

Internal Assessment Test – I

Sub:	OPERATIONS RESEARCH	Code:	22MBA24
Date:	08-08-2023	Duration:	90 mins
		Max Marks:	50
		Sem:	II
		Branch:	MBA
SET - 3			

		Marks		OBE																																																						
		CO	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 OR and write in brief.	[03]																																																								
	(b) Outline the development of OR.	[07]																																																								
	(c) Examine the OR approach in detail.	[10]																																																								
2	(a) Explain the term Dummy Variable in Transportation.	[03]																																																								
	(b) Solve the case. Four different ships are to be assigned to three cargo consignors with a view to maximizing the profit. From the following profit matrix representing the problem, work out the optimal assignment plan and determine the maximum possible profit.	[07]																																																								
<table border="1" style="margin: auto; border-collapse: collapse;"> <thead> <tr> <th colspan="2"></th> <th colspan="3" style="text-align: center;">CARGO CONSIGNORS</th> </tr> <tr> <th style="text-align: center;">SHIPS</th> <th style="text-align: center;">P</th> <th style="text-align: center;">Q</th> <th style="text-align: center;">R</th> <th></th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">A</td> <td style="text-align: center;">1</td> <td style="text-align: center;">4</td> <td style="text-align: center;">5</td> <td></td> </tr> <tr> <td style="text-align: center;">B</td> <td style="text-align: center;">2</td> <td style="text-align: center;">3</td> <td style="text-align: center;">3</td> <td></td> </tr> <tr> <td style="text-align: center;">C</td> <td style="text-align: center;">3</td> <td style="text-align: center;">3</td> <td style="text-align: center;">3</td> <td></td> </tr> <tr> <td style="text-align: center;">D</td> <td style="text-align: center;">5</td> <td style="text-align: center;">1</td> <td style="text-align: center;">2</td> <td></td> </tr> </tbody> </table>								CARGO CONSIGNORS			SHIPS	P	Q	R		A	1	4	5		B	2	3	3		C	3	3	3		D	5	1	2																								
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	(c) Outline the case and Consider the transportation problem.	[10]																																																								
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Find the initial basic feasible solution using each of the following methods and compare their total costs.																																																										

- a) Northwest Corner Method.
- b) Least Cost Cell Method.
- c) Vogel's Approximation Method.

3 (a) Infer the term Unbalanced Problem in Assignment. [03]

(b) Summarize the data and Solve the following pay off matrix using the graphic method. [07]

	B1	B2	B3	B4
A1	19	6	7	5
A2	7	3	14	6
A3	12	8	18	4
A4	8	7	13	-1

(c) Judge the case and compute the payoff matrix of Player A as shown in below table and solve it optimally using graphical method. [10]

PLAYER A	PLAYER B					
		1	2	3	4	5
	1	4	2	1	7	3
2	2	7	8	1	5	

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

4 **Case Study**

Analyze the case given below.

Find the optimum solution for the transportation problem involving the following cost matrix by :

To	S1	S2	S3	Available
From				
F1	50	50	220	1
F2	90	45	170	3
F3	250	200	50	4
Requirement	4	2	2	

Compute the Cost by VAM and MODI.

CO2	L3
CO3	L5
CO3	L5
CO2	L4

Course Outcomes (COs)		PO1	PO2	PO3	PO4	PO5	PS01	PS02	PS03	PS04
CO1:	Get an insight into the fundamentals of Operations Research and its definition, characteristics and phases.	1a, 1b				1c	1a, 1b, 1c			
CO2:	Use appropriate quantitative techniques to get feasible and optimal Solutions.		2a, 2c	3a, 4				2a, 2c, 3a, 4		
CO3:	Understand the usage of game theory, Queuing Theory and Simulation for Solving Business Problems.				2b, 3b, 3c			2b, 3b, 3c		
CO4:	Understand and apply the network diagram for project completion.									

Cognitive level	KEYWORDS
L1 - Remember	list, define, tell, describe, recite, recall, identify, show, label, tabulate, quote, name, who, when, where, etc.
L2 - Understand	describe, explain, paraphrase, restate, associate, contrast, summarize, differentiate interpret, discuss
L3 - Apply	calculate, predict, apply, solve, illustrate, use, demonstrate, determine, model, experiment, show, examine, modify
L4 - Analyze	classify, outline, break down, categorize, analyze, diagram, illustrate, infer, select
L5 - Evaluate	asses, decide, choose, rank, grade, test, measure, defend, recommend, convince, select, judge, support, conclude, argue, justify, compare, summarize, evaluate
L6 - Create	design, formulate, build, invent, create, compose, generate, derive, modify, develop, integrate

PO1–Theoretical Knowledge; PO2–Effective Communication Skills; PO3–Leadership Qualities; PO4 –Sustained Research Orientation; PO5 –Self-Sustaining Entrepreneurship

CI

CCI

HOD

SCHEME OF EVALUATION
Internal Assessment Test 1 - Aug 2023

Sub:	Operations Research - 22MBA24						Code:	CR	
Date:	08-08-2023	Duration:	90min	Max Marks:	50	Sem:	IV	Branch:	MBA

Note: Part A - Answer Any Two Full Questions (20*02=40 Marks)
Part B - Compulsory (01*10= 10marks)

Part	Question #	Description	Marks	Max Marks
A	1 a)	OR can be considered as being the application of scientific method by inter-disciplinary team to solve problems involving the control of organized sys.	3	20 M
	b)	Defn. of OR → OR was used in military purposes - 1953 - OR society of America 1957 - → FOR society individual managers to solve complex managerial problems	7	
	c)	OR A approach → Formulating the problem → Constructing the model → Deriving the solution ✓ Analytical method ✓ Heuristic method ✓ Simulation method → Testing the validity → Implementing the solution → Modifying the model	10	

2	a)	Slack variable is a imaginary origin with zero cost introduced to model an unbalanced problem	3																			
	b)	<table border="1"> <thead> <tr> <th>Ships</th> <th>Cargo</th> <th>Cargo</th> </tr> </thead> <tbody> <tr> <td>A</td> <td>5</td> <td>P</td> </tr> <tr> <td>B</td> <td>0</td> <td>S</td> </tr> <tr> <td>C</td> <td>3</td> <td>P</td> </tr> <tr> <td>D</td> <td>5</td> <td>P</td> </tr> <tr> <td></td> <td><u>13</u></td> <td></td> </tr> </tbody> </table>	Ships	Cargo	Cargo	A	5	P	B	0	S	C	3	P	D	5	P		<u>13</u>		7	
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c)	<p>Transportation Cost</p> <p>NOCP = 19,700</p> <p>LCM =</p> <p>VAM = 12,250</p>	10	20 M																			
3	a)	UNBALANCED PROBLEM UNANSWERED Converting the unbalanced problem no. of rows & columns in to equal no. of rows & columns	3																			
	b)	<p>$V = S$</p> <p>Player A = $[6/18, 12/18]$</p> <p>Player B = $[11/18, 0, 7/18, 0]$</p>	7	20 M																		

		c)	$V = 1$ $\text{Player A} = [1/4, 3/4]$ $\text{Player B} = [6/8, 0, 0, 2/8, 0]$	10	
B	4	a)	$NAM = 820$ $MOD1 = 820$ <hr/> news production cost.	10	10 M