks	0-10	10-20	20-30	30-40	40-50	50-60	Total
No. of Students	10	?	25	30	?	10	100

SECTION-C
(2Qx20M=40 Marks)

Section C contains 2 questions. Q11 has internal choice | **Marks** | **CO**

Q 10 The following table gives the figures of monthly drop in acidity level and chlorine concentration in lake water. Apply two-way classification of analysis of variance and interpret your results.

Chlorine Concentration	Acidity level			
	Low	Medium	High	Very High
Low	22	19	9	7
Medium	11	11	8	4
High	9	10	6	4

Tabulated values: $F_{(2,6)} = 5.14$ *and* $F_{(3,6)} = 4.76$ at 5% level of significance.

20 **CO4**

Q 11

A tobacco company claims that there is no relationship between smoking and lung ailments. To investigate the claims random sample of 300 males in the age group of 40 to 50 is given medical test. The observed sample results are tabulated below:

	No. of patients favorable	Not favorable	Total
Smokers	75	105	180
Non-Smokers	25	95	120
Total	100	200	300

Based on this information, can it be concluded that smoking and lung ailments are independent?
(Given that table value of $\chi^2_{0.05}\ for\ 1\ d.f\ is\ 3.841$)

OR

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

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.

(Tabulated $t_{0.05}\ for\ 10\ d.f\ is\ 2.223$)

20

CO4