# LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

### B.Com. DEGREE EXAMINATION – COMMERCE

THIRD SEMESTER – APRIL 2010

### ST 3104 / 3101 - BUSINESS STATISTICS

Date & Time: 28/04/2010 / 1:00 - 4:00     Dept. No.     Max. : 100 Marks

## SECTION A

**Answer ALL questions.**                                      **(10 x 2 =20 marks)**

1.  What is a statistical survey?
2.  Distinguish between primary and secondary data.
3.  What are the advantages of diagrammatic presentation of data?
4.  Calculate the harmonic mean of the following values: 1, 0.5, 10, 45, 175, 0.01, 4, 11.2.
5.  Find the weighted arithmetic mean of the first 5 natural numbers taking the respective numbers as the weights.
6.  What is skewness?
7.  What is the use of a scatter diagram?
8.  Given the 2 regression equations, 4X-5Y+33=0, 20X-9Y-107=0, find the mean values of X and Y.
9.  What are the components of time series?
10. Define generalized linear programming problem.

## SECTION B

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

11. Discuss the importance of statistics in various fields.
12. Construct a histogram for the following data:

| Variable | 10-20 | 20-30 | 30-40 | 40-50 | 50-60 | 60-70 | 70-80 |
|---|---|---|---|---|---|---|---|
| Frequency | 12 | 30 | 45 | 65 | 70 | 25 | 18 |

13. Calculate median and mode for the following series:

| Marks | 0-10 | 10-20 | 20-30 | 30-40 | 40-50 | 50-60 | 60-70 |
|---|---|---|---|---|---|---|---|
| No. of Students | 15 | 25 | 52 | 56 | 78 | 80 | 70 |

14. The numbers of telephone calls received at an exchange in 245 successive one-minute intervals are shown in the following frequency distribution. Compute the mean deviation about the median.

| No. of calls | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|---|
| Frequency | 14 | 21 | 25 | 43 | 51 | 40 | 39 | 12 |

15. Find Karl Pearson's coefficient of skewness for the following data:

| Value | 6 | 12 | 18 | 24 | 30 | 36 | 42 |
|---|---|---|---|---|---|---|---|
| Frequency | 4 | 7 | 9 | 18 | 15 | 10 | 5 |

16. Calculate Karl Pearson's coefficient of correlation for the following data:

| X | 6 | 8 | 12 | 15 | 18 | 20 | 24 | 28 | 31 |
|---|---|---|---|---|---|---|---|---|---|
| Y | 10 | 12 | 15 | 15 | 18 | 25 | 22 | 26 | 28 |

17. Calculate Laspeyre's and Fisher's index numbers from the following data.

| Commodity | Price (2008) | Quantity (2008) | Price (2009) | Quantity (2009) |
|---|---|---|---|---|
| Bricks | 20 | 8 | 40 | 6 |
| Sand | 50 | 10 | 60 | 5 |
| Timber | 40 | 15 | 50 | 15 |
| Cement | 20 | 209 | 20 | 25 |

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**18.** An engineering workshop has 5 operators A, B, C, D and E, assignable to any one of the 5 machines $M_1$, $M_2$, $M_3$, $M_4$ and $M_5$. The possible weekly outputs are displayed in the matrix given below. Find the best way to assign the operators to the machines to maximize the output.

|   | $M_1$ | $M_2$ | $M_3$ | $M_4$ | $M_5$ |
|---|---|---|---|---|---|
| **A** | 18 | 20 | 25 | 30 | 34 |
| **B** | 17 | 21 | 27 | 32 | 38 |
| **C** | 21 | 26 | 33 | 37 | 32 |
| **D** | 19 | 22 | 29 | 35 | 40 |
| **E** | 22 | 26 | 29 | 34 | 39 |

## SECTION C

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

**19.** Following are the marks obtained by 2 students A and B in 10 tests:

| Tests | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| **Marks(A)** | 44 | 80 | 76 | 48 | 52 | 72 | 68 | 56 | 60 | 54 |
| **Marks(B)** | 48 | 75 | 54 | 60 | 63 | 69 | 72 | 51 | 57 | 66 |

If the consistency of performance is the criterion for awarding a prize, which student should get the prize?

**20.** Calculate the first 4 moments and values of $\beta_1$ and $\beta_2$ for the following frequency distribution.

| Value | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|
| **Frequency** | 1 | 3 | 7 | 3 | 1 |

**21.** Given the bivariate data:

| X | 1 | 5 | 3 | 2 | 1 | 1 | 7 | 3 |
|---|---|---|---|---|---|---|---|---|
| Y | 6 | 1 | 0 | 0 | 1 | 2 | 1 | 5 |

(i) Fit a regression line of Y on X and hence predict Y if X=5.
(ii) Fit a regression line of X on Y and hence predict X if Y=2.5.
(iii) Calculate correlation coefficient.

**22.** There are three sources ($S_i$) or origins which store a given product. These sources supply these products to four dealers ($D_j$). The cost (in Rs.) of transporting the products from various sources to various dealers, the capacities of the sources and the demands of the dealers are given below.

|   | $D_1$ | $D_2$ | $D_3$ | $D_4$ | **Supply** |
|---|---|---|---|---|---|
| $S_1$ | 11 | 23 | 17 | 14 | **250** |
| $S_2$ | 16 | 18 | 14 | 10 | **300** |
| $S_3$ | 21 | 24 | 13 | 10 | **400** |
| **Demand** | **200** | **225** | **275** | **250** | |

Find out the solution for transporting the products at a minimum cost by using
(i) North-West Corner Rule, (ii) Least Cost method and (iii) Vogel's Approximation Method.
Compare the costs and write down the best solution.

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