

M.Com. Semester—I
STATISTICAL ANALYSIS FOR BUSINESS
Paper—MC-102

Time Allowed—3 Hours] [Maximum Marks—60

SECTION—A

Note :—Attempt any 10 parts. Each part carries 2 marks.

1. (i) Differentiate Null and Alternate Hypothesis.
- (ii) Differentiate between Type I and Type II error.
- (iii) What is Poisson distribution ? What are its features ?
- (iv) Differentiate between Primary data and Secondary data.
- (v) What is meant by the term "Standard Error" ?
- (vi) What do you mean by Conditional Probability ?
- (vii) What do you mean by Pilot Study ?
- (viii) Distinguish between biased and unbiased errors.
- (ix) What are the assumptions of t test ?

(x) Discuss the features of a good questionnaire.

(xi) Define Systematic Random Sampling.

(xii) Distinguish between dependent and independent events.

SECTION—B

Note :—Attempt any two questions. Each question carries 10 marks.

2. "Sampling is a necessity under certain conditions". Illustrate with the help of suitable examples. Also discuss the well known methods of sampling.
3. On what criteria should secondary data be evaluated ? What are the problems which a researcher can face while finding relevant material for research when searching databases ? What could be the possible reasons for that ?
4. (a) The probabilities of solving a problem by three students A, B, C and $\frac{2}{7}$, $\frac{3}{8}$ and $\frac{1}{2}$ respectively. If all of them try independently, find the probability that the problem will be solved. Also find the probability that the problem will not be solved.

(b) From a sales force of 150 persons, one will be selected to attend a special sales meeting. If 52 of them are unmarried, 72 are college graduates, and $\frac{3}{4}$ of the 52 that are unmarried are college graduates. Find the probability that the sales person selected at random will be neither single nor a college graduate. 5,5

5. (a) A manufacturer who produces medicine bottles, finds that 0.1 percent of the bottles are defective. The bottles are packed in boxes containing 500 bottles. A drug manufacturer buys 100 boxes from the producer of bottles. Using Poisson distribution, find how many boxes will contain :

- (i) no defective
- (ii) at least two defectives.

(b) The internal recruitment board of a company wants to recruit new employees. Before recruitment, the company recruitment board examines different categories of qualification of its employees. The

table given below indicates the four categories of qualification and the gender of the employees.

	Male	Female	Total
Matriculates	110	80	190
Graduates	60	80	140
Postgraduates	40	50	90
PhDs	10	15	25
Total	220	225	445

If an employee of the company is selected at random :

- (i) What is the probability that he is a male or a graduate ?
- (ii) What is the probability that she is a female or a Postgraduate ?
- (iii) What is the probability that the employee is a matriculate or a graduate ?
- (iv) What is the probability that the employee is a postgraduate or a Ph.D. ? 5,5

SECTION—C

Note :—Attempt any **two** questions. Each question carries **10** marks.

6. Explain the Phases of designing a questionnaire with the help of a hypothetical example.
7. A business group is interested in starting a college in the western region of the country. The group took a random sample of the 1542 school students from four different schools located in the same region and ascertained their willingness to join three different colleges : college 1, college 2 and college 3. Data collected are provided in the following table.

Table : School students' responses towards joining three different colleges :

Colleges Schools	Colleges		
	College 1	College 2	College 3
School 1	120	125	127
School 2	139	100	95
School 3	165	168	98
School 4	180	105	120

Use χ^2 test of homogeneity to draw inferences from the data.

8. Following data relates to a survey regarding the incomes and savings of 100 school teachers in a certain city. From the data given below calculate the Coefficient of Correlation :

Weekly Income (In Rs.)	Saving (In Rs.)				Total
	500	1000	1500	2000	
4000	8	4	-	-	12
6000	-	12	24	6	42
8000	-	9	7	2	18
10000	-	-	10	5	15
12000	-	-	9	4	13
Total	8	25	50	17	100

9. (a) In a college, there are two streams, Science and Commerce. The college management wants to find out that there is a significant difference between the proportion of average students (students between toppers and lowers) of two streams or not. Therefore, the management conducts a survey and finds out that 350 students out of 500 students of the Science stream are under the category of average students.

In case of Commerce stream, 550 students out of 600 students are under the category of average students. Use 5% level of significance.

- (b) A CFL manufacturing company supplies its products to various retailers across the country. The company claims that the average life of its CFL is 24 months. The company has received complaints from retailers that the average life of its CFL is not 24 months. For verifying the complaints, the company took a random sample of 60 CFLs and found that the average life of the CFLs is 23 months. Assume that the population standard deviation is 5 months. Use $\alpha = 0.05$ to test whether the average life of a CFL in the population is 24 months. 5,5