

**Exam. Code : 103204**

**Subject Code : 1118**

**B.A./B.Sc. 4<sup>th</sup> Semester**

**QUANTITATIVE TECHNIQUES—IV**

Time Allowed—Three Hours] [Maximum Marks—100

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

1. (i) Distinguish between multiple and partial correlation coefficient.
- (ii) Explain Gompertz curve.
- (iii) Define multiple regression.
- (iv) Explain the term probability mass function.
- (v) Define moment generating function.
- (vi) Define a discrete random variable.
- (vii) The following statement cannot be true, why ?  
“The mean of the binomial distribution is 4 and its S.D. is 3”.
- (viii) Define Beta distribution.
- (ix) Define standard error of estimates.
- (x) What is non-random sampling ?  $10 \times 2 = 20$

## UNIT—I

2. The table shows the corresponding values of three variables  $X_1$ ,  $X_2$  and  $X_3$ . Find the least square regression of  $X_3$  on  $X_1$  and  $X_2$  :

$X_1$	:	3	5	6	8	12	14	
$X_2$	:	16	10	7	4	3	2	
$X_3$	:	90	72	54	42	30	12	20

3. (a) Discuss the shapes and characteristics of a logistic curve.
- (b) The sales of a company in lakhs of rupees for the years 1997 to 2003 are given below :

<b>Year</b>	:	1997	1998	1999	2000
<b>Sales</b>	:	32	47	65	92
<b>Year</b>	:	2001	2002	2003	
<b>Sales</b>	:	132	190	275	

Fit an exponential trend  $y = ab^x$  and estimate the value for 2004. 10,10

## UNIT—II

4. (a) There are 4 boys and 2 girls in room A and 5 boys and 3 girls in room B. A girl from one of the two rooms laughed loudly. What is the probability that the girl who laughed was from B ?

- (b) A can hit a target 3 times in 5 shots, B, 2 times in 5 shots and C, 3 times in 4 shots. They fire a volley. What is the probability of hitting 2 shots ? 10,10
5. (a) Define characteristic function and its properties.  
(b) What is the expectation of the number of failures preceding the first success in an infinite series of independent trials with constant probability 'P' of success in each trial ? 10,10

### UNIT—III

6. Derive the main properties of Gamma distribution. 20
7. (a) Show that mean and variance are equal in case of Poisson distribution.  
(b) Derive two main properties of normal distribution. 10,10

### UNIT—IV

8. (a) What is standard error and discuss its utility.  
(b) Explain the features of a good sample. 10,10
9. Distinguish between a population and a sample. Discuss methods of drawing random sample from a finite population. 20