

University of Mumbai

Examination 2020 under cluster 4 (PCE)

Program: BE Mechanical Engineering

Curriculum Scheme: Rev2012

Examination: Final Year Semester VII

Course Code: MEE7099 and Course Name: Operations Research

Time: 1 hour

Max. Marks: 50

Note to the students: - All the Questions are compulsory and carry equal marks.

Q1.	Consider the constraint $5x + 3y - 4z \leq 7$. Find the value of the slack variable s associated to this constraint for the point A (1,2,3).																								
Option A:	$s = 8$																								
Option B:	$s = 6$																								
Option C:	$s = 0$																								
Option D:	$s = 1$																								
Q2.	Find the value of A & B from the simplex method from the tableau: <table border="1" style="margin: 10px auto;"><thead><tr><th></th><th>x_1</th><th>x_2</th><th>x_3</th><th>x_4</th><th></th></tr></thead><tbody><tr><th>x_1</th><td>1</td><td>-1</td><td>B</td><td>3</td><td>3</td></tr><tr><th>x_3</th><td>A</td><td>-2</td><td>1</td><td>1</td><td>4</td></tr><tr><th>z</th><td>0</td><td>3</td><td>0</td><td>-4</td><td>-1</td></tr></tbody></table>		x_1	x_2	x_3	x_4		x_1	1	-1	B	3	3	x_3	A	-2	1	1	4	z	0	3	0	-4	-1
	x_1	x_2	x_3	x_4																					
x_1	1	-1	B	3	3																				
x_3	A	-2	1	1	4																				
z	0	3	0	-4	-1																				
Option A:	(1,1)																								
Option B:	(2,2)																								
Option C:	(3,3)																								
Option D:	(0,0)																								
Q3.	The graph of $x \leq 2$ and $y \geq 2$ will be situated in the																								
Option A:	First and second quadrant																								
Option B:	Second and third quadrant																								
Option C:	Third and fourth quadrant																								
Option D:	First and fourth quadrant																								
Q4.	Maximize $4x + 6y$ subject to $3x + 2y \leq 6$, $2x + 3y \leq 6$, $x, y \geq 0$. Dual is given by																								
Option A:	Min $6u + 6v$ subject to $3u + 2v \geq 4$; $2u + 3v \geq 6$; and $u, v \geq 0$																								
Option B:	Max $6u + 6v$ subject to $3u + 2v \leq 4$; $2u + 3v \leq 6$; and $u, v \geq 0$																								
Option C:	Max $4u + 6v$ subject to $3u + 2v \geq 6$; $2u + 3v \geq 6$; and $u, v \geq 0$																								
Option D:	Min $4u + 6v$ subject to $3u + 2v \leq 6$; $2u + 3v \leq 6$; and $u, v \geq 0$																								
Q5.	A tie for leaving variables in simplex procedure implies:																								
Option A:	optimality																								
Option B:	no solution																								
Option C:	Cycling																								
Option D:	unbounded																								

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Q6.	A linear programming problem with mixed constraints (some constraints of \leq type and some of \geq type) can be solved by which of the following methods?
Option A:	Big-M method or Two-phase method
Option B:	Dual Simplex method
Option C:	Only Big-M method
Option D:	Only Two-phase method
Q7.	In the solution of a linear programming problem by Simplex method, if during iteration, all ratios of right-hand side b_i to the coefficients of entering variable a_i are found to be negative, it implies that the problem has
Option A:	Infeasible
Option B:	Unbounded
Option C:	Infinite
Option D:	Degeneracy
Q8.	In marking assignments, which of the following should be preferred?
Option A:	Only column having single zero
Option B:	Column having more than one zero
Option C:	Only row having single zero
Option D:	Only Row/column having single zero
Q9.	In an assignment problem involving 5 workers and 5 jobs, total number of assignments possible are _____.
Option A:	10
Option B:	5
Option C:	25
Option D:	15
Q10.	In assignment problem of maximization, the objective is to maximize ____
Option A:	Loss
Option B:	Cost
Option C:	Profit
Option D:	Production time
Q11.	When the total demand is equal to supply then the transportation problem is said to be _____
Option A:	Maximization
Option B:	Minimization
Option C:	Unbalanced
Option D:	Balanced
Q12.	Traffic intensity in Queuing Theory is also called
Option A:	Service factor
Option B:	Arrival factor
Option C:	Utilization factor
Option D:	Departure factor

