

K. J. Somaiya Institute of Engineering and Information Technology, Sion, Mumbai-22
(Autonomous College Affiliated to University of Mumbai)

Subject Code: ILC7055

Subject Name: Operation Research

Date: 13/12/2022

Nov – Dec 2022				
(B.Tech.) Program: Electronics and Telecommunication, Information Technology and Computer engineering				
Examination: LY Semester: VII				
Course Code: ILC7055 and Course Name: Operation Research				
Duration: 2.5 Hours			Max. Marks: 60	
Instructions:				
(1) All questions are compulsory.				
(2) Draw neat diagrams wherever applicable.				
(3) Assume suitable data, if necessary.				
		Max. Marks	CO	BT level
Q 1	Solve any six questions out of eight	12		
i)	Explain the following terms (1) pure strategy (2) mixed strategy (3) Saddle point (4) Pay-off matrix	2	CO3	U
ii)	Explain degeneracy in terms of Transportation Problem	2	CO2	U
iii)	Consider the following 7 jobs J1, J2, J3, J4, J5, J6 and J7. They are processed on machines A and B in the order AB. The processing times on machine A for the 7 jobs are [3, 12, 13, 4, 10, 11, 9] and the processing times on machine B for the 7 jobs are [8, 9, 8, 6, 13, 1, 3]. Determine the optimum job sequence	2	CO4	A
iv)	Explain Monte Carlo Simulation	2	CO5	U
v)	Explain the steps in Decision theory approach	2	CO6	U
vi)	Explain applications of linear programming	2	CO1	U
vii)	List the general rules for converting any primal LPP into its dual	2	CO1	R
viii)	Explain the different phases of project management	2	CO4	U
Q.2	Solve any four questions out of six.	16		
i)	Food X contains 6 units of vitamin A per gram and 7 units of vitamin B per gram and costs 12 paise per gram. Food Y contains 8 units of vitamin A per gram and 12 units of vitamin B per gram and costs 20 paise per gram. The daily minimum requirement of vitamins A & B is 100 units and 120 units respectively. Formulate a LPP	4	CO1	C
ii)	Determine the basic feasible solution to the following Transportation problem using Vogel's Approximation method	4	CO2	A

Factory	Warehouse					Available
	W1	W2	W3	W4	W5	
F1	7	6	4	5	9	40
F2	8	5	6	7	8	30
F3	6	8	9	6	5	20
F4	5	7	7	8	6	10
Required	30	30	15	20	5	

iii)	<p>Solve the following payoff matrix with respect to Player A and find the strategies for both players along with the value of game.</p> <p style="text-align: center;">B</p> <table style="margin-left: auto; margin-right: auto;"> <tr> <td></td> <td></td> <td style="text-align: center;">1</td> <td style="text-align: center;">2</td> </tr> <tr> <td rowspan="2" style="vertical-align: middle;">A</td> <td style="text-align: center;">1</td> <td style="border: 1px solid black; padding: 5px;">10</td> <td style="border: 1px solid black; padding: 5px;">8</td> </tr> <tr> <td style="text-align: center;">2</td> <td style="border: 1px solid black; padding: 5px;">6</td> <td style="border: 1px solid black; padding: 5px;">12</td> </tr> </table>			1	2	A	1	10	8	2	6	12	4	CO3	A
		1	2												
A	1	10	8												
	2	6	12												

iv)	<p>Determine the optimal schedule for the following two machines and six jobs flow shop problem</p> <table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="border-top: 1px solid black; border-bottom: 1px solid black;">Job</th> <th style="border-top: 1px solid black; border-bottom: 1px solid black;">Machine 1</th> <th style="border-top: 1px solid black; border-bottom: 1px solid black;">Machine 2</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>5</td> <td>7</td> </tr> <tr> <td>2</td> <td>10</td> <td>8</td> </tr> <tr> <td>3</td> <td>8</td> <td>13</td> </tr> <tr> <td>4</td> <td>9</td> <td>7</td> </tr> <tr> <td>5</td> <td>6</td> <td>11</td> </tr> <tr> <td>6</td> <td>12</td> <td>10</td> </tr> </tbody> </table>	Job	Machine 1	Machine 2	1	5	7	2	10	8	3	8	13	4	9	7	5	6	11	6	12	10	4	CO4	U
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v)	<p>A textile mill buys its raw material from a vendor. The annual demand of the raw material is 9000 units. The ordering cost is Rs. 100 per order and the carrying cost is 20% of the purchase price per month, where the purchase price per unit is Re. 1. Find the following</p> <p>(a) EOQ (b) Total cost w.r.t EOQ</p>	4	CO5	R
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