PANJAB UNIVERSITY

FUNDAMENTAL OF MATHEMATICAL STATISTICS

(BCA 1ST SEMESTER)

Maximum Marks: 65

<u>Note: -</u> Attempt <u>five</u> questions in all, including Question No. 9 (Section E) which is compulsory and selecting one question each from Section A-D.

2022: -

SECTION – A

1. a) Define Statistics. How do you think that knowledge of statistics is essential in decision making? Give example.   6
    b) The mean age of a group of 50 students is 15 years and the mean age of another group of 70 students is 20 yrs. Find the mean age of all the 120 students together.   7

2. a) Define tabulation of data and its objectives. Also write advantages and disadvantages of tabulation.   6
    b) Explain the use of harmonic mean as an average. Given the following frequency distribution of first year students of a particular college, calculate the harmonic mean.   7

Age	13	14	15	16	17
No. of students	2	5	13	7	3

SECTION – B

3. a) Calculate the value of x and y from the following data. Given the median of the distribution is 28.5 and total students are 60.   6

Marks	0-10	10-20	20-30	30-40	40-50	50-60
No. of Students	5	x	20	15	y	5

b) Calculate Standard deviation and coefficient of variation of the following data: 7

Items	10	12	14	16	18	20	22
Frequency	4	6	10	15	9	4	2

4. **a)** Define various absolute measures of dispersion. 6

b) Find out median and mode for the following data: 7

Classes	10-20	20-30	30-40	40-50	50-60	60-70	70-80
Frequency	4	8	10	12	10	4	2

SECTION – C

5. **a)** Define Concurrent Deviation method of correlation. Calculate coefficient of concurrent deviation for the following data: 6

Price	25	28	30	23	35	38	39	42
Demand	35	34	35	30	29	38	26	23

b) Following are the marks obtained by eight students in two subjects as given below:

Students	Marks	
	Computer	Statistics
1	46	55
2	65	54
3	86	77
4	69	75
5	75	66
6	48	55
7	70	60
8	68	52

Calculate Spearman's rank correlation coefficients. 7

6. **a)** What is meant by coefficient of correlation between two variables? Also distinguish between positive correlation and negative correlation. 6

b) Calculate Karl Pearson's coefficient of correlation between X and Y:

X	7	4	6	9	3	8
Y	8	5	4	8	3	6

7

SECTION – D

7. a) What is do you mean by regression? Why are these two regression lines in a bivariate series? Can there be one regression line?	**6**
   b) The two regression equations, Regression equation of X on Y is $10x - 2y = 4$ and regression equation of Y on X is $2y - 5x = 8$. Find $\bar{x},\ \bar{y}$ and coefficient of correlation.	**7**

8. For the following data:
   a) Calculate two regression equations.
   b) Estimate the value of x when y = 30
   c) Determine the correlation coefficient using regression coefficients.	**13**

X	10	14	16	24	26
Y	5	6	7	9	13

SECTION – E

(Compulsory questions)

9. Answer the following questions:
   a) Define probable error.	**2**
   b) Mention any two limitations of regression analysis.	**2**
   c) Define variance.	**2**
   d) Define the term frequency density.	**2**
   e) Write merits and demerits of range.	**2**
   f) If the sum and difference of upper and lower quartiles are 55 and 11 respectively, find the coefficient of quartile deviation.	**3**