# LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

B.Com. DEGREE EXAMINATION –COMMERCE

THIRD SEMESTER – NOVEMBER 2009

**ST 3104 / 3101 - BUSINESS STATISTICS**

Date & Time: 14/11/2009 / 1:00 - 4:00 Dept. No. Max. : 100 Marks

**SECTION – A** **10 x 2 = 20**

Answer **ALL** the questions

1). Mention any four main functions of Statistics.
2). When do you prefer a multiple bar diagram?
3). What is the impact of extreme values of a set on median?
4). What are the merits of harmonic mean?
5). State the various measures of dispersion.
6). Write down any two properties of correlation coefficient.
7). Define Index numbers
8). Write the utility of time series analysis to a businessman.
9). Define slack and surplus variables
10). Write a short note on degeneracy in linear programming.

**SECTION – B** **5 x 8 = 40**

***Answer any FIVE questions***

11). Draw the Histogram and frequency polygon for the following data

| Incomes (Rs.) | No. of the employee |
|---|---|
| 4000 - 4499 | 21 |
| 4500 - 4999 | 32 |
| 5000 - 5499 | 52 |
| 5500 - 5999 | 105 |
| 6000 - 6499 | 62 |
| 6500 - 6999 | 43 |
| 7000 - 7499 | 18 |
| 7500 - 7999 | 9 |

12. The number examined, the mean weight and standard deviation in each group of examination by two medical examiners is given below. Find the mean weight and standard deviation of both the groups taken together

| | | | |
|---|---|---|---|
| A | 50 | 113 | 6.5 |
| B | 60 | 120 | 8.2 |

13). Calculate the coefficient of rank correlation from the following data:

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| X | 48 | 33 | 40 | 9 | 16 | 16 | 65 | 24 | 16 | 57 |
| Y | 13 | 13 | 24 | 6 | 15 | 4 | 20 | 9 | 6 | 19 |

14).Calculate Karl pearson's coefficient of correlation for the following data:-

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Cost** (Rs.) | 39 | 65 | 62 | 90 | 82 | 75 | 25 | 98 | 36 | 78 |
| **Sales** (Rs.) | 47 | 53 | 58 | 86 | 62 | 68 | 60 | 91 | 51 | 84 |

15). From the following data compute price index by applying weighted average of price relatives method using:
(a) Arithmetic mean, and
(b) Geometric mean.

| Commodities | $p_0$ Rs. | $q_0$ | $p_1$ Rs. |
|---|---|---|---|
| Sugar | 6.0 | 10 kg. | 8.0 |
| Rice | 3.0 | 20 kg. | 3.2 |
| Milk | 2.0 | 5 lt. | 3.0 |

16). Compute 4 – yearly moving average values for the following data:

| **Years** | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Value** | 24 | 28 | 34 | 42 | 52 | 64 | 78 | 94 | 112 | 132 | 154 | 178 |

17). Solve (using Graphical Method).

Maximum **Z** = $3X_1 + 4X_2$

Subject to the constraints

$$4X_1 + 2X_2 \leq 80$$

$$X_1 + 5X_2 \leq 180$$

$$X_1, X_2 \geq 0$$

18). Obtain an IBFS to the following transportation problem by using Vogel's Approximation method.

| | | **Destination** | | | | **Availability** |
|---|---|---|---|---|---|---|
| | | **$D_1$** | **$D_2$** | **$D_3$** | **$D_4$** | |
| **Origin** | **$O_1$** | 6 | 4 | 1 | 5 | 14 |
| | **$O_2$** | 8 | 9 | 2 | 7 | 16 |
| | **$O_3$** | 4 | 3 | 6 | 2 | 5 |
| **Requirement** | | 6 | 10 | 15 | 4 | |

**SECTION – C** **2 X 20 = 40**

***Answer any TWO questions***

19). a) Explain different types of diagram. (8)
b) The scores of two batsmen A and B in ten innings during a certain season are:

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **A** | 32 | 28 | 47 | 63 | 71 | 39 | 10 | 60 | 96 | 14 |
| **B** | 19 | 31 | 48 | 53 | 67 | 90 | 10 | 62 | 40 | 80 |

Which of the two batsmen A, B is more consistent in scoring? (12)

20). From the data given below find:
(a) The two regression equations,
(b) The coefficient of correlation between marks in Economics and Statistics and
(c) The most likely marks in Statistics when the marks in Economics are 30.

| **Marks in Economics** | 25 | 28 | 35 | 32 | 31 | 36 | 29 | 38 | 34 | 32 |
|---|---|---|---|---|---|---|---|---|---|---|
| **Marks in Statistics** | 43 | 46 | 49 | 41 | 36 | 32 | 31 | 30 | 33 | 39 |

21). The sales of a commodity ( in ‘1000 Rs. ) are given below :

| Year | Sales |
|---|---|
| 1999 | 82 |
| 2000 | 86 |
| 2001 | 81 |
| 2002 | 86 |
| 2003 | 92 |
| 2004 | 90 |
| 2005 | 99 |

(i) Using the method of least squares, fit a straight line trend equation to the data.

(ii) What is the average annual change in the sales?

(ii) Obtain the trend values for the years 1999 – 2005 and show that the sum of difference between the actual and the trend values is equal to zero.

(iv) What are the expected sales for the year 2010?

22). Solve the following Linear Programming Problem by Simplex Method.

$Max\ \ Z = 2x_1 + 3x_2$

Subject to the constraints

$10x_1 + 5x_2 \leq 600$

$6x_1 + 20x_2 \leq 600$

$8x_1 + 10x_2 \leq 600$

$and\ \ x_1, x_2 \geq 0.$

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