Paper–M.C.–102 : QUANTITATIVE METHODS FOR BUSINESS

(Same for USOL Candidates)

Time Allowed : 3 Hrs. **Maximum Marks : 80**

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

UNIT–I

1. (a) State and prove the addition theorem of probability for any two events A and B. Rewrite the theorem when A and B are mutually exclusive.

   (b) State and prove Bayes' theorem of probability. 16

2. (a) A student is to match three historical events (Gandhi's birth, India's freedom and First World War) with three years 1947, 1914 and 1869. If he guesses, with no knowledge of the correct answers. Obtain the probability distribution of the number of answers he gets correctly.

   (b) A coin is tossed six times. What is the probability of obtaining four or more heads ? 16

3. (a) A manufacturer of blades knows that 5% of his product is defective. If he sells blades in boxes of 100, and guarantees that not more than 10 blades will be defective, what is the probability (approximately) that a box will fail to meet the guaranteed quality?

   (b) Give the salient features of a normal distribution. Write its probability function. 16

UNIT–II

4. (a) What do you mean by Sampling ? Briefly explain various methods of sampling.

   (b) A population consists of 4 members 0, 4, 6 and 6. Draw all possible sample of size 2 drawn with replacement. Find the sampling distribution of Sample mean. Hence find the mean and variance of the sample mean. 16

5. A random sample of 700 units from a large consignment showed that 200 were damaged. Find (i) 95% and (ii) 99% confidence limits for the proportion of damaged units in the consignment. 16

6. Explain the terms :

   (a) Level of significance

   (b) Critical values

   (c) Acceptance and Rejection Regions

   (d) One-tailed and two-tailed tests. 16

UNIT–III

7. (a) An investigation of the relative merits of two kinds of flashlight batteries showed that a random sample of 100 batteries of brand A lasted on the average 36.5 hours with a standard deviation of 1.8 hours, while a random sample of 80 batteries of brand B lasted on the average 36.8 hours with a standard deviation of 1.5 hours. Use a level of significance of 0.05 to test whether the observed difference between the average life times is significant.

   (b) Outline the procedure for large sample tests and discuss their theoretical basis. 16

8. (a) A group of seven-week-old chickens reared on a high protein diet weigh 12, 15, 11, 16, 14, 14 and 16 ounces; a second group of five chickens similarly treated except that they receive a low protein diet weigh 8, 10, 14, 10 and 13 ounces. Test whether there is significant evidence that additional protein has increased the weight of the chickens.

   (b) Explain the meaning and concept of "Analysis of Variance" 16

UNIT–IV

9. (a) A daily sample of 30 times was taken over a period of 14 days in order to establish attributes control limits. If 21 defectives were found, what should be the upper and lower control limits of the proportion of the defectives ?

   (b) Explain clearly the basis and working of control charts for mean and range. State the assumptions on which mean and R charts are developed. 16

10. (a) Discuss the construction of p-chart when all samples are of same size. How is the procedure modified for variable sample size ?

    (b) Explain, how decisions are taken under uncertainty using probabilities. 16