**Chapter 18: Master Scheduling and Material Requirements Planning**

**Practice Problems**

**MULTIPLE CHOICE**

1. What is the correct sequence for medium- to short-term time frames of the planning hierarchy?

|  |  |
| --- | --- |
| a. | capacity requirements planning, detailed scheduling, master scheduling, material requirements planning |
| b. | detailed scheduling, master scheduling, material requirements planning, capacity requirements planning |
| c. | master scheduling, material requirements planning, capacity requirements planning, detailed scheduling |
| d. | capacity requirements planning, master scheduling, material requirements planning, detailed scheduling |

ANS: C PTS: 1 DIF: Medium

2. The manufacturing plan that determines the quantity of each end item to be produced in specific periods during the short-range planning horizon is known as \_\_\_\_\_\_.

|  |  |
| --- | --- |
| a. | capacity requirements planning |
| b. | detailed scheduling |
| c. | master scheduling |
| d. | material requirements planning |

ANS: C PTS: 1 DIF: Easy

3. The amount of a particular item that is ordered from the plant or a supplier or issued as a standard quantity to the production is referred to as \_\_\_\_\_\_.

|  |  |
| --- | --- |
| a. | allocated production |
| b. | lot size |
| c. | master schedule |
| d. | batch amount |

ANS: C PTS: 1 DIF: Easy

Milford Manufactures is trying to develop its master schedule for the next 8 weeks. Below, you will find the forecasted values for Weeks 1 through 8 and the actual customer orders for Weeks 1 through 4.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Week | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| Forecast | 150 | 150 | 150 | 150 | 140 | 140 | 160 | 160 |
| Customer Orders | 125 | 130 | 145 | 160 |  |  |  |  |

The on-hand inventory for Week 1 is 30 units and the MPS lot size is 190 units.

4. What would be the projected on-hand inventory for Week 2?

|  |  |
| --- | --- |
| a. | 30 |
| b. | 80 |
| c. | 110 |
| d. | 125 |

ANS: C PTS: 1 DIF: Medium

5. Given the information provided above, what would be the projected on-hand inventory for Week 4?

|  |  |
| --- | --- |
| a. | 90 |
| b. | 110 |
| c. | 160 |
| d. | 180 |

ANS: D PTS: 1 DIF: Medium

6. Given the information provided above, what would be the projected on-hand inventory for Week 6?

|  |  |
| --- | --- |
| a. | 90 |
| b. | 110 |
| c. | 160 |
| d. | 180 |

ANS: A PTS: 1 DIF: Medium

7. Given the information provided above, what would be the projected on-hand inventory for Week 8?

|  |  |
| --- | --- |
| a. | 90 |
| b. | 110 |
| c. | 150 |
| d. | 180 |

ANS: C PTS: 1 DIF: Medium

8. What would be the available-to-promise quantity in Week 4?

|  |  |
| --- | --- |
| a. | 0 |
| b. | 30 |
| c. | 120 |
| d. | 190 |

ANS: B PTS: 1 DIF: Medium

9. What would be the available-to-promise quantity in Week 5?

|  |  |
| --- | --- |
| a. | 0 |
| b. | 30 |
| c. | 120 |
| d. | 190 |

ANS: A PTS: 1 DIF: Medium

10. What would be the available-to-promise quantity in Week 6?

|  |  |
| --- | --- |
| a. | 0 |
| b. | 30 |
| c. | 120 |
| d. | 190 |

ANS: D PTS: 1 DIF: Medium

11. What would be the available-to-promise quantity in Week 7?

|  |  |
| --- | --- |
| a. | 0 |
| b. | 30 |
| c. | 120 |
| d. | 190 |

ANS: D PTS: 1 DIF: Medium

12. What would be the available-to-promise quantity in Week 8?

|  |  |
| --- | --- |
| a. | 0 |
| b. | 30 |
| c. | 120 |
| d. | 190 |

ANS: D PTS: 1 DIF: Medium

13. The total expected requirements for raw materials, components, subassemblies, or finished goods from all sources regardless of the amount of on-hand inventory is known as \_\_\_\_\_\_.

|  |  |
| --- | --- |
| a. | gross requirement |
| b. | net requirement |
| c. | planned order release |
| d. | planned order receipt |

ANS: A PTS: 1 DIF: Easy

14. The date at which an order quantity for an item will be released to a vendor or an in-house production facility and that is derived from planned order receipts by taking onto account the lead time required for delivery of the item is known as \_\_\_\_\_\_.

