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| **University of Mumbai****Online Examination 2020**  |
| **Program: BE Engineering** **Curriculum Scheme: R-2016****Examination: Final Year Semester VII****Course Code: ILOC 7015 Course Name: Operations Research** **Time: 1 hour Max. Marks: 50** |
| **Question Paper Set No.\_03** |

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Note: Each question is for 2 marks.

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|  |  | Multiple Choice Questions (MCQ) |
|  |  | ALL questions are compulsory.There are 25 questions, each question carries 2 mark. |
|  | The calling population is assumed to be infinite when— |
|  | a) | Arrivals are independent of each other |
|  | b) | Capacity of the system is finite |
|  | c) | Service rate is faster than the arrival rate |
|  | d) | Arrival and service rate are same. |
|  | The distribution of arrivals in a queuing system can be considered as a: |
|  | a) | Death Process |
|  | b) | Pure Birth Process |
|  | c) | Pure live process |
|  | d) | Sick process |
|  | For a simple queue (M / M / 1), Probability that a person arriving will have to wait is known as --- |
|  | a) | Poisson busy period |
|  | b) | Random factor, |
|  | c) | Traffic intensity  |
|  | d) | Exponential service factor. |
|  | One can increase the chance that result of simulation are not erroneously by |
|  | a) | Validating the simulation |
|  | b) | Changing the input parameters |
|  | c) | Using discrete probability distribution in place of continuous ones |
|  | d) | None of these |
|  | Consider the following statements: The immediate objective of the product is1. To simulates sales function
2. To utilize the existing equipment and power
3. To monopolize the markets
4. To minimize the production cost

Which of the following statement is/are correct |
|  | a) | 1,2 and 3 |
|  | b) | 1 and 2 only |
|  | c) | 2 and 3 only |
|  | d) | 1 and 4 only |
|  | Read the given question and answer the question No.9, 10Customers arrive at a service facility to get the required service. The inter-arrival and service time are constant and are 1.8 1nd 4 minutes respectively. Simulate the system for 14 minutes. The arrival time of customers within 14 minutes period will be:

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Customer | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| Arrival Time (min) | 0 | 1.8  | 3.6 | 5.4 | 7.2 | 9.0 | 10.8 | 12.6 |

 |
|  | Determine the average waiting time of a customer. |
|  | a) | 3.7 min |
|  | b) | 3.4 min |
|  | c) | 4.0 min |
|  | d) | 3.0 min |
|  | Consider the following statements about solving dynamic programming problems. Identify the statement which is FALSE. |
|  | a) | The solution procedure uses a recursive relationship that enables solving for the optimal policy for stage (n+1) given the optimal policy for state n. |
|  | b) | After completing the solution procedure, if a non-optimal decision is made at some stage, the solution procedure will need to be reapplied to determine the new optimal decisions at subsequent stages. |
|  | c) | Once an optimal policy has been found for the overall problem, the information needed to specify the optimal decision at a particular stage is the state at that stage and the decision made at preceding stages. |
|  | d) | It does provide computational saving over using exhaustive enumeration to find the best combination of decisions |
|  | Consider the following project network, where the number over each node is the time required for the corresponding activity. Consider the problem of finding the longest path through this network from start to finish, since the longest path is the critical path. What are the stages and states for the dynamic programming formulation of this problem? |
|  | a) | 6 stages, 12 states |
|  | b) | 5 stages, 14 states |
|  | c) | 4 stages, 14 states |
|  | d) | 4 stages, 12 states |
|  | The arc lengths of a directed graph of a project are as shown in the figure. The shortest path length from node 1 to node 6 is…………….http://www.gate-exam.in/images/Qimage/ME/2018/Q-161.PNG |
|  | a) | 8 |
|  | b) | 7 |
|  | c) | 9 |
|  | d) | 10 |
| 1.
 | When the game is played on a predetermined course of action, which does not change throughout game, then the game is said to be--- |
|  | a) | Pure strategy game |
|  | b) | Fair strategy game |
|  | c) | Mixed strategy game |
|  | d) | Unsteady game |
|  | Saddle point for the following game is --  |
|  | a) | (1,2)  |
|  | b) | (2,1) |
|  | c) | (2,2) |
|  | d) | (1,1) |
| 1.
 | In a two person zero sum game, the following does not hold correct: |
|  | a) | Row player is always a loser |
|  | b) | Column Player is always a winner. |
|  | c) | Column player always minimizes losses |
|  | d) | If one loses, the other gains. |
|  | The demand is doubled and ordering cost, unit cost and inventory carrying cost are halved, then EOQ will be |
|  | a) | Half |
|  | b) | Same |
|  | c) | Twice |
|  | d) | Four times |
|  | When the ordering cost is increased to four times, the EOQ will be increased to |
|  | a) | 2 times |
|  | b) | 3 times |
|  | c) | 8 times  |
|  | d) | Remain same |
|  | If the annual demand of an item becomes half, ordering cost double, holding cost one-fourth and the unit cost twice, then the ratio of the new EOQ and earlier EOQ is |
|  | a) | 1/2 |
|  | b) | $$1/\sqrt{2}$$ |
|  | c) | $$\sqrt{2}$$ |
|  | d) | 2 |
|  | In any Simplex iteration if the current pivot row is [6, 4, 1, 0, 0, 0, 24] and the pivot element corresponds to the second element. Then the new pivot row is. |
|  | a) | [6, 4, 1, 0, 0, 0, 24] |
|  | b) | [1, 2/3, 1/6, 0, 0, 0, 4] |
|  | c) | [3/2, 1, 1/4, 0, 0, 0, 6] |
|  | d) | [1, 2/3, 1/6, 0, 0, 0, 6] |
|  | In any Simplex iteration the values in the Optimization function "z" row, corresponding to the Basic variables in that iteration |
|  | a) | Represent the Inverse Matrix |
|  | b) | Are zero |
|  | c) | Represent the Identity matrix |
|  | d) | Represent the Dual Matrix |
|  | In any Simplex iteration the values in the table columns corresponding to the Basic variables in that iteration - |
|  | a) | Represent the Inverse Matrix |
|  | b) | Are zero |
|  | c) | Represent the Identity matrix |
|  | d) | Represent the Dual Matrix |
|  | In the Simplex method an unrestricted variable is replaced with which of the following? |
|  | a) | a positive variable |
|  | b) | a negative variable |
|  | c) | a non-negative variable |
|  | d) | two non-negative variables |
|  | In the Simplex method the equations should have right hand side as? |
|  | a) | Negative |
|  | b) | Non-negative |
|  | c) | Zero |
|  | d) | Unrestricted |
|  | In the Simplex method to convert a constraint of type ≥, to equation form, we need to add what type of variable? |
|  | a) | surplus variable |
|  | b) | slack variable |
|  | c) | artificial variable |
|  | d) | dual variable |
|  | A company produces two products: Product A and Product B. Each product must go through two processes: assembly and painting. The times required (in minutes) for each product in each process as well as the per unit profit for each product are shown below:

