Solutions to Hw10 Section B

1) a)

\[
\begin{align*}
c_{12} &= 150 \\
c_{13} &= 150 + 22x3 = 216 \\
c_{14} &= 150 + 22x3 + 56x2x3 = 552 \\
c_{15} &= 150 + 22x3 + 56x2x3 + 90x3x3 = 1362 \\
c_{23} &= 150 \\
c_{24} &= 150 + 56x3 = 165 \\
c_{25} &= 150 + 56x3 + 90x2x3 = 858 \\
c_{34} &= 150 \\
c_{35} &= 150 + 90x3 = 420 \\
c_{45} &= 150
\end{align*}
\]

b) Produce 76+22 = 98 in month 1
56 in month 3
90 in month 4
Total cost = \(c_{13} + c_{34} + c_{45} = 216 + 150 + 150 = 516\)

c) 1-2-3-5
Total cost = \(c_{12} + c_{23} + c_{35} = 150 + 150 + 420 = 720\)

2)

<table>
<thead>
<tr>
<th></th>
<th>Push</th>
<th>Pull</th>
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</thead>
<tbody>
<tr>
<td>a) Initiating production</td>
<td>Depends on forecast, initiated before demand is realized</td>
<td>Production is pulled by customers, initiated by realized demand</td>
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<td>b) WIP inventory</td>
<td>Due to lot production there is excess WIP inventory in the system</td>
<td>There is a tight control on WIP level</td>
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<td>WIP is not more than the number of kanban cards</td>
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<tr>
<td>c) Ability to catch and correct defective items</td>
<td>It is not possible to catch and correct the items promptly, lot production causes increase in scrap, rework and inspection costs.</td>
<td>When there is a defective item, the line stops immediately the item is corrected. Propagation is prevented</td>
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</table>
3) A retail store like Gap uses a push system. The reason is that they keep their end-products at the stores so that customers come and buy. Their production system is a make-to-stock system which implies a push system. On the other hand fast-food restaurants like McDonalds, use a pull system. They keep the inventory of raw materials such as meat, bread etc and upon a customer request production is initiated (which is simply an assembly). There is almost no set-up cost/time while switching among products which makes a pull system applicable.

4)
- Demand variations over time
- Suppliers may not be near
- High set-up cost/time