|  |  |
| --- | --- |
| a. | gross requirement |
| b. | net requirement |
| c. | planned order release |
| d. | planned order receipt |

ANS: C PTS: 1 DIF: Medium

15. The amount that is actually needed and is obtained by subtracting the item’s on-hand inventory from the gross requirements is known as \_\_\_\_\_\_.

|  |  |
| --- | --- |
| a. | gross requirement |
| b. | net requirement |
| c. | planned order release |
| d. | planned order receipt |

ANS: B PTS: 1 DIF: Easy

16. The process of breaking down or exploding the requirements of a parent item at one level into its component requirements at the next level is known as \_\_\_\_\_\_.

|  |  |
| --- | --- |
| a. | gross requirement |
| b. | net requirement |
| c. | MRP explosion |
| d. | planned order receipt |

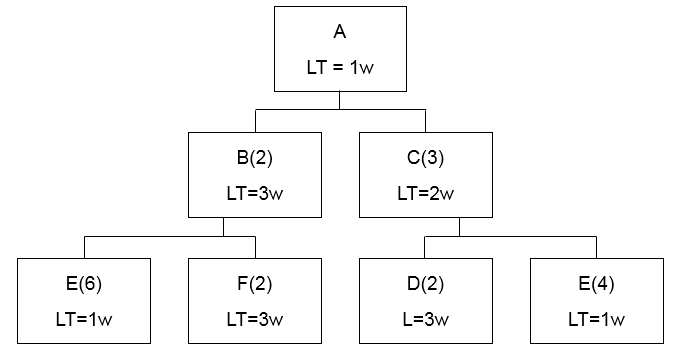
ANS: C PTS: 1 DIF: Medium

17. The date at which an order quantity for an item will be released to a vendor or an in-house production facility is known as \_\_\_\_\_\_.

|  |  |
| --- | --- |
| a. | gross requirement |
| b. | net requirement |
| c. | planned order release |
| d. | planned order receipt |

ANS: C PTS: 1 DIF: Easy

Upton Enterprises produces a variety of switches. Below, you will find a bill-of-material file for their simplest switch: Part A. The number in the parentheses represents the number of units required for the upper level. LT stands for the lead time, measured in weeks.



18. Assuming that Upton Enterprises has none of Switch A in inventory, and the inventory levels of Parts B, C, D, E, and F are also zero, how long would it take to produce 100 units of Switch A?

|  |  |
| --- | --- |
| a. | 3 weeks |
| b. | 5 weeks |
| c. | 7 weeks |
| d. | 14 weeks |

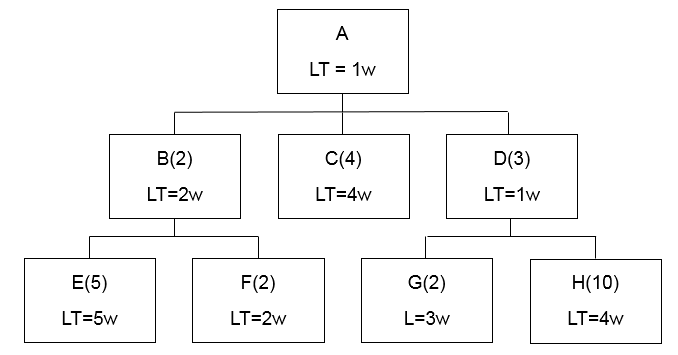
ANS: C PTS: 1 DIF: Medium

19. Assuming that Upton Enterprises has none of Switch A in inventory, and the inventory levels of Parts B, C, D, E, and F are also zero, and there is an order to produce 100 units of Switch A, what would be the total number of B, C, D, E, and F parts altogether?

|  |  |
| --- | --- |
| a. | 500 |
| b. | 600 |
| c. | 3,100 |
| d. | 3,900 |

ANS: D PTS: 1 DIF: Medium

Milford Manufacturing has the following bill-of-material file for one of their products. The number in the parentheses represents the number of units required for the upper level. LT stands for the lead time, measured in weeks.

.