|  |  |
| --- | --- |
|  | Product |
|  | A | B |
| Revenue |  $ 27.00  |  $ 30.00  |
| Unit Assembly Time (minutes) | 3 | 4.5 |
| Unit Painting Time (minutes) | 6 | 3 |

The company has 60 hours of assembly time and 80 hours of painting time available each week. If a linear programming model is used to determine the optimal number of Products A and B to produce next week, the company’s constraint for the painting process would be: |
|  | a) | 6A + 3B < 80 |
|  | b) | 6A + 3B < 80 |
|  | c) | 6A + 3B < 4,800 |
|  | d) | 6A + 3B > 4,800 |
|  | A company produces two products: Product A and Product B. Each product must go through two processes: assembly and painting. The times required (in minutes) for each product in each process as well as the per unit profit for each product are shown below:

|  |  |
| --- | --- |
|  | Product |
|  | A | B |
| Revenue |  $ 27.00  |  $ 30.00  |
| Unit Assembly Time (minutes) | 3 | 4.5 |
| Unit Painting Time (minutes) | 6 | 3 |

The company has 60 hours of assembly time and 80 hours of painting time available each week. If a linear programming model is used to determine the optimal number of Products A and B to produce next week, the optimal number of Product A’s to produce next week would be |
|  | a) | 10 |
|  | b) | 600 |
|  | c) | 725 |
|  | d) | 850 |
|  | A company produces two products: Product A and Product B. Each product must go through two processes. Each Product A produced requires 2 hours in Process 1 and 5 hours in Process 2. Each Product B produced requires 6 hours in Process 1 and 3 hours in Process 2. There are 80 hours of capacity available each week in each process. Each unit of Product A produced generates $6.00 in profit for the company. Each unit of Product B produced generates $9.00 in profit for the company. If the company produces 6 units of Product A and 9 units of Product B then the company’s objective function would be equal to |
|  | a) | $36 |
|  | b) | $81 |
|  | c) | $108 |
|  | d) | $117 |
|  | The following transportation table shows the cost of shipping one unit from each source to each destination in the upper right hand corner of each cell, as well as the supply capacities and demand requirements: The optimal solution is: The total amount shipped from Portland to Dallas is: |
|  | a) | 4,500 |
|  | b) | 1,000 |
|  | c) | 4,000 |
|  | d) | 1,500 |

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