(i) Printed Pages: 4 Roll No. .....

(ii) Questions : 10 Sub. Code : 3802

Exam. Code : 0501

Master of Commerce 1st Semester

(2122)

QUANTITATIVE METHODS FOR BUSINESS

(Same for USOL Candidates)

Paper : M.C-102

Time Allowed : Three Hours] **[Maximum Marks : 80**

Note :—Attempt **five** questions in all, selecting at least **one** question from each Unit.

UNIT–I

1. (a) A husband and wife appear in an interview for two vacancies for the same post. The probability of husband's selection is $\frac{1}{7}$ and that of wife's selection is $\frac{1}{5}$. What is the probability that :

(i) At least one of them will be selected ?

(ii) Both of them will be selected ?

(b) Four cards are drawn with and without replacement. What is the probability that they are all aces ?

2×8=16

2. (a) What do you mean by Poisson Distribution ? Give examples where it can be applied. Also discuss its main properties.

(b) Assuming that sex ratio of male children is $\frac{1}{2}$. Find the probability that in a family of 5 children :

(i) All children will be of same sex.

(ii) Three of them will be boys and two girls.

2×8=16

3. (a) The wage distribution of the workers in a factory is normal with mean Rs. 400 and standard deviation Rs. 50. If the wages of 40 workers be less than Rs. 350. What is the total number of workers in the factory ?

(Table value of Z at 1 is 0.3413)

(b) In a normal distribution, 31% of the items are under 45 and 8% are over 64. Find mean and standard deviation of the distribution.

(Table value of Z at 0.19 is 0.5 and at 0.42 is 1.41)

2×8=16

UNIT–II

4. (a) Explain, with illustrations, the concept of :

(i) Point Estimation

(ii) Interval Estimation.

(b) Explain the terms :

(i) Level of significance

(ii) Critical region

(iii) Power of a test

(iv) Standard error. 2×8=16

5. (a) Explain the procedure followed in testing of Hypothesis. Point out difference between one tailed and two tailed tests.

(b) Explain the Central Limit Theorem and is usefulness.

12+4=16

6. (a) In a hospital, 480 female and 520 male babies were born in a week. Do these figures confirm the hypothesis that male and female are born in equal number ? Assume $\alpha = 0.01$.

(Table value of $Z_{0.01}$ is 2.58)

(b) A machine produced 20 defective articles in a batch of 500. After overhauling, it produced 3 defective articles in a batch of 100. Has the machine improved ? Assume $\alpha = 0.05$.

(Table value of $Z_{0.05}$ is 1.645) 8+8=16

UNIT–III

7. (a) 10 students are selected at random from a college and their marks in Statistics are found to be :

71	72	73	75	76	77	78	79	79	80

In the light of the marks, test whether, the average marks in Statistics of the college are 75. (The table value of t at 5% for V = 9 is 2.262).

(b) Test the significance of the difference of means of the two samples at 5% level of significance from the following data :

	No. of items	Mean	SD
Sample A	6	40	8.0
Sample B	5	50	10.0

(The table value of t for 9 df at 5% is 2.26)

8+8=16

8. Perform a two-way ANOVA on the data given below :

Plots of Land	Treatment			
	A	B	C	D
P	45	40	38	37
Q	43	41	45	38
R	39	39	41	41

Use Coding method, subtracting 40 from the given numbers. (The table value of F for (3, 6) df at 5% is 4.76 and for (2, 6) at 5% is 5.14). 16

UNIT–IV

9. (a) Explain clearly the basis and working of control charts for mean and range. Also state the assumptions on which mean and range charts are developed.

(b) Calculate the control limit for mean chart and range chart and determine whether the process is in control or not :

Sample No.	1	2	3	4	5	6	7	8	9	10
Mean	11.2	11.8	11.6	10.8	11	9.6	10.4	9.6	10.6	10
Range	7	4	8	5	7	4	8	4	7	9

8+8=16

10. (a) Explain the following terms in the context of SQC :

(i) Specification limits

(ii) Tolerance limits

(iii) Control limits.

(b) What is Quality Control ? Discuss its need and utility in Industry. 12+4=16