20. In order to produce 500 units of end Item A, how many units of Part B would have to be available?

|  |  |
| --- | --- |
| a. | 500 |
| b. | 1,000 |
| c. | 1,500 |
| d. | 3,000 |

ANS: B PTS: 1 DIF: Easy

21. In order to produce 500 units of end Item A, how many units of Part C would have to be available?

|  |  |
| --- | --- |
| a. | 500 |
| b. | 1,000 |
| c. | 2,000 |
| d. | 3,000 |

ANS: C PTS: 1 DIF: Easy

22. In order to produce 500 units of end Item A, how many units of Part D would have to be available?

|  |  |
| --- | --- |
| a. | 1,000 |
| b. | 1,500 |
| c. | 5,000 |
| d. | 10,000 |

ANS: B PTS: 1 DIF: Medium

23. In order to produce 500 units of end Item A, how many units of Part E would have to be available?

|  |  |
| --- | --- |
| a. | 2,000 |
| b. | 3,000 |
| c. | 5,000 |
| d. | 10,000 |

ANS: C PTS: 1 DIF: Medium

24. In order to produce 500 units of end Item A, how many units of Part F would have to be available?

|  |  |
| --- | --- |
| a. | 2,000 |
| b. | 3,000 |
| c. | 5,000 |
| d. | 10,000 |

ANS: A PTS: 1 DIF: Medium

25. In order to produce 500 units of end Item A, how many units of Part G would have to be available?

|  |  |
| --- | --- |
| a. | 2,000 |
| b. | 3,000 |
| c. | 5,000 |
| d. | 10,000 |

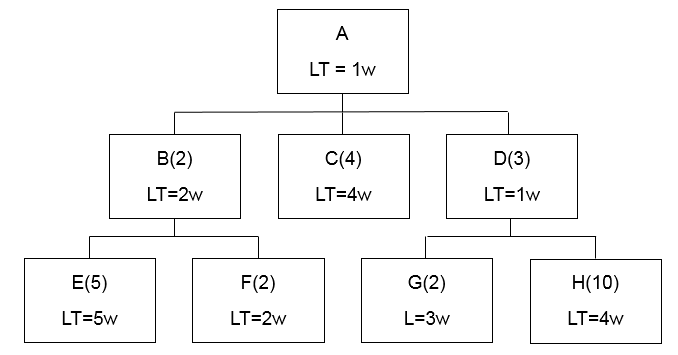
ANS: B PTS: 1 DIF: Medium

26. In order to produce 500 units of end Item A, how many units of Part H would have to be available?

|  |  |
| --- | --- |
| a. | 5,000 |
| b. | 8,000 |
| c. | 10,000 |
| d. | 15,000 |

ANS: D PTS: 1 DIF: Medium

Milford Manufacturing has the following bill-of-material file for one of their products. The number in the parentheses represents the number of units required for the upper level. LT stands for the lead time, measured in weeks.



Milford Manufacturing has generated for forecast their end Product A for the next 10 weeks. The forecast is given below:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| A | Week 1 | Week 2 | Week 3 | Week 4 | Week 5 |
| Gross Requirements | 0 | 0 | 0 | 0 | 900 |
| Beginning Available Inventory | 2,200 | 2,200 | 2,200 | 2,200 | 2,200 |
| Ending Available Inventory | 2,200 | 2,200 | 2,200 | 2,200 | 1,300 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| A | Week 6 | Week 7 | Week 8 | Week 9 | Week 10 |
| Gross Requirements | 2,350 | 2,000 | 0 | 4,800 | 1,275 |
| Beginning Available Inventory | 1,300 | 950 | 950 | 950 | 950 |
| Ending Available Inventory | 950 | 950 | 950 | 950 | 950 |

Their beginning inventory is 2,200 units. When there is a need for producing Part A, Milford does it in batch multiples of 500 units (i.e., if there is a need for 850 units of A, then Milford would produce 1,000 units).

27. For Part A, what would be the planned order release for Period 5?

|  |  |
| --- | --- |
| a. | 0 |
| b. | 900 |
| c. | 2,000 |
| d. | 2,200 |

ANS: C PTS: 1 DIF: Medium

28. For Part A, what would be the planned order release for Period 6?

|  |  |
| --- | --- |
| a. | 0 |
| b. | 900 |
| c. | 1,000 |
| d. | 2,000 |

ANS: D PTS: 1 DIF: Medium

29. For Part A, what would be the planned order release for Period 7?

|  |  |
| --- | --- |
| a. | 0 |
| b. | 900 |
| c. | 1,000 |
| d. | 2,000 |

ANS: A PTS: 1 DIF: Medium

30. For Part A, what would be the planned order release for Period 8?

|  |  |
| --- | --- |
| a. | 0 |
| b. | 1,000 |
| c. | 2,000 |
| d. | 5,000 |

ANS: D PTS: 1 DIF: Medium

31. For Part A, what would be the planned order release for Period 9?

|  |  |
| --- | --- |
| a. | 0 |
| b. | 1,000 |
| c. | 1,500 |
| d. | 2,000 |

ANS: C PTS: 1 DIF: Medium

32. Given the demand for Part A in the table above, what would be the planned order release for Period 6 for Part B? Assume that Milford uses lot-for-lot for this part. Part B’s beginning available inventory in Period 1 is 6,500 units.

