(for 2022 onwards)

(FOR THE CANDIDATES ADMITTED IN DURING THE ACADEMIC YEARS 2022 ONLY)

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22PMS2N1

N.G.M.COLLEGE (AUTONOMOUS) : POLLACHI

END-OF-SEMESTER EXAMINATIONS : MAY 2023

M. Sc., PHYSICS & M.COM., SEMESTER II

MAXIMUM MARKS: 100

TIME : 2 HOURS

PART - IV

22PMS2N1 – NME-MATHEMATICAL STATISTICS AND TECHNIQUES

SECTION - A (5 X 5 = 25 MARKS)

ANSWER ANY FIVE OF THE FOLLOWING QUESTIONS. (K1 & K2)

1. The following data gives the monthly income of 10 employees in an office, calculate the arithmetic mean:
   Income(Rs): 14,780 15,760 26,690 27,750 24,840 24,920 16,100 17,810 27,050 26,950.
2. From the following data, find the median:

Income (Rs.)	15,000	15,500	16,800	18,000	18,500	17,800
No. of persons	24	26	16	20	6	30

3. Calculate Karl Pearson's coefficient of correlation from the following data:

Case	A	B	C	D	E	F	G	H
X_1	10	6	9	10	12	13	11	9
X_2	9	4	6	9	11	13	8	4

4. The ranking of 10 students in two subjects A and B are as follows:

A	6	5	3	10	2	4	9	7	8	1
B	3	8	4	9	1	6	10	7	5	2

   Find the rank correlation coefficient.

5. The following table shows the ages (X) and blood pressure (Y) of 8 persons:

X	52	63	45	36	72	65	47	25
Y	62	53	51	25	79	43	60	33

   Obtain the regression equation of Y on X and find the expected blood pressure of a person who is 49 years old.

6. In a sample of 500 people from a village in Rajasthan, 280 are found to be rice eaters and the rest wheat eaters. Can we assume that both the food are equally popular? S. E. (1% level) is 2.58.

7. In a hospital, 480 female and 520 male babies were born in a week. Do these figures confirm the hypothesis that males and females are born in equal number? 1.96 S.E. at 5% level is given.

8. In a sample of 8 observations, the sum of squared deviations of items from the mean was 84.4. In another sample of 10 observations, the value was found to be 102.6. Test whether the difference is significant at 5% level. Given that at 5% level, table value of F for v_1=7 and v_2=9 degrees of freedom is 3.29 and for v_1=8 and v_2=10 degrees of freedom is 3.07.

SECTION – B (5 X 15 = 75 MARKS)

ANSWER EITHER (a) OR (b) IN EACH OF THE FOLLOWING QUESTIONS.

(K3), (K4 (Or) K5)

9. a) Calculate mean, median and standard deviation from the following data:

Wages (Rs. '000)	0-10	10-20	20-30	30-40	40-50	50-60
No. of workers	12	17	23	39	16	03

(OR)

b) Two brands of tyres are tested with the following results:

Life	20-25	25-30	30-35	35-40	40-45
Brand A	1	22	64	10	3
Brand B	0	24	76	0	0

(i) Which brand of tyres have greater average life? (ii) Compare the variability and state which brand of tyres would you use on your fleet of trucks?

10. a) Calculate Karl Pearson's coefficient of correlation from the following data:

Roll No. of Students	1	2	3	4	5
Marks in Accountancy	48	35	17	23	47
Marks in Statistics	45	20	40	25	45

(OR)

b) Ten competitors in a beauty contest are ranked by three judges in the following order:

1st judge	1	6	5	10	3	2	4	9	7	8
2nd judge	3	5	8	4	7	10	2	1	6	9
3rd judge	6	4	9	8	1	2	3	10	5	7

Use the rank correlation coefficient to determine which pair of judges has the nearest approach to common tastes in beauty.

11. a) In a correlation study the following values are obtained :

	X		Y
Mean	65		67
S.D.	2.5		3.5
C.V.		0.8	

Find the two regression equations.

(OR)

b) In a partially destroyed laboratory record of an analysis of correlation data, the following results only are legible: Variance of X = 9, Regression equations are $8X - 10Y + 66 = 0$, $40X - 18Y - 214 = 0$. Find (i) The mean values of X and Y (ii) Coefficient of correlation between X and Y (iii) Standard deviation of Y.

12.a) A random sample of size 16 has 53 as mean. The sum of the squares of the deviations taken from mean is 135. Can this sample be regarded as taken from the population having 56 as mean? Obtain 95% and 99% confidence limits of the mean of the population. (for v=15, $t_{0.05}$=2.13 for v=15, $t_{0.01}$=2.95)

(OR)

b) The life time of electric bulbs for a random sample of 10 from a large consignment gave the following data:

Item	1	2	3	4	5	6	7	8	9	10
Life in '000 hrs	4.2	4.6	3.9	4.1	5.2	3.8	3.9	4.3	4.4	5.6

Can we accept the hypothesis that the average life time of bulbs is 4000 hrs. For v=9, $t_{0.05}$=2.262.

13.a) From the following data, would you conclude that owner cultivators are more inclined towards the use of fertilizers at 5% level? Carry out Chi-square test as per testing procedure.

	Owned	Rented	Total
Using fertilizers	416	184	600
Not using fertilizers	64	336	400
Total	480	520	1000

(Given for degree of freedom = 1, chi-square 5% = 3.84.)

(OR)

b) The following data present the yields in quintals of common ten subdivisions of equal area of two agricultural plots:

Plot 1	6.2	5.7	6.5	6.0	6.3	5.8	5.7	6.0	6.0	5.8
Plot 2	5.6	5.9	5.6	5.7	5.8	5.7	6.0	5.5	5.7	5.5

Test whether two samples taken from two random populations have the same variance. (5% point of F for for v_1=9 and v_2=9 degrees of freedom is 3.18.

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