Exam. Code : 103204

Subject Code : 1148

B.A./B.Sc. 4th Semester

QUANTITATIVE TECHNIQUES—IV

Time Allowed—3 Hours]   [Maximum Marks—100

Note :— Attempt **FIVE** questions in all. Question No. 1 is compulsory and attempt **ONE** question from each of **four** units.

1.   (i)   Distinguish between linear and non-linear regression.

     (ii)   Explain Gompertz curve.

     (iii)   Define probability mass function.

     (iv)   What is characteristic function ?

     (v)   Define random variable.

     (vi)   Define Poisson distribution.

     (vii)   What is Gamma distribution ?

     (viii)   The following statement cannot be true, why ?

         "The mean of a binomial distribution is 4 and its S.D. is 3."

     (ix)   What is a standard error ?

     (x)   What do you mean by population ? $10 \times 2 = 20$

UNIT—I

2.   (a)   Is it possible to get the following from a set of experimental data :

$$r_{23} = 0.7, \; r_{31} = -0.4, \; r_{12} = 0.6$$

     (b)   In a trivariate distribution :

$$r_{12} = 0.8, \; r_{13} = 0.6, \; r_{23} = 0.5$$
$$\sigma_. = 10, \; \sigma_2 = 8, \; \sigma_3 = 5$$

     Determine the regression equation of x_1 on x_2 and x_3 if the variates are measured from their means.   10,10

3.   (a)   Discuss the shapes and characteristics of a logistic curve.

     (b)   Fit a modified exponential curve to the following data :

Year	1981	1982	1983	1984	1985	1986
Income (Rs. Thousands)	100	125	175	225	325	375

     10,10

UNIT—II

4.   (a)   A speaks truth in 60 per cent cases and B in 70 per cent cases. In what percentage of cases are likely to contradict each other in stating the same fact ?

     (b)   A box A contains 1 red and 2 white marbles and another box B contains 3 red and 2 white marbles. One marbles is drawn at random from one of the boxes and it is found to be red. Find the probability that it was drawn from box B.   10,10

5. (a) Calculate the expected value of X, the sum of the scores when two dice are rolled.

   (b) Define moments and explain how moments are helpful in determining the shape of a particular frequency distribution. 10,10

UNIT—III

6. Derive the main properties of Beta distribution. 20

7. (a) Show that mean and variance are equal in case of Poisson distribution.

   (b) Define normal distribution and discuss its main properties. 10,10

UNIT—IV

8. (a) Discuss the main features of a good sample.

   (b) Discuss the relative merits of census and sample method of data collection. 10,10

9. (a) A population consists of the numbers 2, 3, 6, 8 and 11. Enumerate all possible random samples of size two which can be drawn from the population without replacement.

   (b) Explain the stratified random sampling and state when it is used. 10,10