Date: 11-04-2019       Dept. No.                              Max. : 100 Marks
Time: 09:00-12:00

## SECTION – A

**Answer All the Questions**                                      **(10 x 2 = 20)**

1. Write any four characteristics of a good average.

2. An aeroplane covers the four sides of a square at speeds of 1000, 2000, 3000 and 4000 km/hr respectively. What is the overall average speed?

3. Define Range and find the range for the following data 200, 210,208,160,220,250.

4. Provide the formula for combined mean and Standard Deviation.

5. Give any four properties of regression coefficient.

6. What is the purpose of time series analysis?

7. Distinguish between additive and multiplicative model for time series analysis.

8. Define objective function and constraints in LPP.

9. State the difference between feasible and optimal solution.

10. What do you meant by Zero-sum game?

## SECTION –B

**Answer any five questions**                                      **( 5 x 8 = 40)**

11. The number of days that students were missing from school due to sickness in one year was recorded.

| No of days off sick | 1-5 | 6-10 | 11-15 | 16-20 | 21-25 |
|---|---|---|---|---|---|
| Frequency | 12 | 11 | 10 | 4 | 3 |

Find mean deviation about arithmetic mean.

12. Using Karl Pearson's coefficient of skewness determines the nature of the following frequency distribution.

| Size ofItem | Frequency |
|---|---|
| 20- 40 | 7 |
| 40- 60 | 1 |
| 60- 80 | 3 |
| 80-100 | 1 |
| 100-120 | 5 |

13. Calculate the Pearson's coefficient of correlation from the following data:

| X: | 75 | 88 | 95 | 70 | 60 | 80 | 81 | 50 |
|---|---|---|---|---|---|---|---|---|
| Y: | 120 | 134 | 150 | 115 | 110 | 140 | 142 | 100 |

14. Find two regression equations for the following bivariate data. Estimate Y when X is 850.

| X | Y | |
|---|---|---|
| 600 | 1,250 | |
| 630 | | 1,100 |
| 720 | 1,300 | |
| 750 | 1,350 | |
| 800 | 1,500 | |

15. Using three-yearly moving averages, determine the trend values for the following data.

| Year | Production (in '000tonnes) | Year | Production (in '000tonnes) |
|---|---|---|---|
| 2004 | 21 | 2009 | 22 |
| 2005 | 22 | 2010 | 25 |
| 2006 | 23 | 2011 | 26 |
| 2007 | 25 | 2012 | 27 |
| 2008 | 24 | 2013 | 26 |

16. Solve the following linear programming problem by graphical method

Maximize $z = - x_1 + x_2$
Subject to the constraints
$5x_1 + 10x_2 \quad 50$
$x_1 + x_2 \quad 1$
$x_2 \quad 4$
$x_1 , x_2 \quad 0.$

17. Compute the seasonal index from the following data by the method of simple averages.

| Year | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2009 | 46 | 45 | 44 | 46 | 45 | 47 | 46 | 43 | 40 | 40 | 41 | 45 |
| 2010 | 45 | 44 | 43 | 46 | 46 | 45 | 47 | 42 | 43 | 42 | 43 | 44 |
| 2011 | 42 | 41 | 40 | 44 | 45 | 45 | 46 | 43 | 41 | 40 | 42 | 45 |

18. By graphical method solve the game with pay-off matrix

Player B

$$\text{Player A} \begin{bmatrix} -1 & 0 \\ 0 & 4 \\ -4 & 3 \\ 2 & -5 \end{bmatrix}$$

# SECTION –C

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

19. Calculate first four central moments. Hence compute $\beta_1$ and $\beta_2$. Also comment upon the nature of the frequency distribution.

| Marks in statistics | 0-10 | 10-20 | 20-30 | 30-40 | 40-50 | 50-60 | 60-70 | 70-60 |
|---|---|---|---|---|---|---|---|---|
| No. of students | 18 | 22 | 30 | 42 | 40 | 38 | 22 | 14 |

20. a)A study of wheat prices at two cities yielded the following data:

|  | **City A** | **City B** |
|---|---|---|
| Average Price | Rs 2,463 | Rs 2,797 |
| Standard Deviation | Rs 0.326 | Rs 0.207 |

Coefficient of correlation $r$ is 0.774. Estimate from the above data the most likely price of wheat *(i)* at City A corresponding to the price of Rs 2,334 at City B
        *(ii* at city B corresponding to the price of Rs 3.052 at City A
b) The following distribution is relating to marks obtained by students in an examination. Find standard deviation.

| Marks | 0-10 | 10-20 | 20-30 | 30-40 | 40-50 | 50-60 | 60-70 | 70-80 | 80-90 | 90-100 |
|---|---|---|---|---|---|---|---|---|---|---|
| No. of students | 1 | 3 | 6 | 10 | 12 | 11 | 6 | 3 | 2 | 1 |

21. Find the seasonal indices by Ratio to Trend method from the data given below.

| Year | 1st Quarter | 2nd Quarter | 3rd Quarter | 4th Quarter |
|---|---|---|---|---|
| 2008 | 34 | 54 | 38 | 38 |
| 2009 | 36 | 60 | 52 | 48 |
| 2010 | 40 | 58 | 56 | 52 |
| 2011 | 52 | 76 | 64 | 58 |
| 2012 | 70 | 90 | 88 | 84 |

22. Obtain an Initial Basic Feasible Solution to the following transportation problem by

(i). North-West corner rule  (ii) Least cost method and   (iii) Vogel's approximation methods.

|  | D | E | F | G | Availability |
|---|---|---|---|---|---|
| A | 6 | 4 | 1 | 5 | 14 |
| B | 8 | 9 | 2 | 7 | 16 |
| C | 4 | 3 | 6 | 2 | 5 |
| Requirement | 6 | 10 | 15 | 4 |  |

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