

**End Semester/Reappear (Semester IV) Examination May 2025**

**Programme: BBA**

**Course: Management Science**

**Course Code:11CC204**

**Enrolment no. \_\_\_\_\_**

**Full Marks: 70**

**Time: 3 Hrs.**

Q.N o.	Questions	CO	Bloom Taxonomy Category	Marks																																			
<b>Section I</b>																																							
1	<b>Short Answer type questions.</b>			4 x 5 = 20																																			
a	Express mathematical and matrix form of general L.P.P. or	CO1	Understand																																				
	Write short notes on (i) Types of variables in L.P.P. (ii) Basic solution of L.P.P.	CO1	Remember																																				
b	Define non – degenerate and degenerate solution with suitable diagram in transportation problem. or	CO2	Remember																																				
	Give mathematical formulation of the assignment problem.	CO2	Understand																																				
c	Define: Competitive game, pure strategies, Mixed strategies, two person zero sum game. or	CO3	Remember																																				
	Discuss dominance property in game theory.	CO3	Remember																																				
d	Define the given terminology in sequencing problems: Number of machine, processing order, Processing time, Idle time on a machine, Total elapsed time. or	CO4	Remember																																				
	Explain the importance of sequencing problems.	CO4	Remember																																				
<b>Section II</b>																																							
	<b>Long Answer type questions.</b>			3 x 10 = 30																																			
2	Using Simplex algorithm solve the given LPP  $\text{Maximize } Z = 2x_1 + 5x_2 + 7x_3$ Subject to constraints $3x_1 + 2x_2 + 4x_3 \leq 100$ $x_1 + 4x_2 + 2x_3 \leq 100$ $x_1 + x_2 + 3x_3 \leq 100$ and $x_1, x_2, x_3 \geq 0$ or Use Two – phase simplex method to solve the given L.P.P $\text{Minimize } Z = x_1 + x_2$ Subject to constraints $2x_1 + x_2 \geq 4; x_1 + 7x_2 \geq 7$ and $x_1, x_2 \geq 0$	CO1	Apply																																				
3	A marketing manager has 5 salesmen and there are 5 sales districts. Considering the capabilities of the salesmen and the nature of districts, the capabilities of the salesmen and the sales per month (in 1000 rupees) for each salesmen in each district would be as follow: Find the assignment of salesmen to the districts that will result in the maximum sales.  <table border="1" style="margin-left: auto; margin-right: auto; border-collapse: collapse;"> <thead> <tr> <th></th> <th>A</th> <th>B</th> <th>C</th> <th>D</th> <th>E</th> </tr> </thead> <tbody> <tr> <th>1</th> <td>32</td> <td>38</td> <td>40</td> <td>28</td> <td>40</td> </tr> <tr> <th>2</th> <td>40</td> <td>24</td> <td>28</td> <td>21</td> <td>36</td> </tr> <tr> <th>3</th> <td>41</td> <td>27</td> <td>33</td> <td>30</td> <td>37</td> </tr> <tr> <th>4</th> <td>22</td> <td>38</td> <td>41</td> <td>36</td> <td>36</td> </tr> <tr> <th>5</th> <td>29</td> <td>33</td> <td>40</td> <td>35</td> <td>39</td> </tr> </tbody> </table> or		A		B	C	D	E	1	32	38	40	28	40	2	40	24	28	21	36	3	41	27	33	30	37	4	22	38	41	36	36	5	29	33	40	35	39	CO2
	A	B	C	D	E																																		
1	32	38	40	28	40																																		
2	40	24	28	21	36																																		
3	41	27	33	30	37																																		
4	22	38	41	36	36																																		
5	29	33	40	35	39																																		

Find optimal transportation cost of given transportation problem.										
To										
		A	B	C	Supply					
From	I	2	7	4	5					
	II	3	3	1	8					
	III	5	4	7	7					
	IV	1	6	2	14					
	Demand	7	9	18						
CO2		Evaluate								
4	A book binder has one printing press, one binding machine and one finishing machine and manuscripts of a number of different books. The time required for printing, binding, and finishing of each book is known. Determine the order in which the books be processed to minimize the total elapsed time.									
			<b>Processing Time (Minutes)</b>							
		<b>Book</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>			
	<b>Printing Time</b>	<b>40</b>	<b>90</b>	<b>80</b>	<b>60</b>	<b>50</b>				
	<b>Binding Time</b>	<b>50</b>	<b>60</b>	<b>20</b>	<b>30</b>	<b>40</b>				
	<b>Finishing time</b>	<b>80</b>	<b>100</b>	<b>60</b>	<b>70</b>	<b>100</b>				
or										
Find the optimal sequence, the total time required to complete the tasks and idle time on each machine for the given data:										
		Tasks								
		A	B	C	D	E	F	G	H	I
Machines	I	2	5	4	9	6	8	7	5	4
	II	6	8	7	4	3	9	3	8	11
CO4		Evaluate								

### Section III

<b>Application based questions</b>																						
5	Discuss the algebraic method for solving 2 X 2 games. A and B play a game in which each has three coins a 5 p, a 10p, and a 20p. Each player selects a coin without the knowledge of the others choice. If the sum of the coins is an odd amount, A wins B's coin; if the sum is even, B win A's coin. Find the best strategy for each player and the value of the game.		CO3	Evaluate																		
	or																					
	a. Is the given two person zero sum game stable? Solve the game																					
		<b>Player B</b> <table style="margin-left: auto; margin-right: auto;"> <tr> <td></td> <td>5</td> <td>-10</td> <td>9</td> <td>0</td> </tr> <tr> <td rowspan="3" style="writing-mode: vertical-rl; transform: rotate(180deg);">Player A</td> <td>6</td> <td>7</td> <td>8</td> <td>1</td> </tr> <tr> <td>8</td> <td>7</td> <td>15</td> <td>1</td> </tr> <tr> <td>3</td> <td>4</td> <td>-1</td> <td>4</td> </tr> </table>		5	-10	9	0	Player A	6	7	8	1	8	7	15	1	3	4	-1	4	CO3	Evaluate
	5	-10	9	0																		
Player A	6	7	8	1																		
	8	7	15	1																		
	3	4	-1	4																		
b. Solve graphically the given game																						
		$\begin{bmatrix} 1 & 3 & -1 & 4 & 2 & -5 \\ -3 & 5 & 6 & 1 & 2 & 0 \end{bmatrix}^T$																				
				<b>1 x 20 = 20</b>																		

### COURSE OUTCOME

On completion of the course, student will be able to

CO1: Understand a basic thoughtfulness for linear programming problem.

CO2: Formulate mathematical model for management and technical problems using LPP concepts.

CO3: Understand the content of an operations strategy and the decisions involved.

CO4: Create an interest to solve transportation and assignment problems with its physical significance