Internal Assesment Test - II

Sub:	OPERATIONS RESEARCH						Code:	20MBA24
Date:	27-08-2022	Duration:	90 mins	Max Marks:	50	Sem:	II	Branch: MBA

		Marks	OBE	
			CO	RBT
	Part A - Answer Any Two Full Questions (2* 20 = 40 marks)			
1 (a)	Define the term Optimal cost in Transportation.	[03]	CO2	L1
(b)	Explain the Procedure to compute the Transportation Cost by VAM.	[07]	CO2	L2
(c)	Examine the process to compute the Assignment cost by Hungarian.	[10]	CO2	L3
2 (a)	Convert the transportation problem into a balanced transportation problem.	[03]	CO2	L2

		Destination				Supply
		1	2	3	4	
Source	1	5	12	6	10	**300**
	2	7	8	10	3	**400**
	3	9	4	9	2	**300**
	Demand	**200**	**300**	**450**	**250**	

(b) There are four jobs to be assigned to the machines. Only one job could be assigned to one machine. The amount of time in hours required for the jobs in machines are given in the following matrix. **[07] CO2 L3**

	M1	M2	M3	M4
J1	2	3	4	5
J2	4	5	6	7
J3	7	8	9	8
J4	3	5	8	4

Calculate the optimum assignment of jobs to the machines to minimize the total processing time.

(c) Consider the transportation problem. **[10] CO2 L3**

		Destination					Supply
		1	2	3	4	5	
Source	1	10	2	3	15	9	**25**
	2	5	10	15	2	4	**30**
	3	15	5	14	7	15	**20**
	4	20	15	13	-	8	**30**

	Demand	20	20	30	10	25	

Calculate 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.

3 (a)	Define the term Balanced Problem in Assignment.	[03]	CO2 L1

(b) 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, Calculate the optimal assignment plan and determine the maximum possible profit. [07] CO2 L3

SHIPS	P	Q	R
A	1	4	5
B	2	3	3
C	3	3	3
D	5	1	2

(c) Calculate the basic feasible solution to the following transportation problem using the North West Corner Rules, Least Cost Method & VAM. [10] CO2 L3

To From	W1	W2	W3	W4	Units Available
F1	6	4	1	5	14
F2	8	9	2	7	16
F3	4	3	6	2	5
Units Required	6	10	15	4	

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

4   **Case Study**

Calculate the optimum solution for the transportation problem involving the following cost matrix by : [10] CO2 L3

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

Calculate the Cost by VAM and MODI.

Course Outcomes (COs)		PO1	PO2	PO3	PO4	PO5
CO1:	Get an insight into the fundamentals of Operations Research and its definition, characteristics and phases.					
CO2:	Use appropriate quantitative techniques to get feasible and optimal solutions.	1a, 1b, 1c, 2a, 2b, 2c, 3a, 3b, 3c, 4				
CO3:	Understand the usage of game theory, Queuing Theory and Simulation for Solving Business Problems.					
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 2– Aug 2022

Sub:	**OPERATIONS RESEARCH**				**Code:**	20MBA24
Date**:** 27-08-22	Duration: 90mins	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 Distribution	Max Marks
A	1	a)	Definition of Optimal Cost in Transportation.	3	20 M
		b)	Procedure of VAM by Transportation Cost Mentioning only the Points Explaining the points with examples.	4 3	
		c)	Procedure of Assignment Cost by Hungarian Mentioning only the Points Explaining the points with examples.	4 6	
	2	a)	Making the problem Balanced	3	20 M
		b)	Assigning the points Calculating the values Computation of Assignment Cost.	2 2 3	
		c)	Computation of cost as per NWCM Computation of cost as per LCM	5 5	
	3	a)	Definition of Balanced Problem in Assignment.	3	20 M
		b)	Making the Problem to be Balanced Converting the problem from Maximizing to normal Computation of Assignment cost.	2 2 3	
		c)	Computation of cost as per NWCM Computation of cost as per LCM Computation of cost as per VAM	3 3 4	
B	4		Computation of cost as per VAM Computation of cost as per MODI	5 5	10 M

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Internal Assesment Test – II

Sub:	OPERATIONS RESEARCH					Code:	20MBA24
Date:	27-08-2022	Duration: 90 mins	Max Marks: 50	Sem:	I	Branch:	MBA

SOLUTION

		Marks	OBE	
			CO	RBT
	Part A - Answer Any Two Full Questions (2* 20 = 40 marks)			
1 (a)	Definition of Optimal cost in transportation Once an initial solution is obtained, the next step is to check its optimality. An optimal solution is one where there is no further set of transportation routes (allocations) that will further reduce the total transportation cost. Thus, we have to evaluate each unoccupied cell (represent unused route) in the transportation table in terms of an opportunity of reducing total transportation cost.	[03]	CO1	L1
(b)	Procedure to compute the Transportation Cost by VAM **Step 1:** Identify the two lowest costs in each row and column of the given cost matrix and then write the absolute row and column difference. These differences are called penalties. **Step 2:** Identify the row or column with the maximum penalty and assign the corresponding cell's min(supply, demand). If two or more columns or rows have the same maximum penalty, then we can choose one among them as per our convenience. **Step 3:** If the assignment in the previous satisfies the supply at the origin, delete the corresponding row. If it satisfies the demand at that destination, delete the corresponding column. **Step 4:** Stop the procedure if supply at each origin is 0, i.e., every supply is exhausted, and demand at each destination is 0, i.e., every demand is satisfying. If not, repeat the above steps, i.e., from step 1.	[07]	CO1	L2
(c)	Process to compute the Assignment cost by Hungarian. Step 1: Subtract the row minima. Step 2: Subtract the column minimums. Step 3: Use a limited number of lines to cover all zeros. Step 4: Add some more zeros to the equation.	[10]	CO2	L3
2 (a)	Unbalanced transportation problem into a balanced transportation problem	[03]	CO2	L2

		Destination				Supply
		1	2	3	4	
Source	1	5	12	6	10	**300**
	2	7	8	10	3	**400**
	3	9	4	9	2	**300**
	0	0	0	0	0	**200**
	Demand	**200**	**300**	**450**	**250**	

(b) Source   Destination   [07] CO2 L3

1 – P

2 – Q

3 – R

4 – S

Total Assignment Cost = Rs. 20.

(c) Transportation Cost   [10] CO2 L4

NWCR = 1030

LCM = 820

3 (a) Define the term Balanced Problem in Assignment   [03] CO2 L1

Unbalanced Assignment problem is an assignment problem where the number of
facilities is not equal to the number of jobs.

(b) Assignment Cost = 13   [07] CO2 L2

(c) Transportation Cost   [10] CO2 L2

NWCR = 128

LCM = 156
VAM = 114

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

4   Transportation Cost   CO2 L4

VAM = 820

MODI = 835

Course Outcomes (COs)		PO1	PO2	PO3	PO4	PO5
CO1:	Gain conceptual knowledge and practical experience in understanding the HR concepts globally.					
CO2:	Comprehend and correlate the strategic approaches to HR aspects amongst PCN's, TCN's and HCN's.	1a, 1b, 1c, 2a, 2b, 2c, 3a, 3b, 3c, 4				
CO3:	Develop knowledge and apply the concepts of HR in global perspective.					
CO4:	Have a better insight of HR concepts, policies and practices by critically analyzing the impact of contemporary issues globally.					

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
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