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CMR INSTITUTE OF TECHNOLOGY

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CMRIT

Internal Assesment Test – I

Sub:	OPERATIONS RESEARCH							Code:	MBA204
Date:	01-07-2025	Duration:	90 mins	Max Marks:	50	Sem:	II	Branch:	MBA

SET - 1

	Marks	OBE CO	OBE RBT

Part A - Answer Any Two Full Questions (2* 20 = 40 marks)
Part B – Compulsory – Case Study (1*10 = 10 marks)

1 (a) Explain the term Operation Research. [03] CO1 L2

(b) Outline the Scope of Operations Research. [07] CO1 L4

(c) Examine the Phases of Operations Research. [10] CO1 L3

2 (a) Explain the term.Transportation cost and convert the Unbalanced problem in to Balanced Problem under Transportation Problem. [03] CO2 L2

		Destination			Supply
		1	2	3	
Source	1	30	50	15	**300**
	2	35	70	20	**200**
	3	20	45	60	**500**
	Demand	**300**	**200**	**400**	

(b) Solve the problem by Hungerian Method (Assignment Problem). The matrix entries represent the processing times in hours. [07] CO3 L3

		OPERATOR				
		1	**2**	**3**	**4**	**5**
JOB	**1**	10	12	15	12	8
	2	7	16	14	14	11
	3	13	14	7	9	9
	4	12	10	11	13	10
	5	8	13	15	11	15

(c) Outline the case of and compute the same. Consider the following transportation problem involving three sources and four destinations. The cell entries represent the cost of transportation per unit. [10] CO2 L4

		Destination				Supply
		1	2	3	4	
Source	1	3	1	7	4	**300**
	2	2	6	5	9	**400**
	3	8	3	3	2	**500**
	Demand	**250**	**350**	**400**	**200**	

Obtain the initial basic feasible solution using the following methods:

- Northwest Corner Cell method.
- Least Cost Cell method.
- Vogel's Approximation method.

3 (a) Infer the term Optimality in Transportation Problem. [03] CO2 L3

(b) Summarize the given case as given below. [07] CO3 L5

Solve the following LP problem using Graphical method.

Maximize $Z = 10X_1 + 3X_2$

Subject to

$2X_1 + 3X_2 \leq 18$

$6X_1 + 5X_2 \geq 60$

X_1 and $X_2 \geq 0$

(c) Judge the case and formulate the Equation for the same. [10] CO3 L5

A big hospital has the following minimal daily requirements of doctors;

Period	Clock Time (24 Hours)	No of Doctors required
1	6am – 10am	72
2	10am – 2pm	77
3	2pm – 6pm	85
4	6pm – 10pm	68
5	10pm – 2am	25
6	2am – 6am	23

Doctors report to the hospital at the beginning of each period and work for 8 consecutive hours. Formulate this as a linear programming problem to minimize the total number of doctors to meet the needs of the hospital throughout the day.

Part B - Compulsory (01*10=10 marks)

4 **Case Study**

Analyze the case given below. [10] CO2 L4

Find the optimal distribution by using Vogel's Approximation Method in the first stage to get the initial basic initial basic feasible solution. (Apply MODI)

		Destination					Supply
Source		1	2	3	4	5	
	1	10	2	16	14	10	**300**
	2	6	18	12	13	16	**500**
	3	8	4	14	12	10	**825**
	4	14	22	20	8	18	**375**
Demand		**350**	**400**	**250**	**150**	**400**	

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ACCREDITED WITH A++ GRADE BY NAAC

SCHEME OF EVALUATION
Internal Assessment Test 1– July 2025

Sub: OPERATIONS RESEARCH | Code: MBA204

Date: 01/07/2025 | Duration: 90mins | Max Marks: 50 | Sem: II | Branch: MBA

Note: Part A - Answer Any Two Full Questions (20*02=40 Marks)

Part B - Compulsory (01*10= 10marks)

Part	Question #		Description	Marks Distribution		Max Marks
A	1	a)	OR It is a scientific approach to problem solving for executive management.	3 marks for explanation.	3	20 M
		b)	Scope of OR ✓ Decision support. ✓ Problem solving. ✓ Resource optimization ✓ Industry application ✓ Integration with tech.	3 marks for points & 4 marks for explanation.	7	
		c)	Phases of OR ✓ Problem definition ✓ Data collection ✓ Model construction & selection ✓ Model validation & verification ✓ Sol. Generation & Analysis ✓ Implementation & Monitoring	5 marks for explanation.	10	

	2	a)	30 50 15 0 300 35 70 20 0 200 20 45 60 0 120 300 200 400 100 1000 1120	3 M	3	20 M
		b)	Job Operation Time(Hrs) 1 5 8 2 1 7 3 3 7 4 2 10 5 4 11 A.C. = 2. 43	7 M	7	
		c)	∞ CR = 4400 LCM = 2850 VAM = 2850	3 M 3 M 4 M	10	

	3	a)	Transportation problem finding the most efficient way to move goods or resources, minimizing cost or other relevant objective function, while satisfying supply and demand constraints	3 M	3	20 M
		b)	Graphical points [9, 6] [10, 17] NO FEASIBLE REGION	4 M 3 M	7	
		c)	Min. $Z = x_1 + x_2 + x_3 + x_4 + x_5 + x_6$ Sub. to constraints $x_1 + x_2 \geq 77$ $x_2 + x_3 \geq 85$ $x_3 + x_4 \geq 68$ $x_4 + x_5 \geq 25$ $x_5 + x_6 \geq 23$ $x_6 + x_1 \geq 72$ Non-negativity function: $x_1, x_2, x_3, x_4, x_5, x_6 \geq 0$.	3 M 5 M 2 M	10	

B	4	a)	VAM = 12,250		10	10 M