EASTERN UNIVERSITY, SRILANKA

FIRST EXAMINATION IN SCIENCE 2003/2004

SECOND SEMESTER

(June/July, 2005)

ST-102- DESCRIPTIVE STATISTICS

Answer all questions

Time: One hour

(i) Derive the equation that is used to calculate the median value of a continuous frequency distribution

(ii) The following table gives the distribution of marks secured by the students in an examination.

Marks	Number of students
Below 20	20
20-30	40
30-50	78
50-60	77
60-70	67
Above 70	10

1. Draw an Ogive graph for the above data and read the median value from the graph. Check your result by actual calculations.
2. Find the mode value of the distribution.
3. Compute the marks limits within which there are middle 50% of the students.
4. If 60% of the students passed this test, find the minimum marks obtained by a student who passed the examination.

(b) Let R be the range and σ is the standard deviation of a set of observations $x_1, x_2, \ldots x_n$.

Prove that $R \geq \sigma$.

Hint: $x_i - \mu \leq R \; ; \; i = 1,2,\ldots n.$

(c) First semester examination marks for four subjects of a student and the credit points for each subject are given below. Find a suitable average marks earned by the student?

Subject	Marks	Credit points
BDS 102	84%	2
BDS 103	96%	3
BDS 104	72%	2
BDS 105	88%	2

(d) Prove that for any frequency distribution the total percentage of cases falling in the interval,

$$\frac{1}{2}(Q_1 + Q_3) \pm \frac{1}{2}(Q_3 - Q_1) \text{ is } 50\%.$$

2. (a) What is an *Index number*?

(b) Show that *Fisher's ideal index number* satisfies both time reversal test and factor rev test.

(c) Prove that *Fisher's ideal index number* lies between *Laspeyre*'s and *Paasche*'s inde numbers.

(d) Compute price index numbers from the following data using:

(i) *Laspeyre*'s method,

(ii) *Paasche*'s method,

(iii) *Fisher*'s method.

Commodity	Base year		Current year	
	Quantity	Price	Quantity	Price
A	12	10	15	12
B	15	7	20	5
C	24	5	20	9
D	5	16	5	14