

MASTER OF BUSINESS ADMINISTRATION (CBCS - 2020 COURSE)

M.B.A Sem-III : WINTER- 2022

SUBJECT : OPERATIONS RESEARCH FOR MANAGERS

Day : Wednesday

Time : 02:00 PM-04:00 PM

Date : 14-12-2022

W-22790-2022

Max. Marks : 50

**N.B.:**

- 1) Attempt **ANY THREE** questions from Section – I and **ANY TWO** questions from Section – II.
- 2) Answers to both the section should be written in **SAME** answer book.
- 3) Use of non-programmable **CALCULATOR** is allowed.
- 4) Use graph paper **WHEREVER** necessary.
- 5) Figures to the right indicate **FULL** marks.

**SECTION – I**

**Q.1** What is Operations Research? Explain applications of Operations Research in Business and Management. [10]

**Q.2** Solve the following L.P.P. graphically: [10]

$$\text{Max } Z = 5x + 7y$$

$$\text{Subject to: } x + y \leq 4$$

$$3x + 8y \leq 24$$

$$10x + 7y \leq 35$$

$$x, y \geq 0$$

**Q.3** Find Initial Basic Feasible Solution I.B.F.S of the following T.P by [10]

- a) North-West Corner Rule (NWCR)
- b) Vogel's Approximation Method (VAM)

Plants	Warehouses				Supply
	W <sub>1</sub>	W <sub>2</sub>	W <sub>3</sub>	W <sub>4</sub>	
P <sub>1</sub>	190	300	500	100	70
P <sub>2</sub>	700	300	400	600	90
P <sub>3</sub>	400	100	400	200	180
<b>Demand</b>	50	80	70	140	340

**Q.4** The rainfall distribution in monsoon season is as follows: [10]

Rain in cm	0	1	2	3	4	5
Frequency	50	25	15	5	3	2

Simulate the rainfall for 10 days using following random numbers:

67, 63, 39, 55, 29, 78, 70, 06, 78, 76

Also find average rainfall.

**Q.5** Write short notes on **ANY TWO** of the following: [10]

- a) Network Analysis
- b) History of Operations Research
- c) Monte-Carlo Simulation

P.T.O.

**SECTION – II**

**Q.6** The owner of a company has four salesmen to be assigned to five districts. The [10]  
expected profits (in Rs. Thousands) are given in the following table.

Salesman	Districts				
	I	II	III	IV	V
<b>A</b>	62	78	50	101	82
<b>B</b>	71	84	61	73	59
<b>C</b>	87	92	111	71	81
<b>D</b>	48	64	87	77	80

Advice the owner of company which assignment of salesmen maximizes the total profit.

**Q.7** Four petrol dealers A, B, C and D required 50, 40, 60 and 40 kl of petrol [10]  
respectively. It is possible to supply this from three locations X, Y and Z which have 80, 100 and 50 kl respectively. The cost in ₹ for shipping each kl is shown in the table below:

Location	Dealers			
	A	B	C	D
<b>X</b>	7	6	6	6
<b>Y</b>	5	7	6	7
<b>Z</b>	8	5	8	6

Determine the most economical supply pattern for the company.

**Q.8** A small maintenance project consists of the following jobs. The jobs and their [10]  
duration in days is given below:

Job	1 – 2	1 – 3	2 – 3	2 – 5	3 – 4	3 – 6	4 – 5	4 – 6	5 – 6	6 – 7
Duration (days)	15	15	3	5	8	12	1	14	3	14

- a) Draw a network diagram representing the project and find earliest time and latest time for each activity.
- b) Find the critical path and the total project duration.

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