LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

**B.Sc.** DEGREE EXAMINATION – **STATISTICS**

FIRST SEMESTER – NOVEMBER 2012

# ST 1502/ST 1500 - STATISTICAL METHODS

Date : 08/11/2012 Dept. No. Max. : 100 Marks

Time : 1:00 - 4:00

**PART – A**

**Answer ALL the questions: (10 x 2 = 20)**

1. Why is sampling necessary under certain conditions?
2. A survey of 100 people is conducted and all are asked questions relating to the following characteristics:

* marital status
* salary
* occupation
* number of hours of television they watch per week

What type of data and measurement scales are applicable?

1. List the requisites of a good measure of central tendency.
2. What is meant by Kurtosis?
3. State the principles of least squares.
4. What is the general form of growth curves?
5. Define rank correlation coefficient.
6. Find the means of variables X and Y and the correlation coefficient given the following information:

Regression equation of Y on X: 3Y – X – 50 = 0

Regression equation of X on Y: 3Y– 2X –10 = 0

1. Out of 900 persons, 300 were literates and 400 had travelled beyond the limits of their district.100 of the literates were among those who had not travelled. Is there any relation between literacy and travelling?
2. What is meant by coefficient of colligation?

**PART – B**

**Answer any FIVE questions: (5 x 8 = 40 marks)**

1. The survey about colour preferences reported the age distribution of the people who responded.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Age group (years) | 1-18 | 19-24 | 25-35 | 36-50 | 51-69 | 70-74 |
| count | 10 | 97 | 70 | 36 | 14 | 5 |

Draw ‘less than ogive’ curve and locate the median.

1. Describe the various ways of classification of statistical data with suitable illustrations.
2. The volumes of water (in litres) consumed by 12 elephants in one day are listed below:

66 90 68 94 86 96 70 138 90 120 92 102

Calculate the mean and variance and interpret the data.

1. Describe the construction of Lorenz curve.
2. What is skewness? Distinguish diagrammatically the different types of skewness.
3. Calculate the sample coefficient of correlation between number of ovulated follicles

and number of eggs laid by pheasants. Data of 11 pheasants were collected:

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Number of eggs | 39 | 29 | 46 | 28 | 31 | 25 | 49 | 57 | 51 | 21 | 42 |
| Number of follicles | 37 | 34 | 52 | 26 | 32 | 25 | 55 | 65 | 40 | 25 | 45 |

1. Fit a curve of the form *y* = ab*t* for the following data observed on the growth of a fruitfly population

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Time *t* (in days) | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| No.of flies *y* | 110 | 116 | 122 | 128 | 134 | 141 | 148 | 155 |

1. Describe the conditions for consistency of data when there are three attributes.

**PART – C**

**Answer any TWO questions (2 x 20 = 40 marks)**

1. (a) What is meant by a questionnaire? Explain the precautions that must be taken

while drafting a questionnaire. (12 marks)

(b) Distinguish between primary and secondary data. (8 marks)

1. (a) Establish the relationship between raw and central moments. (10 marks)

(b) The following frequency distribution is the weight in pounds of 57 children at a

day-care center:

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Weight (in pounds) | 10-19 | 20-29 | 30-39 | 40-49 | 50-59 | 60-69 | 70-79 |
| No. of children | 5 | 19 | 10 | 13 | 4 | 4 | 2 |

Calculate mean deviation about median. (10 marks)

1. (a) What is meant by ‘curve fitting’? Give the normal equations to fit a second degree

parabola. (10 marks)

(b) In a sample of 500 children, 200 came from higher income group and the rest

from lower income group. The numbers of delinquent c hildren in these groups

were 25 and 100 respectively. Calculate the coefficient of association between

delinquency and income group. (10 marks)

1. Potato chip lovers do not like soggy chips,so it is important to find characteristics of the production process that produce chips with an appealing texture. The following sample data on frying time(in seconds) and moisture content(%) were selected.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Frying time | 65 | 50 | 35 | 30 | 20 | 15 | 10 | 5 |
| Moisture content | 1.4 | 1.9 | 3.0 | 3.4 | 4.2 | 8.1 | 9.7 | 16.3 |

Predict the moisture content of the chips if the frying time is 40 seconds.

$$$$$$$