### Module 3 Assignment

The due date for submitting this assignment has passed. As per our records you have not submitted this assignment.

1) Consider the demand for six periods (in man hours) 3000, 3200, 4000, 3600, 4200 and 3800. Regular time capacity is 3600 hours and overtime capacity is 400 hours in a month. The RT, OT and inventory costs are 30, 45 and 5 per unit and per unit per month. Provide a feasible solution using the tabular form?

<table>
<thead>
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<th>Period</th>
<th>R1</th>
<th>R2</th>
<th>R3</th>
<th>R4</th>
<th>R5</th>
<th>R6</th>
<th>O1</th>
<th>O2</th>
<th>O3</th>
<th>O4</th>
<th>O5</th>
<th>O6</th>
</tr>
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<tbody>
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<tr>
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<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

No, the answer is incorrect.

Score: 0

Accepted Answers:

- \( R_1 = R_2 = R_3 = R_4 = R_5 = R_6 = 3600, O_1 = O_2 = O_3 = O_4 = O_5 = 0, O_6 = 200 \)
- \( R_1 = R_2 = R_3 = R_4 = R_5 = R_6 = 3400, O_1 = O_2 = O_3 = O_4 = O_5 = 0, O_6 = 200 \)
- \( R_1 = R_2 = R_3 = R_4 = R_5 = R_6 = 3400, O_1 = O_2 = O_3 = O_4 = O_5 = 0, O_6 = 200 \)
- \( R_1 = R_2 = R_3 = R_4 = R_5 = R_6 = 3400, O_1 = O_2 = O_3 = O_4 = O_5 = 0, O_6 = 200 \)
- \( R_1 = R_2 = R_3 = R_4 = R_5 = R_6 = 3400, O_1 = O_2 = O_3 = O_4 = O_5 = 0, O_6 = 200 \)
Consider the demand for six periods (in man hours) 3000, 3200, 4000, 3600, 4200 and 3800. Regular time capacity is 3600 hours and overtime capacity is 400 hours in a month. The RT, OT and inventory costs are 30, 45 and 5 per hour and per hour per month. Formulate a LP model for this situation?

\[
\begin{align*}
\text{Minimize} & \quad 30\sum R_t + 45\sum O_t + 5\sum I_t \\
\text{subject to} & \quad I_{t-1} + R_t + O_t - D_t = I_t. \\
& \quad R_t \leq 3600 \\
& \quad O_t \leq 400
\end{align*}
\]

No, the answer is incorrect.

Score: 0

Accepted Answers:

Minimize \(30\sum R_t + 45\sum O_t + 5\sum I_t\) 
subject to 
\(I_{t-1} + R_t + O_t - D_t = I_t.\) 
\(R_t \leq 3600\) 
\(O_t \leq 400\) 
\(R_t, O_t, I_t \geq 0.\)
4) Consider the demand for six periods (in man hours) 3000, 3200, 4000, 3600, 4200 and 3800. Regular time capacity is 3600 hours and overtime capacity is 400 hours in a month. The RT, OT and inventory costs are 30, 45 and 5 per unit and per unit per month. Formulate and solve a transportation model? Use outsourcing cost as Rs 50 per hour.

- The transportation table has:
  - 6 destinations nodes, 12 supply nodes
  - The optimal total cost is 669000

- The transportation table has:
  - 6 destinations nodes, 6 supply nodes
  - The optimal total cost is 669000.

- The transportation table has:
  - 6 destinations nodes, 12 supply nodes
  - Dummy demand = 2200
  - The optimal total cost is 684000.

- The transportation table has:
  - 12 destinations nodes, 6 supply nodes
  - Dummy demand = 2200
  - The optimal total cost is 669000.

- The transportation table has:
  - 6 destinations nodes, 12 supply nodes
  - Dummy demand = 2200
  - The optimal total cost is 669000

No, the answer is incorrect.
Score: 0

Accepted Answers:
The transportation table has:
- 6 destinations nodes, 12 supply nodes
- Dummy demand = 2200
- The optimal total cost is 669000

5) Consider the demand for six periods (in man hours) 3000, 3200, 4000, 3600, 4200 and 3800. Regular time capacity is 3600 hours and overtime capacity is 400 hours in a month. The RT, OT and inventory costs are 30, 45 and 5 per unit and per unit per month. Formulate and solve a transportation model? Use outsourcing cost as Rs 50 per hour and backorder cost as Rs 10 per manhour.

- The optimum solution remains the same with cost = 669000 as in Question 4.
- Cost will reduce compared to Question 4, due to backordering
- Dummy demand is now 24000
- Cost will increase compared to Question 4, due to outsourcing

No, the answer is incorrect.
Score: 0

Accepted Answers:
The optimum solution remains the same with cost = 669000 as in Question 4.
6) Consider the demand for four periods (in man hours) 300, 320, 400, 360. Production cost is Rs 10 and set up cost is Rs 1000. Inventory cost is Re 1 per unit/month. Find the production quantities that minimize total cost using Wagner Whitin algorithm?

**Instruction:** A answer [a,b,c,d] represents a, b, c, d quantities need to be produced in the period 1, 2, 3, 4 respectively

- [1380,0,0,0]
- [300,1080,0,0]
- [300,320,760,0]
- [300,320,400,360]
- [620,0,760,0]

No, the answer is incorrect.
Score: 0
Accepted Answers:
[620,0,760,0]

7) Consider the demand for four periods (in man hours) 300, 320, 400, 360. Production cost is Rs 10 and set up cost is Rs 1000. Inventory cost is Re 1 per unit/month. Backorder cost is Re 1/month? Find the production quantities that minimize total cost using Wagner Whitin algorithm?

- Total cost remains same
- Total cost will increase
- Total cost will decrease

No, the answer is incorrect.
Score: 0
Accepted Answers:
Total cost remains same

8) Explain the Quadratic model for aggregate planning?

- At least one of the costs exhibits non-linear behaviour
- Some of the costs exhibit non-linear behaviour
- All costs exhibit non-linear behaviour

No, the answer is incorrect.
Score: 0
Accepted Answers:
At least one of the costs exhibits non-linear behaviour

9) Consider the demand for six periods (in man hours) 2000, 2500, 3000, 2600, 2400 and 2800. Regular time capacity is 2400 hours and overtime capacity is 400 hours in a month. The RT, OT and inventory costs are 60, 80 and 5 per unit and per unit per month. Formulate and solve a transportation model? Use outsourcing cost as Rs 100 per hour.

- Total cost corresponding to the optimal solution is 939500, no overtime is used in any period
- Total cost corresponding to the optimal solution is 939500,

...
Consider the demand for six periods (in man hours) 2000, 2500, 3000, 2600, 2400 and 2800. Regular time capacity is 2400 hours and overtime capacity is 400 hours in a month. The RT, OT and inventory costs are 60, 80 and 5 per unit and per unit per month. Formulate and solve a transportation model? Use outsourcing cost as Rs 100 per hour. Use backorder cost = Rs 10/man hour

- **No, the answer is incorrect.**
- **Score: 0**
- **Accepted Answers:**
  - Total cost corresponding to the optimal solution is 939500, overtime is used in periods 4 and 6

No, the answer is incorrect.
Score: 0
Accepted Answers:
Total cost corresponding to the optimal solution remains the same as in Question: 9. Backorder is not used