|  |  |
| --- | --- |
| a. | 4,500 |
| b. | 6,000 |
| c. | 6,500 |
| d. | 9,500 |

ANS: D PTS: 1 DIF: Medium

33. Given the demand for Part A in the table above, what would be the ending available inventory for Period 6 for Part B? Assume that Milford uses lot-for-lot for this part. Part B’s beginning available inventory in Period 1 is 6,500 units.

|  |  |
| --- | --- |
| a. | 0 |
| b. | 500 |
| c. | 4,500 |
| d. | 6,500 |

ANS: B PTS: 1 DIF: Medium

34. Given the demand for Part A in the table above, what would be the ending available inventory for Period 9 for Part B? Part B’s beginning available inventory in Period 1 is 6,500 units. Assume that Milford uses lot-for-lot for this part.

|  |  |
| --- | --- |
| a. | 0 |
| b. | 500 |
| c. | 3,000 |
| d. | 4,500 |

ANS: A PTS: 1 DIF: Medium

35. Given the demand for Part A in the table above, what would be the planned order release for Period 6 for Part C? Assume that Milford purchases this part in lots of 7,500. This means that Milford would buy Part C in 7,500 units; 15,000 units; or 22,500 units, depending on need. Part C’s beginning available inventory in Period 1 is 1,275 units.

|  |  |
| --- | --- |
| a. | 0 |
| b. | 7,500 |
| c. | 15,000 |
| d. | 22,500 |

ANS: A PTS: 1 DIF: Medium

36. Given the demand for Part A in the table above, what would be the planned order receipt for Period 9 for Part C? Assume that Milford purchases this part in lots of 7,500. This means that Milford would buy Part C in 7,500 units; 15,000 units; or 22,500 units, depending on need. Part C’s beginning available inventory in Period 1 is 1,275 units.

|  |  |
| --- | --- |
| a. | 0 |
| b. | 7,500 |
| c. | 15,000 |
| d. | 22,500 |

ANS: B PTS: 1 DIF: Medium

37. Given the demand for Part A in the table above, what would be the ending available inventory for Period 9 for Part C? Assume that Milford purchases this part in lots of 7,500. This means that Milford would buy Part C in 7,500 units; 15,000 units; or 22,500 units, depending on need. Part C’s beginning available inventory in Period 1 is 1,275 units.

|  |  |
| --- | --- |
| a. | 0 |
| b. | 775 |
| c. | 3,275 |
| d. | 4,775 |

ANS: D PTS: 1 DIF: Medium

38. Given the demand for Part A in the table above, what would be the planned order release for Period 7 for Part D? Assume that Milford uses lot-for-lot for this part. Part D’s beginning available inventory in Period 1 is 9,000 units.

|  |  |
| --- | --- |
| a. | 0 |
| b. | 7,500 |
| c. | 15,000 |
| d. | 22,500 |

ANS: C PTS: 1 DIF: Medium

39. Given the demand for Part A in the table above, what would be the ending available inventory for Period 6 for Part D? Assume that Milford uses lot-for-lot for this part. Part D’s beginning available inventory in Period 1 is 9,000 units.

|  |  |
| --- | --- |
| a. | 0 |
| b. | 4,500 |
| c. | 9,000 |
| d. | 12,500 |

ANS: C PTS: 1 DIF: Medium

40. Given the demand for Part A in the table above, what would be the planned order receipt for Period 6 for Part E? Assume that Milford uses lot-for-lot for this part. Part E’s beginning available inventory in Period 1 is 4,250 units.

|  |  |
| --- | --- |
| a. | 0 |
| b. | 4,250 |
| c. | 43,250 |
| d. | 45,000 |

ANS: C PTS: 1 DIF: Hard

41. Given the demand for Part A in the table above, what would be the ending available inventory for Period 8 for Part E? Assume that Milford uses lot-for-lot for this part. Part E’s beginning available inventory in Period 1 is 4,250 units.

