Bachelor of Science (B.Sc.I.T.) Semester—III (C.B.S.) Examination

STATISTICAL METHODS

Paper—VI

Time : Three Hours] [Maximum Marks : 50

Note :— (1) **All** questions are compulsory and carry equal marks.
(2) Assume suitable data wherever necessary.

EITHER

1. (a) How is census and sample investigation used in Statistics ? Explain. 5

(b) Define Statistics and explain its importance. 5

OR

(c) Define tabulation and give its characteristics and objects. 5

(d) Discuss the different sources for collecting primary data. 5

EITHER

2. (a) Define Geometric mean. Derive the formula $G = \text{Antilog}\left(\frac{1}{N}\sum_{i=1}^{n} f_i \log x_i\right)$ for the geometric mean of frequency distribution :

$x : x_1, x_2, \ldots\ldots, x_n$

$f : f_1, f_2, \ldots\ldots, f_n$. 5

(b) The distribution of 100 families according to their expenditure per week is given below :

Expenditure :	0 – 10	10 – 20	20 – 30	30 – 40	40 – 50
Number of families :	14	?	27	?	15

The median and mode of the distribution are 25 and 24 respectively. Calculate the missing frequencies. 5

OR

(c) What is frequency curve ? Explain its types. 5

(d) Calculate the mean for the following frequency distribution :

Class-interval :	0 – 8	8 – 16	16 – 24	24 – 32	32 – 40	40 – 48
Frequency :	8	7	16	24	15	7

5

EITHER

3. (a) What do you mean by dispersion ? Explain the measures of dispersion. 5

(b) What is Kurtosis ? Explain its importance. 5

OR

(c) Find the mean and standard deviation of the following series :

Expenditure	No. of students
Below Rs. 5	6
Below Rs. 10	16
Below Rs. 15	28
Below Rs. 20	38
Below Rs. 25	46

5

(d) Calculate the first four moments of the following distribution about the mean and hence find β_1 and β_2 :

x :	0	1	2	3	4	5	6	7	8
f :	1	8	28	56	70	56	28	8	1

5

EITHER

4. (a) Prove that the correlation coefficient is independent of change of origin and scale . 5

(b) Obtain the regression equation of Y on X for the following distribution :

$$f(x, y) = \frac{Y}{(1+x)^4} \exp\left(-\frac{Y}{1+x}\right); \; x, y \geq 0 .$$ 5

OR

(c) Calculate the correlation coefficient between the heights of father (X) and of the sons (Y) from the following data :

X :	65	66	67	68	69	70	71	67
Y :	67	68	64	72	70	67	70	68

5

(d) What is linear regression ? Explain with the help of Scatter Diagram. 5

5. Attempt **all** :

(a) Explain what precautions are to be taken while using secondary data. 2½

(b) Define Harmonic Mean. Give its merits and demerits. 2½

(c) Give the characteristics for an ideal measure of dispersion. 2½

(d) If the lines of regression of Y on X and X on Y are respectively $a_1X + b_1Y + c_1 = 0$ and $a_2X + b_2Y + c_2 = 0$, then prove that $a_1b_2 \leq a_2b_1$. 2½