

MASTER OF BUSINESS ADMINISTRATION (CBCS - 2020 COURSE)
M.B.A Sem-III : SUMMER : 2024
SUBJECT: OPERATIONS RESEARCH FOR MANAGERS

Day : Saturday
Date : 18/05/2024

S-22790-2024

Time : 02:00 PM-04:00 PM
Max. Marks : 50

N.B.

1. Attempt any **THREE** questions from Section I and any **TWO** questions from Section II.
2. Figures to the right indicate **FULL** marks
3. Answers to both the sections should be written in the **SAME** answer-book.
4. Use of non – programmable **CALCULATOR** is **ALLOWED**.
5. **ALLOWED** to use **GRAPH PAPER** wherever necessary.

SECTION- I

- Q.1** A company owns two flour mills A and B, which have different production capacities for high, medium and low-quality flour. The company has entered a contract to supply flour to a firm every month with at least 8, 12 and 24 quintals of high, medium, and low quality respectively. It costs the company Rs 2000 and Rs 1500 per day to run mill A and B respectively. In one day, Mill A produces 6, 2 and 4 quintals of high, medium and low-quality flour respectively, Mill B produces 2, 4 and 12 quintals of high, medium and low-quality flour respectively. Formulate the linear programming model to Minimize the cost. **(10)**
- Q.2** Find Solution using North-West Corner method.

	D1	D2	D3	D4	Supply
S1	19	30	50	10	7
S2	70	30	40	60	9
S3	40	8	70	20	18
Demand	5	8	7	14	

- Q.3** Consider the following transportation problem. **(10)**

		To			
From		I	II	III	Supply
	A	5	1	7	10
	B	6	4	6	80
	C	3	2	5	15
	Demand	75	20	50	

Find the optimal solution.

- Q.4** A department has five employees with five jobs to be performed. The time (in hours) each men will take to perform each job is given in the effectiveness matrix. **(10)**

		Employees				
		I	II	III	IV	V
Jobs	A	10	5	13	15	16
	B	3	9	18	13	6
	C	10	7	2	2	2
	D	7	11	9	7	12
	E	7	9	10	4	12

How should the jobs be allocated, one per employee, so as to minimize the total man-hours?

- Q.5** Write short notes on any **TWO** of the following: **(10)**
- Applications of Operations Research
 - Unbalanced Transportation Problem
 - Slack

SECTION- II

- Q.6** Find solution using graphical method **(10)**

$$\text{MAX } z = 10x_1 + 6x_2$$

subject to

$$5x_1 + 3x_2 \leq 30$$

$$x_1 + 2x_2 \leq 18$$

$$\text{and } x_1, x_2 \geq 0$$

- Q.7** A bakery keeps stock of a popular brand of cake. Previous experience shows the daily demand pattern for the item with associated probabilities, as given below: **(10)**

Daily demand (number)	:	0	10	20	30	40	50
Probability	:	0.01	0.20	0.15	0.50	0.12	0.02

Use the following sequence of random numbers to simulate the demand for next 10 days.

Random numbers: 25, 39, 65, 76, 12, 05, 73, 89, 19, 49.

Also estimate the daily average demand for the cakes on the basis of the simulated data

- Q.8** An established company has decided to add a new product to its line. It will buy the product from a manufacturing concern, package it, and sell it to a number of distributors that have been selected on a geographical basis. Market research has already indicated the volume expected and the size of sales force required. Following are the activities and duration for the project. **(10)**

Activity	Predecessor Activity	Duration (days)
A	-	14
B	A	4
C	B	2
D	C	1
E	A	2
F	E	3
G	E	2
H	E	4
I	H,L	3
J	K	12
K	D,F,G	4
L	J	2
M	H,L	2

- Draw a Network diagram for the project.
- Indicate the critical path.
- For each non-critical activity, find the total and free float.

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