|  |  |
| --- | --- |
| a. | 0 |
| b. | 15,000 |
| c. | 43,250 |
| d. | 45,000 |

ANS: A PTS: 1 DIF: Hard

42. Given the demand for Part A in the table above, what would be the ending available inventory for Period 9 for Part F? Assume that Milford purchases this part in lots of 3,000. This means that Milford would by Part F in 3,000 units; 6,000 units; or 9,000 units, depending on need. Part C’s beginning available inventory in Period 1 is 11,000 units.

|  |  |
| --- | --- |
| a. | 0 |
| b. | 6,000 |
| c. | 9,000 |
| d. | 11,000 |

ANS: A PTS: 1 DIF: Hard

43. Given the demand for Part A in the table above, what would be the planned receipt for Period 6 for Part F? Assume that Milford purchases this part in lots of 3,000. This means that Milford would by Part C in 3,000 units; 6,000 units; or 9,000 units, depending on need. Part F’s beginning available inventory in Period 1 is 11,000 units.

|  |  |
| --- | --- |
| a. | 0 |
| b. | 3,000 |
| c. | 8,000 |
| d. | 9,000 |

ANS: D PTS: 1 DIF: Hard

44. Given the demand for Part A in the table above, what would be the ending available inventory for Period 8 for Part G? Assume that Milford uses lot-for-lot for this part. Part G’s beginning available inventory in Period 1 is 6,000 units.

|  |  |
| --- | --- |
| a. | 0 |
| b. | 6,000 |
| c. | 9,000 |
| d. | 11,000 |

ANS: A PTS: 1 DIF: Hard

45. Given the demand for Part A in the table above, what would be planned receipt for Period 5 for Part G? Assume that Milford uses lot-for-lot for this part. Part G’s beginning available inventory in Period 1 is 6,000 units.

|  |  |
| --- | --- |
| a. | 0 |
| b. | 6,000 |
| c. | 24,000 |
| d. | 30,000 |

ANS: C PTS: 1 DIF: Hard

46. Given the demand for Part A in the table above, what would be the planned receipt for Period 3 for Part H? Assume that Milford purchases this part in lots of 50,000. This means that Milford would buy Part H in 50,000 units; 100,000 units; or 150,000 units, depending on need. Part H’s beginning available inventory in Period 1 is 75,000 units.

|  |  |
| --- | --- |
| a. | 0 |
| b. | 50,000 |
| c. | 100,000 |
| d. | 150,000 |

ANS: C PTS: 1 DIF: Hard

47. Given the demand for Part A in the table above, what would be the ending available inventory for Period 8 for Part H? Assume that Milford purchases this part in lots of 3,000. This means that Milford would buy Part C in 7,500 units; 15,000 units; or 22,500 units, depending on need. Part H’s beginning available inventory in Period 1 is 75,000 units.

|  |  |
| --- | --- |
| a. | 0 |
| b. | 30,000 |
| c. | 50,000 |
| d. | 75,000 |

ANS: B PTS: 1 DIF: Hard

Lazar Lighting Fixtures manufactures commercial ceiling lighting systems. They wish to determine what lot sizing approach would be best for them. They have determined the following master schedule:

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Lot size: lot-for-lot | 1 | 2 | 3 | 4 | 5 | 6 |
| Gross Requirements | 100 | 80 | 140 | 160 | 100 | 70 |
| Scheduled Receipts |  |  |  |  |  |  |
| Projected on Hand = 100 | 0 | 0 | 0 | 0 | 0 | 0 |
| Net Requirements |  | 80 | 140 | 160 | 100 | 70 |
| Planned Order Receipts |  | 80 | 140 | 160 | 100 | 70 |
| Planned Order Releases | 80 | 140 | 160 | 100 | 70 |  |

Inventory carrying cost is $3 per unit, and the ordering cost is $250 per order.

48. What would be the cost for the lot-for-lot approach?

|  |  |
| --- | --- |
| a. | $150 |
| b. | $1,250 |
| c. | $800 |
| d. | $1,650 |

ANS: B PTS: 1 DIF: Medium

49. What would be the approximate cost using the EOQ approach?

|  |  |
| --- | --- |
| a. | $15 |
| b. | $125 |
| c. | $1,070 |
| d. | $1,650 |

ANS: C PTS: 1 DIF: Hard

50. Which of the following is NOT a benefit of using MRP?

|  |  |
| --- | --- |
| a. | improved use of capacity |
| b. | simplified scheduling |
| c. | reduced inventory cost |
| d. | ability to track material requirements |

ANS: B PTS: 1 DIF: Easy