Exam. Code : 103204
Subject Code : 1115

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

QUANTITATIVE TECHNIQUES—IV

Time Allowed—2 Hours] [Maximum Marks—100

Note :— There are ***eight*** questions of equal marks. Candidates are required to attempt any ***four*** questions.

1. The following data relates to three variables X_1, X_2 and X_3; obtain the equation of the plane of regression of X_1 on X_2 and X_3. Also estimate value of X_1 when $X_2 = 15$ and $X_3 = 30$:

X_1	4	6	7	9	13	15
X_2	15	12	8	6	4	3
X_3	30	24	20	14	10	4

2. (a) Differentiate between partial and multiple correlation coefficients.

   (b) Discuss the procedure to estimate modified exponential curve.

   (c) Fit exponential curve of type $y = ab^x$ to the following data :

x	1	2	3	4	5
y	1.6	4.5	13.8	40.2	125.0

3. (a) Define probability. Also explain laws of addition and multiplication.

   (b) A problem in statistics is given to three students A, B and C whose chances of solving it are 1/3, 1/4 and 1/5 respectively. Find the probability that the problem will be solved if they all try independently.

4. (a) Define random variable. What is probability density function ?

   (b) An unbiased coin is tossed 3 times. If a random variable 'X' is defined as number of heads; then find probability mass function of X.

   (c) What do you mean by mathematical expectation ? Also discuss some important properties of mathematical expectation.

5. Define a binomial variate with parameters n and p and obtain its probability function. Also derive important properties of binomial distribution.

6. What is normal distribution ? Draw a rough sketch of its probability density function. Also derive its moment generating function.

7. (a) Distinguish between population and sample. Also discuss important features of a good sample.

   (b) Write a note on the concept of standard error of estimates.

8. Distinguish between random and subjective sampling. What is simple random sampling ? Discuss its merits and limitations.