LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

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

SECOND SEMESTER – **APRIL 2012**

# ST 2102/2101 - BUSINESS STATISTICS

Date : 23-04-2012 Dept. No. Max. : 100 Marks

Time : 9:00 - 12:00

**SECTION A**

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

1. State the various methods of collecting secondary data.
2. What are the limitations of statistics?
3. What are the different types of bar diagram.
4. Find the value of median for the following data:

50, 70, 45, 20, 80, 90, 25, 30, 40, 10.

1. What are the various measures of dispersion?
2. In a frequency distribution, the coefficient of skewness based on quartiles is 0.6. If the sum of the upper and the lower quartiles is 100 and the median is 38. Find the value of the upper quartile.
3. Distinguish between correlation and regression.
4. What are the various components of a time series.?
5. What is an index number? What are its uses?
6. What is degeneracy and non- degeneracy in transportation problem?

**SECTION B (5 X 8 = 40 Marks)**

**Answer any FIVE questions**

11.Discuss in detail the scope of statistics.

12. Draw a histogram and frequency polygon on the basis of the following data:

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Mid value | 18 | 25 | 32 | 39 | 46 | 53 | 60 |
| Frequency | 10 | 15 | 32 | 42 | 26 | 12 | 9 |

13. Calculate mean deviation about the median for the following data:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| x | 10 | 11 | 13 | 14 | 12 |
| f | 3 | 12 | 12 | 3 | 18 |

14. Calculate Bowley’s coefficient of skewness from the following data:

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Marks | 0 – 10 | 10 – 20 | 20 – 30 | 30 – 40 | 40 – 50 | 50 – 60 | 60 – 70 | 70 – 80 |
| No. of persons | 10 | 25 | 20 | 15 | 10 | 35 | 25 | 10 |

15. A sample of 12 fathers and their eldest sons gave the following data about their height in inches

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Father | 65 | 63 | 67 | 64 | 68 | 62 | 70 | 66 | 68 | 67 | 69 | 71 |
| Son | 68 | 66 | 68 | 65 | 69 | 66 | 68 | 65 | 71 | 67 | 68 | 70 |

Calculate Rank Correlation.

16. Below are given the annual production ( in thousand tones) of a fertilizer factory.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Year | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 | 1983 |
| Production | 70 | 75 | 90 | 91 | 95 | 98 | 100 |

Fit a straight line trend by the method of least squares and calculate the trend values

17. From the following data of wholesale prices of wheat construct Chain base index taking 1993 as base.

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Year | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 |
| Price(in Rs.)  per quintal | 50 | 60 | 62 | 65 | 70 | 78 | 82 | 84 | 88 | 90 |

18. Use the graphical method to solve the following L.P problem.

Minimize Z=20x+10y

Subject to the constraints,

x+2y ≤ 40

3x+y ≥ 30

4x+3y ≥ 60

x,y≥0

**SECTION C (2 X 20 = 40 Marks)**

**Answer any TWO questions**

19.(a) ) Calculate the mean, median and mode from the following data. Verify the empirical relation

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Marks | 10-20 | 20-30 | 30-40 | 40-50 | 50-60 | 60-70 | 70-80 | 80-90 |
| No. of students | 4 | 12 | 40 | 41 | 27 | 13 | 9 | 4 |

(10)

19.(b) The scores of two players A and B in 12 rounds are given below:

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| A | 74 | 75 | 78 | 72 | 78 | 77 | 79 | 81 | 79 | 76 | 72 | 71 |
| B | 87 | 84 | 80 | 88 | 89 | 85 | 86 | 82 | 82 | 79 | 86 | 80 |

(10)

Identify the better player and the more consistent player (10)

20.(a) . Calculate the correlation coefficient from the following data

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| x | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |
| y | 15 | 16 | 14 | 13 | 11 | 12 | 10 | 8 | 9 |

(10)

20(b) From the following data, find the most likely production corresponding to the rainfall of 40 cm

|  |  |  |
| --- | --- | --- |
|  | Rainfall ( in cms) | Production (Tonnes) |
| Mean | 35 | 50 |
| Standard Deviation | 5 | 8 |

Coefficient of correlation equation = 0.8

(10)

21. Calculate seasonal indices by the ‘Ratio to moving average method ‘ from the following data.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Year | 1st quarter | 2nd quarter | 3rd quarter | 4th quarter |
| 1993 | 68 | 62 | 61 | 63 |
| 1994 | 65 | 58 | 66 | 61 |
| 1995 | 68 | 63 | 63 | 67 |

(20)

22.(a) The head of department has 5 jobs A,B,C,D and E and 5 subordinates V,W,X,Y and Z. The number of hours each man would take to perform each job is as follows:-

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | V | W | X | Y | Z |
| A | 3 | 5 | 10 | 15 | 8 |
| B | 4 | 7 | 15 | 18 | 8 |
| C | 8 | 12 | 20 | 20 | 12 |
| D | 5 | 5 | 8 | 10 | 6 |
| E | 10 | 10 | 15 | 25 | 10 |

How should the jobs be allocated to minimize the total time.

(10)

22(b) Solve the following Transportation problem by Vogel’s Approximation Method.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | D1 | D2 | D3 | Availability |
| A1 | 2 | 7 | 4 | 5 |
| A2 | 3 | 3 | 1 | 8 |
| A3 | 5 | 4 | 7 | 7 |
| A4 | 1 | 6 | 2 | 14 |
| Demand | 7 | 9 | 18 |  |

(10)

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