

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.

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 - 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

		UNIT - II																																																			
3	a)	Solve the following TP to determine the optimum transportation schedule. <table border="1"><tr><td></td><td colspan="6"></td><td>supply</td></tr><tr><td></td><td></td><td>D</td><td>E</td><td>F</td><td>G</td><td></td><td></td></tr><tr><td></td><td>A</td><td>8</td><td>10</td><td>7</td><td>6</td><td></td><td>50</td></tr><tr><td></td><td>B</td><td>12</td><td>9</td><td>4</td><td>7</td><td></td><td>40</td></tr><tr><td></td><td>C</td><td>9</td><td>11</td><td>10</td><td>8</td><td></td><td>30</td></tr><tr><td colspan="2">Demand</td><td>25</td><td>32</td><td>40</td><td>23</td><td></td><td></td></tr></table>								supply			D	E	F	G				A	8	10	7	6		50		B	12	9	4	7		40		C	9	11	10	8		30	Demand		25	32	40	23			CO2	PO1	12
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	b)	Explain Degeneracy in Transportation problem.	2	1	08																																																
		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: <table border="1"><tr><td colspan="2"></td><td colspan="4">MACHINE</td></tr><tr><td></td><td></td><td>M1</td><td>M2</td><td>M3</td><td>M4</td></tr><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></table> <p>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?</p>			MACHINE						M1	M2	M3	M4	Workers	W1	12	3	6	-	W2	4	10	-	5	W3	7	2	8	9	W4	-	7	8	6	CO2	PO1	12															
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	b)	Differentiate between Transportation and Assignment problems.	CO2	PO1	8																																																
		UNIT - III																																																			
5	a)	Solve the following game. <table border="1"><tr><td></td><td colspan="4">Player A strategies</td></tr><tr><td rowspan="4">Player B strategies</td><td></td><td>I</td><td>II</td><td>III</td></tr><tr><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></table>		Player A strategies				Player B strategies		I	II	III	A	-4	6	3	B	-3	-3	4	C	2	-3	4	CO3	PO1	10																										
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	C	2	-3	4																																																	
	b)	Players A and B play a game in which each player has three 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	10																																																

		UNIT – IV																																			
6	a)	<p>There are six jobs, each of which is to be processed through three machines A, B and C in the order CBA, processing time in hours are shown in the table below.</p> <table border="1"><thead><tr><th></th><th colspan="3">Machines</th></tr><tr><th>Jobs</th><th>A</th><th>B</th><th>C</th></tr></thead><tbody><tr><td>1</td><td>8</td><td>3</td><td>8</td></tr><tr><td>2</td><td>7</td><td>4</td><td>3</td></tr><tr><td>3</td><td>6</td><td>5</td><td>7</td></tr><tr><td>4</td><td>9</td><td>2</td><td>2</td></tr><tr><td>5</td><td>10</td><td>1</td><td>5</td></tr><tr><td>6</td><td>9</td><td>6</td><td>1</td></tr></tbody></table> <p>Determine the optimum sequence for the five jobs and the minimum elapsed time.</p>		Machines			Jobs	A	B	C	1	8	3	8	2	7	4	3	3	6	5	7	4	9	2	2	5	10	1	5	6	9	6	1	CO4	PO4	10
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	b)	<p>Use graphical method to solve the following sequencing problem, also calculate the total time required to complete both the jobs.</p> <table border="1"><tbody><tr><td rowspan="2">Job 1</td><td>Sequence</td><td>A</td><td>B</td><td>C</td><td>D</td><td>E</td></tr><tr><td>Time(hrs)</td><td>2</td><td>3</td><td>4</td><td>6</td><td>2</td></tr><tr><td rowspan="2">Job 2</td><td>Sequence</td><td>C</td><td>A</td><td>D</td><td>E</td><td>B</td></tr><tr><td>Time(hrs)</td><td>4</td><td>5</td><td>3</td><td>2</td><td>6</td></tr></tbody></table>	Job 1	Sequence	A	B	C	D	E	Time(hrs)	2	3	4	6	2	Job 2	Sequence	C	A	D	E	B	Time(hrs)	4	5	3	2	6	CO4	PO1	10						
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		UNIT - V																																			
7	a)	<p>The cost of a machine is Rs 6100 and its scrap value is only Rs 100. The maintenance costs are found from experience to be as follows:</p> <table border="1"><thead><tr><th>Years</th><th>1</th><th>2</th><th>3</th><th>4</th><th>5</th><th>6</th><th>7</th><th>8</th></tr></thead><tbody><tr><td>Maintenance Cost (Rs)</td><td>100</td><td>250</td><td>400</td><td>600</td><td>900</td><td>1250</td><td>1600</td><td>2000</td></tr></tbody></table> <p>When should the machine be replaced?</p>	Years	1	2	3	4	5	6	7	8	Maintenance Cost (Rs)	100	250	400	600	900	1250	1600	2000	CO5	PO1	10														
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Maintenance Cost (Rs)	100	250	400	600	900	1250	1600	2000																													
	b)	<p>Find the cost per period of individual replacement policy of an installation of 300 light bulbs, given the following: Cost of replacing an individual bulb is Rs. 2 Conditional probability of failure is given below:</p> <table border="1"><tbody><tr><td>Week No.</td><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td></tr><tr><td>Conditional probability of failure</td><td>0</td><td>0.1</td><td>0.3</td><td>0.7</td><td>1.0</td></tr></tbody></table>	Week No.	0	1	2	3	4	Conditional probability of failure	0	0.1	0.3	0.7	1.0	CO5	PO1	10																				
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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.

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 - I	CO	PO	Marks
	1	a)	What are the principles underlying the patent law in India.	CO1	PO1 PO8	10
		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

		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	

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