MCOM 2004

M.Com. DEGREE EXAMINATION, JANUARY 2021.

Second Year/Non – Semester

Commerce

STATISTICAL ANALYSIS

Time : Three hours Maximum : 100 marks

PART A — (5 × 8 = 40 marks)

Answer any FIVE questions.

1. Define classification and explain the various ways of classification adopted in Statistics.

2. Briefly explain the merits and demerits of sampling methods.

3. A bag contains 17 counters marked with the numbers 1 to 17. A counter is drawn and replaced, second drawing is then made. What is the probability that:

   (a) The first number drawn is even and the second odd?

   (b) The first number is odd and the second even?

   How will your results in

   (i) and (ii) be affected if the first counter drawn is not replaced.

4. Calculate the correlation coefficient between the height of father (X) and son (Y) from the data given below:

X in inches :	64	65	66	67	68	69	70
Y in inches :	66	67	65	68	70	68	72

5. A machinist is making engine parts with axle diameter of 0.700 inch. A random sample of 10 parts shows a mean diameter of 0.742 inch with a standard deviation of 0.040 inch. Compute the statistic you would use to test whether the work is meeting the specification. Also state how you would proceed further.

6. Below are given the gain in weights (in lbs.) of pigs fed on two diets A and B. Gain in weight.

   Diet A: 25, 32, 30, 34, 24, 14, 32, 24, 30, 31, 35, 25

   Diet B: 44, 34, 22, 10, 47, 31, 40, 30, 32, 35, 18, 21,35, 29, 22

   Test if the two diets differ significantly as regards their effect on increase in weight.

7. 15,000 random numbers were taken from some logarithm table and the following frequencies of each digit were obtained?

Digit	0	1	2	3	4	5
Frequency	1493	1441	1461	1552	1494	1454

Digit	6	7	8	9
Frequency	1613	1491	1482	1519

Use the x^3 – test to access the correctness of the hypothesis that each digit had an equal chance of being chosen.

8. Use the sign test to see I there is a difference between the number of days required to collect an account receivable before and after a new collection policy. You may assume 0.05 level if significance.

Before	33	36	41	32	39	47	34	29
After	35	29	38	34	37	47	36	32

Before	32	34	40	42	33	36	27
After	30	34	41	38	37	35	28

PART B — (5 × 12 = 60 marks)

Answer any FIVE questions.

9. Calculate Bowley's coefficient of skewness for the following data:

Marks	Below 10	10–20	20–30	30–40
No. of students	10	20	30	50

Marks	40–50	50–60
No. of students	40	30

10. Calculate

(a) Mean

(b) Median and

(c) Mode

Marks below	10	20	30	40	50
No. of students	3	8	17	20	22

11. A company has two plants to manufacture scoters. Plants I manufacture 80% of the scooters oand plant II manufacture 20%. At plant I, 85 out of 100 scooters are rated standard quality or better At Plant II, only 65 out of 100 scooters are rated standard quality or better. What is the probability that the scooter selected at random came from Plant I if it is known that the scooter is of standard quality?

12. Ages of 10 husbands and their wives are given below. Calculate two regression lines and find the age of husband, when wife's age is 30. Further calculate the age of wife when husband's age is 25.

Husbands age	22	23	23	24	26	27	27	28	30	30
Wives age	18	20	21	20	21	22	23	24	25	26

13. Samples of two types of electric light bulbs were tested for length of life and following data were obtained:

	Type I	Type II
Sample no.	$n_1 = 8$	$n_2 = 7$
Sample means	$\bar{x}_1 = 1{,}234$ hrs.	$\bar{x}_2 = 1{,}036$ hrs.
Sample S.D.	$s_1 = 36$ hrs.	$s_2 = 40$ hrs.

Is the difference in the means sufficient to warrant that type I is superior to type II regarding length of life?

14. Performance scores of 16 salesman before and after training are given below:

Scores before training	85	76	64	59	72	68	43	54
Scores after training	82	79	68	52	75	69	40	53
Scores before training	57	61	71	82	39	51	54	57
Scores after training	50	67	74	83	54	59	51	58

At 51% level of significance, test the hypothesis, using Wilcox on test, that the training has not caused any change in the performance score.

15. Three machines are used in the packaging of 10 kg. of wheat flour. Each machine is designed so as to pack on an average 10 kg. of flour per bag. Samples of six bags were selected from each machine and the amount of wheat packaged in each is shown below:

Machine 1	15.8	15.9	16.2	15.7	16.3	15.8
Machine 2	16.5	16.0	15.4	15.9	16.2	16.1
Machine 3	15.7	16.4	16.2	15.9	15.7	16.3

Use a 5% level of significance to test the hypothesis that the amount of wheat packaged by the three machines is the same.

16. Two independent samples of 8 and 7 items respectively had the following values of the variables.

Sample I	9	11	13	11	15	9	12	14
Sample II	10	12	10	14	9	8	10	–

Do the estimates of population variance differ significantly?