Week 4 Assignment 4

The due date for submitting this assignment has passed. Due on 2018-09-12, 23:59 IST. As per our records you have not submitted this assignment.

1) Which one of the following statement is not true about Exhaustive enumeration technique for solving Integer Linear Programming problems? 1 point

- i. Exhaustive enumeration generates all possible integer solutions
- ii. Exhaustive enumeration evaluates all possible integer solutions
- iii. Exhaustive enumeration chooses the optimal among all possible integer solutions
- iv. Exhaustive enumeration cannot guarantee an optimal solution

No, the answer is incorrect. Score: 0
Accepted Answers:
iv. Exhaustive enumeration cannot guarantee an optimal solution

2) Total number of enumerations required for a 0-1 knapsack problem with 5 binary variables will be: 1 point

- i. 10
- ii. 16
- iii. 25
- iv. 32

No, the answer is incorrect. Score: 0
Accepted Answers:
iv. 32

3) Number of basic steps in the Branch and Bound algorithm are: 1 point

- i. 2
- ii. 3
- iii. 4
5) Value of Z for the following problem will be:

Maximize \( Z = 3x + 4y \)
subject to \( x + y \leq 4; \) \( x \) and \( y \) are binary

i. 3
ii. 4
iii. 7
iv. 12

No, the answer is incorrect.
Score: 0
Accepted Answers:
iii. By Linear Programming relaxation

6) Suppose we have to find a bound (Column wise) for the following Assignment problem being solved for minimization. The bound will be:

<table>
<thead>
<tr>
<th></th>
<th>m/c 1</th>
<th>m/c 2</th>
<th>m/c 3</th>
<th>m/c 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Job A</td>
<td>14</td>
<td>8</td>
<td>34</td>
<td>14</td>
</tr>
<tr>
<td>Job B</td>
<td>12</td>
<td>10</td>
<td>28</td>
<td>32</td>
</tr>
<tr>
<td>Job C</td>
<td>22</td>
<td>18</td>
<td>8</td>
<td>26</td>
</tr>
<tr>
<td>Job D</td>
<td>11</td>
<td>24</td>
<td>21</td>
<td>21</td>
</tr>
</tbody>
</table>

i. 41 Infeasible
ii. 41 Feasible
iii. 43 Infeasible
iv. 43 Feasible

No, the answer is incorrect.
Score: 0
Accepted Answers:
ii.
7) Consider Question 6 again. Having found the bound for the total solution, we need to find the branches. Number of such branches will be:

- i. 2
- ii. 3
- iii. 4
- iv. 5

No, the answer is incorrect.
Score: 0
Accepted Answers:
iii. 4

8) While finding optimal solution for a Travelling Salesman problem, sub-tours are to be blocked because:

- i. All sub-tours cannot be found
- ii. Some sub-tours are not possible to cover
- iii. Travelling Salesman problem considers only some sub-tours, not all
- iv. Travelling Salesman problem considers only complete tours, not sub-tours

No, the answer is incorrect.
Score: 0
Accepted Answers:
iv. Travelling Salesman problem considers only complete tours, not sub-tours

9) It is known that solution of the corresponding Assignment Problem provides a bound for a Travelling Solution Problem. Hence, the optimal solution for a Travelling Salesman Problem and the corresponding Assignment problem will be:

- i. Always same
- ii. Always different
- iii. Sometime same
- iv. Not related at all

No, the answer is incorrect.
Score: 0
Accepted Answers:
iii. Sometime same

10) Consider a Travelling Salesman Problem with 4 cities. The distances between the cities are as given below:

<table>
<thead>
<tr>
<th></th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>-</td>
<td>5</td>
<td>6</td>
<td>8</td>
</tr>
<tr>
<td>B</td>
<td>6</td>
<td>-</td>
<td>6</td>
<td>5</td>
</tr>
<tr>
<td>C</td>
<td>7</td>
<td>4</td>
<td>-</td>
<td>7</td>
</tr>
<tr>
<td>D</td>
<td>5</td>
<td>4</td>
<td>6</td>
<td>-</td>
</tr>
</tbody>
</table>

The minimum complete tour length for a Travelling Salesman problem will be:

- i. 20
- ii. 21
- iii. 22
11) Consider the Travelling Salesman Problem of Question 10. The optimal tour for the minimum tour length will be:

- i. A-B-C-D-A
- ii. A-C-B-D-A
- iii. A-B-D-C-A
- iv. A-C-D-B-A

No, the answer is incorrect.
Score: 0
Accepted Answers:
  i. 20

12) Consider the Travelling Salesman Problem of Question 10. In order to solve the problem, we need to replace distance between A to A, B to B, C to C, and D to D by:

- i. 0
- ii. Lowest distance in the matrix
- iii. Highest distance in the matrix
- iv. A very high value M

No, the answer is incorrect.
Score: 0
Accepted Answers:
  iv. A very high value M

13) While Solving a Travelling Salesman Problem of 6 cities, unique assignment obtained after some iteration is: A-D, B-C, C-E, D-B, E-F and F-A. What can you infer about the optimal solution of the Travelling Salesman Problem (TS Problem)?

- i. The unique assignments constitute an optimal solution
- ii. The unique assignments are not feasible
- iii. The unique assignments are feasible but do not constitute an optimal solution
- iv. None of the above

No, the answer is incorrect.
Score: 0
Accepted Answers:
  i. The unique assignments constitute an optimal solution

14) While Solving a Travelling Salesman Problem of 6 cities by Branch and Bound Technique, unique assignments obtained after some iteration are: A-D, B-C, C-A, D-B, E-F and F-E. What can you infer about the optimal solution of the Travelling Salesman Problem (TS Problem)?

- i. The unique assignments constitute an optimal TS Problem solution
- ii. The unique assignments constitute a TS Problem solution which is not optimal
- iii. The unique assignments do not constitute a feasible TS Problem solution
- iv. None of the above

No, the answer is incorrect.
Score: 0
15) Nearest Neighbour Heuristic is used to solve a Travelling Salesman Problem. A feasible solution to the problem is obtained. Which one of the following observations will be true?

- i. The solution obtained will be always optimal
- ii. The solution obtained may be optimal
- iii. The solution obtained will be never optimal
- iv. The solution obtained will be most likely optimal

No, the answer is incorrect.

Score: 0

Accepted Answers:
- ii. The solution obtained may be optimal