CBCS SCHEME

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22MBA24

Second Semester MBA Degree Examination, Dec.2023/Jan.2024
Operations Research

Time: 3 hrs. Max. Marks: 100

Note: 1. Answer any FOUR full questions from Q.No.1 to Q.No.7.
2. Question No. 8 is compulsory.
3. M : Marks , L: Bloom's level , C: Course outcomes.
4. Use of Normal distribution table is permitted.

			M	L	C
Q.1	a.	List out the various phases of operation research.	03	L1	CO1
	b.	A publisher of text books is in the process of presenting a new book to the market the book bind either cloth or hard paper. The each cloth binding book contributes Rs.30 and each paper binding book contributed Rs.25 towards profit. It takes 8 minutes to bind a cloth cover and 6 minutes to bind a paper back, the total time available for binding is 800 hours. After market survey, it is predicted that the cloth cover sales will be atleast 2000 copies but the paper back will be atleast 5000 copies, but the paper back will be atleast 5000 copies. Formulate the above problem in LPP.	07	L2	CO3
	c.	Enumerate the application of operations research.	10	L1	CO1
Q.2	a.	What is linear programming?	03	L2	CO1
	b.	From the following game by using minimax and maximin whose pay of matrix given below also find value of game. Does the game have a saddle point?	07	L3	CO3
	c.	Minimize $z = 2x_1 + 3x_2$ Subject to the constraints : (i) $x_1 + x_2 \le 30$ (ii) $x_2 \ge 3$ (iii) $0 \le x_2 \le 12$ (iv) $0 \le x_1 \le 20$ (v) $x_1 - x_2 \ge 0$ and $x_1, x_2 \ge 0$	10	L3	CO3
Q.3	a.	What do you understand by Decision Tree?	03	L3	CO1
	b.	Determine the initial basic feasible solution for the following transportation problem using Vogel Approximation Model (VAM).	07	L2	CO3
	c.	Briefly discuss the Operations Research models.	10	L2	CO3

Player B

Player A	B_1	B_2	B_3	B_4	B_5
A_1	-2	0	0	5	3
A_2	3	2	1	2	2
A_3	-4	-3	0	-2	6
A_4	5	3	-4	2	6

	D_1	D_2	D_3	D_4	Supply
S_1	2	3	11	7	6
S_2	1	0	6	2	1
S_3	5	8	3	2	10
Demand	7	5	3	2	17

Q.4	a.	What are the objectives of Game Theory?	03	L3	CO3
	b.	In a game of matching coins Player-A wins Rs.8 if both the coins shows heads and Rs.1 if both are tails. Player-B wins Rs.3 when one coin do not match given the choice of being Player-A or Player-B. Find the best strategies and value of the game.	07	L3	CO3
	c.	Determine the initial basic feasible solutions to the following transportation problem by using (i) NWCM (ii) LCM.	10	L2	CO3

Source \ Destination	D_1	D_2	D_3	Supply
S_1	6	4	1	50
S_2	3	8	7	40
S_3	4	4	2	60
Demand	20	95	35	

Q.5	a.	What is meant by unbalanced transportation problem? How to solve unbalanced transportation problem?	03	L2	CO1
	b.	A department of a company has 5 employees with 5 jobs to be performed the time (in hours) that each man takes to perform each job is given in the effectiveness matrix.	07	L2	CO3

Jobs \ Employees	I	II	III	IV	V
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 maximize the total man-hours?

	c.	Listed in the table are the activities and sequencing necessary for a maintenance job in the heat exchangers in a refinery.	10	L4	CO4

Activity	Description	Predecessor Activity
A	Dismantle pipe connections	-
B	Dismantle heats, closure and floting front	A
C	Remove tube bundle	B
D	Clean Bolts	B
E	Clean heater and floating head front	B
F	Clean tube bundle	C
G	Clean shell	C
H	Replace tube bundle	k, g
I	Prepare shell pressure test	D, E, H
J	Prepare tube pressure test and reassemble	I

Draw a network diagram of activities for the project.

Q.6	a.	Define PERT & CPM.	3	L4	CO2
	b.	Describe the phases of project management.	7	L4	CO2

			Marks	Level	CO
	c.	Solve the following transportation problem, using LCM for IBFS and use modified distribution method to check, whether solution is optimal or not.	10	L3	CO3
Q.7	a.	What do you understand by saddle point?	03	L1	CO1
	b.	Find the optimal strategy and value of the game using dominance rule for the following game:	07	L3	CO3
	c.	Describe the characteristics of operations research.	10	L1	CO2
Q.8		Case Study (Compulsory) : Solve the transporation when unique transportation cost, demand and supply is given below.	20	L3	CO3

Q.6 c. table:

Destination

Sources	D_1	D_2	D_3	Supply
S_1	8	6	10	300
S_2	12	16	10	400
S_3	14	10	12	300
Demand	450	150	200	

Q.7 b. table:

	B_1	B_2	B_3
A_1	4	6	8
A_2	-3	-3	4
A_3	2	-3	4

Q.8 table:

	D_1	D_2	D_3	D_4	Supply
A_1	6	1	9	3	70
A_2	11	5	2	8	65
A_3	10	12	4	7	70
Demand	85	35	50	45	205 / 215

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