SHRIMATHI DEVKUNVAR NANALAL BHATT VAISHNAV COLLEGE FOR WOMEN
(AUTONOMOUS)
(Affiliated to the University of Madras and Re-accredited with 'A+' Grade by NAAC)
Chromepet, Chennai - 600 044.
B.Com. PA - END SEMESTER EXAMINATIONS APRIL - 2024
SEMESTER - II
23UPAAT2002 - Business Statistics & Operations Research

Total Duration : 2 Hrs. 30 Mins. Total Marks : 60

Section B

Answer any **SIX** questions $(6 \times 5 = 30$ Marks)

1. Find the mode of the following distribution.

Class Limits	46-50	51-55	56-60	61-65	66-70	71-75	76-80	81-85	86-90	91-95
Frequency	2	3	5	7	9	11	7	2	3	1

2. Solve the coefficient of correlation between x and y from the following data.

x	1	3	5	8	9	10
y	3	4	8	10	12	11

3. Consider the following problem faced by a production planner in a soft drink plant. He has two bottling machines A and B. A is designed for 8-ounce bottles and B for 16-ounce bottles. However, each can be used on both types with some loss of efficiency. The following data is available:

Machine	**8-ounce bottles**	**16-ounce bottle**
A	100/minute	40/minute
B	60/minute	75/minute

Each machine can be run 8-hours per day, 5 days per week. Profit on a 8-ounce bottle is 25 paise and on a 16-ounce bottle is 35 paise. Weekly production of the drink cannot exceed 3,00,000 ounces and the market can absorb 25,000 8-ounce bottles and 7,000 16-ounce bottles per week. The planner wishes to maximize his profit subject, of course, to all the production and marketing restrictions. Apply formulate this as a linear programming problem.

4. Compute an initial basic feasible solution to the following transportation problem using the north-west corner rule.

	D	**E**	**F**	**G**	**Available**
A	11	13	17	14	250
B	16	18	14	10	300
C	21	24	13	10	400
Requirement	200	225	275	250	

Contd...

5. Illustrate the mean deviation about the mean for the following frequency distribution.

Maths	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100
No. of Students	3	8	9	15	20	13	8	4

6. Classify the line of regression of y on x.

x	1	2	3	4	5	8	10
y	9	8	10	12	14	16	15

7. Use graphical method to solve the following L.P.P:
   Maximize $z = 6x_1 + x_2$
   Subject to the constraints
   $2x_1 + x_2 \geq 3$, $x_2 - x_1 \geq 0$ and $x_1, x_2 \geq 0$.

8. Determine an initial basic feasible solution to the following transportation problem using the Least-Cost Method.

	D_1	**D_2**	**D_3**	**D_4**	**Capacity**
O_1	1	2	3	4	6
O_2	4	3	2	0	8
O_3	0	2	2	1	10
Demand	4	6	8	6	

Section C

Answer any **THREE** questions $(3 \times 10 = 30$ Marks)

9. The first quartile of the following data is 21.5

Class	10-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	**Total**
Frequency	24	—	90	122	—	56	20	33	460

   Illustrate the missing frequencies and hence solve the mode.

10. Compute the Pearson's coefficient of skewness for the following frequency distribution.

Annual sales (in '000 Rs.)	0-20	20-40	40-60	60-80	80-100	100-120
No. of items	20	50	59	30	25	16

11. Ten competitors in a beauty contest are ranked by three judges in the following order:

First judge	1	4	6	3	2	9	7	8	10	5
Second judge	2	6	5	4	7	10	9	3	8	1
Third judge	3	7	4	5	10	8	9	2	6	1

    Use the method of rank correlation coefficient to determine which pair of judges has the nearest approach to common taste in beauty?

Contd...

12. Using the graphical method to apply the following LPP:
    Maximize $z = 2x_1 + 3x_2$
    Subject to the constraints $x_1 + x_2 \leq 30$, $x_1 - x_2 \geq 0$, $x_2 \geq 3$,
    $0 \leq x_1 \leq 20$ and $0 \leq x_2 \leq 12$
13. Evaluate the initial basic feasible solution to the following transportation problem using VAM, given the cost matrix.

	D_1	**D_2**	**D_3**	**D_4**	**Supply**
S_1	20	25	28	31	200
S_2	32	28	32	41	180
S_3	18	35	24	32	110
Demand	150	40	180	170	

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