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Q13.	At a bank teller window, customers arrive at the average rate of twenty per hour according to the poisson's distribution. The bank teller spends an average of two minutes per customer to complete a service and service time is exponentially distributed. Customers who arrive from an infinite population are served first come and first served basis. What is the probability of teller to be idle?						
Option A:	0.33						
Option B:	0.66						
Option C:	0.1						
Option D:	10						
Q14.	Dynamic programming cannot be applied to find						
Option A:	Shortest route						
Option B:	Distribution of resources						
Option C:	Evaluating investment opportunities						
Option D:	Static Problems						
Q15.	Replacement theory is not applied when						
Option A:	Efficiency of which declines gradually						
Option B:	Items breaking down suddenly						
Option C:	Jobs are to be optimally sequenced						
Option D:	Items are worn out into scrap						
Q16.	Simulation theory uses_____.						
Option A:	Vogel's Approximation method						
Option B:	MODI method						
Option C:	Bellman's Optimality Principle						
Option D:	Monte Carlo Technique						
Q17.	The simulation which uses computer graphic displays to present the consequences of change in the value of input variation in the model is called						
Option A:	Interactive simulation						
Option B:	Independent simulation						
Option C:	Dependent simulation						
Option D:	Probabilistic simulation						
Q18.	Solving a complex problem by breaking it down into a collection of simpler sub problems and solving each of those sub problems is called						
Option A:	Simplex method						
Option B:	Simulation						
Option C:	Dynamic programming						
Option D:	Sequencing						
Q19.	Calculate the value of game: <table border="1" style="margin-left: auto; margin-right: auto;"> <tbody> <tr> <td>3</td> <td>2</td> </tr> <tr> <td>-2</td> <td>-3</td> </tr> <tr> <td>-4</td> <td>-5</td> </tr> </tbody> </table>	3	2	-2	-3	-4	-5
3	2						
-2	-3						
-4	-5						

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Option A:	2									
Option B:	-2									
Option C:	3									
Option D:	5									
Q20.	The strategies selected by players in which both plays particular strategy, then the strategy is called									
Option A:	Mixed Strategy									
Option B:	Pure Strategy									
Option C:	Single Strategy									
Option D:	Zero Strategy									
Q21.	Find the ranges of values of p and q which will render the matrix cell (2, 2), a saddle point for the game.									
	<table border="1"> <tr> <td>2</td> <td>4</td> <td>5</td> </tr> <tr> <td>10</td> <td>7</td> <td>q</td> </tr> <tr> <td>4</td> <td>p</td> <td>6</td> </tr> </table>	2	4	5	10	7	q	4	p	6
2	4	5								
10	7	q								
4	p	6								
Option A:	$p \geq 7, q \leq 7$									
Option B:	$p \leq 7, q \geq 7$									
Option C:	$p \geq -7, q \leq -7$									
Option D:	$p \leq -7, q \geq -7$									
Q22.	A particular item has a demand of 9,000 units/year. The cost of one procurement is Rs. 100 and the holding cost per unit is Rs. 2.40 per year. The replacement is instantaneous and no shortages are allowed. Determine the economic lot size									
Option A:	890 units/ procurement									
Option B:	880 units/ procurement									
Option C:	886 units/ procurement									
Option D:	866 units/ procurement									
Q23.	A particular item has a demand of 9,000 units/year. The cost of one procurement is Rs. 100 and the holding cost per unit is Rs. 2.40 per year. The replacement is instantaneous and no shortages are allowed. Determine the number of orders per year									
Option A:	10.4 orders/year									
Option B:	9.2 orders/year									
Option C:	11.2 orders/year									
Option D:	12 orders/year									
Q24.	In inventory control theory, the optimum lot size is also called as _____									
Option A:	average level of inventory									
Option B:	economic order quantity									

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Option C:	capacity of a warehouse
Option D:	lot size corresponding to break-even analysis
Q25.	_____ may be defined as the time interval between the placement of an order for an item and its receipt in stock.
Option A:	Down time
Option B:	Oder time
Option C:	Lead time
Option D:	Stock time

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Program: BE Mechanical Engineering

Curriculum Scheme: Rev2016

Examination: Final Year Semester VII

Course Code: ILO 7015 and Course Name: Operations Research

Time: 1 hour

Max. Marks: 50

Question	Correct Option (Enter either 'A' or 'B' or 'C' or 'D')
Q1.	A
Q2.	D
Q3.	A
Q4	A
Q5	C
Q6	A
Q7	B
Q8.	D
Q9.	B
Q10.	C
Q11.	D
Q12.	C
Q13.	A
Q14.	D
Q15.	C
Q16.	D
Q17.	A
Q18.	C
Q19.	A
Q20.	B
Q21.	B
Q22.	D
Q23.	A
Q24.	B
Q25.	C