

INTERNATIONAL ISLAMIC UNIVERSITY CHITTAGONG

Department of Business Administration

BBA Midterm Examination, Spring 2023

Course Title: **Operations Research** Course Code: **OR-3501**

Time: 1 hour 30 min

Marks: 30

[Answer any the following questions]

1.	a) Describe the role that operations research plays in the business world.	CLO1	4																																			
	b) What are the different representations whose objective is to provide a means of analyzing the behavior of operations for the purpose of improving its managerial performance?	CLO1	4																																			
	c) Write down the flaws of operations research.	CLO1	2																																			
OR																																						
	a) What is linear programming problem? Mention the basic assumptions of LPP.	CLO2	3																																			
	b) A firm is engaged in breeding goats. In view of the need to ensure certain nutrient constituents (X, Y, and Z), it is necessary to buy two additional products, A and B. One unit of product A contains 36 units of X, 3 units of Y, and 20 units of Z. One unit of product B contains 6 units of X, 12 units of Y, and 10 units of Z. The minimum requirements for X, Y, and Z are 108 units, 36 units, and 100 units respectively. Product A and B are priced at Tk. 20 and Tk. 40 per unit, respectively. Determine the number of products that the firm should buy to minimize the total cost.	CLO2	7																																			
2.	a) Discuss the unboundedness of LPP with diagram.	CLO2	2																																			
	b) A firm manufactures two products A & B on which the profits earned per unit are Tk.80 & Tk.140 respectively. Each product is processed on two machines M ₁ & M ₂ . Product A requires 1 minute of processing time on M ₁ & 2 minutes on M ₂ , while B requires 1 minute on each machine. Machine M ₁ is available for not more than 7hrs.30 min, while Machine M ₂ is available for 10 hrs., during any working day. Use simplex method to find the number of manufactured units of A & B to get the maximum profit.	CLO2	8																																			
3.	a) What is transportation problem? Write down the technique of conversion from an unbalanced transportation problem to a balanced transportation problem.	CLO2	3																																			
	b) A state has four government hospitals A,B,C and D whose monthly requirements of medicines are met by four distribution centers X,Y,Z and W. the data for distribution cost per unit and availabilities at the centers & requirements at the hospitals are given below:	CLO2	7																																			
<table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th></th> <th>A</th> <th>B</th> <th>C</th> <th>D</th> </tr> </thead> <tbody> <tr> <th>X</th> <td>44</td> <td>84</td> <td>84</td> <td>80</td> </tr> <tr> <th>Y</th> <td>92</td> <td>30</td> <td>64</td> <td>80</td> </tr> <tr> <th>Z</th> <td>32</td> <td>100</td> <td>96</td> <td>72</td> </tr> <tr> <th>W</th> <td>80</td> <td>36</td> <td>120</td> <td>60</td> </tr> <tr> <th>Availability</th> <td>2000</td> <td>12000</td> <td>5000</td> <td>6000</td> </tr> <tr> <th>Requirement</th> <td>8000</td> <td>8000</td> <td>6000</td> <td>3000</td> </tr> </tbody> </table>					A	B	C	D	X	44	84	84	80	Y	92	30	64	80	Z	32	100	96	72	W	80	36	120	60	Availability	2000	12000	5000	6000	Requirement	8000	8000	6000	3000
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Determine the optimum distribution by Cell minima method and the total distribution cost.																																						