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B.M.S. College of Engineering, Bengaluru-560019

Autonomous Institute Affiliated to VTU

May 2024 Semester End Main Examinations

Programme: B.E.

Branch: Mechanical Engineering

Course Code: 16ME8DCORE

Course: Operations Research

Semester: VIII

Duration: 3 hrs.

Max Marks: 100

Instructions: 1. Answer any FIVE full questions, choosing one full question from each unit.
2. Missing data, if any, may be suitably assumed.

UNIT - I			CO	PO	Marks
1	a)	Define OR. Explain the characteristics of OR.	CO1	PO1	08
	b)	A manufacturer of a line of patent medicines is preparing a production plan on medicines A and B. There are sufficient ingredients available to make 20,000 bottles of A and 40,000 bottles of B, but there are only 45,000 bottles into which either of the medicines can be filled. Furthermore, it takes 3 hours to prepare enough material to fill 1000 bottles of A and 1 hour to prepare enough material to fill 1000 bottles of B and there are 66 hours available for this operation. The profit is Rs. 8 per bottle of A and Rs.7 per bottle of B. Formulate this problem as L.P.P to maximize the profit and solve graphically to determine the maximum profit.		PO1	12
OR					
2	a)	What do you mean by degeneracy in simplex problem? How do you resolve it?	CO1	PO1	05
	b)	Show that there is an unbounded solution to the following LPP $\text{Max } Z = 4x_1 + x_2 + 3x_3 + 5x_4$ $\text{Subject to } 4x_1 - 6x_2 - 5x_3 - 4x_4 \geq -20$ $-3x_1 - 2x_2 + 4x_3 + x_4 \leq 10$ $-8x_1 - 3x_2 + 3x_3 + 2x_4 \leq 20$ $x_1, x_2, x_3, x_4 \geq 0$	CO1	PO1	15

Important Note: Completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages. Revealing of identification, appeal to evaluator will be treated as malpractice.

		UNIT - II																																									
3	a)	Solve the following TP to determine the optimum transportation schedule.						CO2	PO1																																		
		<table border="1"> <thead> <tr> <th></th><th>D</th><th>E</th><th>F</th><th>G</th><th></th><th>supply</th></tr> </thead> <tbody> <tr> <td>A</td><td>8</td><td>10</td><td>7</td><td>6</td><td></td><td>50</td></tr> <tr> <td>B</td><td>12</td><td>9</td><td>4</td><td>7</td><td></td><td>40</td></tr> <tr> <td>C</td><td>9</td><td>11</td><td>10</td><td>8</td><td></td><td>30</td></tr> <tr> <td>Demand</td><td>25</td><td>32</td><td>40</td><td>23</td><td></td><td></td></tr> </tbody> </table>							D	E	F	G		supply	A	8	10	7	6		50	B	12	9	4	7		40	C	9	11	10	8		30	Demand	25	32	40	23			12
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	b)	Explain Degeneracy in Transportation problem.						2	I																																		
		OR																																									
4	a)	Four workers are available to work on four machines and the respective costs associated with each machine worker assignment is given below:						CO2	PO1																																		
		<table border="1"> <thead> <tr> <th colspan="2"></th><th colspan="4">MACHINE</th></tr> <tr> <th></th><th></th><th>M1</th><th>M2</th><th>M3</th><th>M4</th></tr> </thead> <tbody> <tr> <td rowspan="4">Workers</td><td>W1</td><td>12</td><td>3</td><td>6</td><td>-</td></tr> <tr> <td>W2</td><td>4</td><td>10</td><td>-</td><td>5</td></tr> <tr> <td>W3</td><td>7</td><td>2</td><td>8</td><td>9</td></tr> <tr> <td>W4</td><td>-</td><td>7</td><td>8</td><td>6</td></tr> </tbody> </table>								MACHINE						M1	M2	M3	M4	Workers	W1	12	3	6	-	W2	4	10	-	5	W3	7	2	8	9	W4	-	7	8	6	12		
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		The sign (-) indicates that the particular worker machine assignment is not permitted. (i) Determine the optimum assignment. (ii) A fifth machine is available to replace one of the existing machines and the associated costs are W1 = 4 Rs, W2=3 Rs. W3=3Rs and W4=2 Rs. Determine whether the new machine can be accepted and if so, which machine does it replace?																																									
	b)	Differentiate between Transportation and Assignment problems.						CO2	PO1																																		
		UNIT - III																																									
5	a)	Solve the following game.						CO3	PO1																																		
		<table border="1"> <thead> <tr> <th colspan="2"></th><th colspan="3">Player A strategies</th></tr> <tr> <th>Player B strategies</th><th></th><th>I</th><th>II</th><th>III</th></tr> </thead> <tbody> <tr> <td rowspan="3">Player A strategies</td><td>A</td><td>-4</td><td>6</td><td>3</td></tr> <tr> <td>B</td><td>-3</td><td>-3</td><td>4</td></tr> <tr> <td>C</td><td>2</td><td>-3</td><td>4</td></tr> </tbody> </table>								Player A strategies			Player B strategies		I	II	III	Player A strategies	A	-4	6	3	B	-3	-3	4	C	2	-3	4	10												
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	b)	Players A and B play a game in which each player has three coins 20p, 25p and 50p. Each of them selects a coin without the knowledge of the other player. If the sum of the values of the coins is an even number, A wins B's coin. If the sum is an odd number, B wins A's coin. (i) Develop a payoff matrix with respect to player A. (ii) Find the optimal strategies for the players. What is the value of the game?						CO3	PO1																																		
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Autonomous Institute Affiliated to VTU

May 2024 Semester End Main Examinations

Programme: B.E.

Branch: Mechanical Engineering

Course Code: 20ME8HSIPR

Course: Intellectual Property Rights

Semester: VIII

Duration: 3 hrs.

Max Marks: 100

Instructions: 1. Answer any FIVE full questions, choosing one full question from each unit.
2. Missing data, if any, may be suitably assumed.

			UNIT - I			CO	PO	Marks
			1 a) What are the principles underlying the patent law in India.					
			b) Discuss the role of TRIPS & WIPO w.r.t Intellectual property.			CO1	PO1 PO8	10
			UNIT - II					
			2 a) Discuss infringement of patent and also punishment of the same.			CO1	PO1 PO8	10
			b) Discuss various types of transfer of patent in detail.			CO1	PO1 PO8	10
			UNIT - III					
			3 a) Discuss infringement of trademark and also discuss actions against the infringement.			CO3	PO1	10
			b) Discuss rights conferred by registration of trade mark.			CO3	PO1	10
			OR					
			4 a) Explain the procedure to register trademark under trade mark act in India.			CO3	PO1	10
			b) What is trade mark and elaborate the functions of trademark			CO3	PO1	10
			UNIT-IV					
			5 a) Elaborate the main features of copyrights act of 1957			CO2	PO1	10
			b) Explain characteristics of copyright.			CO2	PO1	10
			OR					
			6 a) With appropriate illustration explain copyright in the context of computer software and sound recording			CO2	PO1	10

Important Note: Completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages. Revealing of identification, appeal to evaluator will be treated as malpractice.

	b)	Discuss infringement of copyright and explain remedies against infringement.	CO2	PO1	10
		UNIT -V			
7	a)	Explain the features of industrial design act 2000.	CO1 CO2 CO3	PO1 PO8	10
	b)	Explain piracy of registration of design with suitable examples.	CO1 CO2 CO3	PO1 PO8	10

B.M.S.C.E. - EVEN SEM 2023-24