**Chapter 18 Supplement: Capacity Requirements Planning, MRP II, ERP, and DRP**

**Practice Problems**

**MULTIPLE CHOICE**

Zontar Fabrications is planning the next day’s stamping operations. They have six jobs lined up for tomorrow. The volume of required production, the setup times and the stamping (run) times for the six products are listed below.

|  |  |  |  |
| --- | --- | --- | --- |
| Job | Order Size | Setup (Min.) | Runtime (Min.) |
| A-0 | 600 | 6 | 0.25 |
| A-2 | 1,000 | 10 | 0.20 |
| B-3 | 1,200 | 15 | 0.20 |
| B-5 | 800 | 9 | 0.30 |
| C-2 | 1,400 | 12 | 0.25 |
| C-6 | 900 | 8 | 0.20 |

1. What would be the total required time to produce Job A-0?

|  |  |
| --- | --- |
| a. | 156 |
| b. | 177 |
| c. | 192 |
| d. | 210 |

ANS: A PTS: 1 DIF: Easy

2. What would be the total required time to produce Job A-2?

|  |  |
| --- | --- |
| a. | 192 |
| b. | 210 |
| c. | 255 |
| d. | 281 |

ANS: B PTS: 1 DIF: Easy

3. What would be the total required time to produce Job B-3?

|  |  |
| --- | --- |
| a. | 233 |
| b. | 249 |
| c. | 255 |
| d. | 277 |

ANS: C PTS: 1 DIF: Easy

4. What would be the total required time to produce Job B-5?

|  |  |
| --- | --- |
| a. | 233 |
| b. | 241 |
| c. | 249 |
| d. | 255 |

ANS: C PTS: 1 DIF: Easy

5. What would be the total required time to produce Job C-2?

|  |  |
| --- | --- |
| a. | 255 |
| b. | 279 |
| c. | 350 |
| d. | 362 |

ANS: D PTS: 1 DIF: Easy

6. What would be the total required time to produce Job C-6?

|  |  |
| --- | --- |
| a. | 177 |
| b. | 188 |
| c. | 192 |
| d. | 210 |

ANS: B PTS: 1 DIF: Easy

7. Zontar Fabrications has two machines in its stamping operations, each of which functions at an 87% efficiency. Zontar runs two 8-hour shifts. What would be the stamping operations idle capacity, if any?

|  |  |
| --- | --- |
| a. | 0 minutes |
| b. | 23 minutes |
| c. | 162 minutes |
| d. | 250 minutes |

ANS: D PTS: 1 DIF: Medium

8. What would be the utilization of the stamping operation for these six jobs?

|  |  |
| --- | --- |
| a. | 0% |
| b. | 15% |
| c. | 60% |
| d. | 85% |

ANS: D PTS: 1 DIF: Medium

Glencoe Industries will be manufacturing four products for the frames of military motorcycles next month. They are operating on an 8-hour-day shift and will be open 23 days next month. Data for their monthly demand and production standards are provided below.

Standard Labor Hours per Unit per Employee

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Product | Demand | Materials | Fabrication | Welding | Assembly |
| A | 200 | 6.9 lb./unit | 0.9 | 0.3 | 1.1 |
| B | 550 | 5.0 lb./unit | 1.4 | 0.2 | 0.8 |
| C | 375 | 9.2 lb./unit | 2 | 0.4 | 1.3 |
| D | 425 | 2.9 lb./unit | 1.6 | 0.2 | 0.8 |

9. If Glencoe purchased 9,000 pounds of materials what would be the surplus or deficit in materials?

|  |  |
| --- | --- |
| a. | deficit of 187.5 pounds |
| b. | deficit of 98.5 pounds |
| c. | neither deficit nor surplus |
| d. | surplus of 187.5 pounds |

ANS: D PTS: 1 DIF: Medium

10. Given the demand for all four products, what would be the number of workers required in the fabrication area? (Round up.)

|  |  |
| --- | --- |
| a. | 8 |
| b. | 10 |
| c. | 13 |
| d. | 19 |

ANS: C PTS: 1 DIF: Hard

11. Given the demand for all four products, what would be the number of workers required in the welding area? (Round up.)

|  |  |
| --- | --- |
| a. | 3 |
| b. | 6 |
| c. | 9 |
| d. | 13 |

ANS: A PTS: 1 DIF: Hard

12. Given the demand for all four products, what would be the number of workers required in the assembly area? (Round up.)

|  |  |
| --- | --- |
| a. | 7 |
| b. | 9 |
| c. | 13 |
| d. | 17 |

ANS: B PTS: 1 DIF: Hard

YoYo Dyne produces several types of small quadrocoptor drones for commercial and military use. They are planning for the next 6 months’ production. The forecasted demand for their best three selling models is given below.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Product | January | February | March | April | May | June |
| Sarissa | 300 | 400 | 450 | 600 | 550 | 500 |
| Javelin | 125 | 300 | 180 | 290 | 400 | 600 |
| Pilum | 100 | 120 | 135 | 175 | 200 | 210 |

In order to plan for production, YoYo Dyne gathered information of standard labor times for the five major operations required. These data are given below.

Standard Hours per Unit per Employee

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Product | Preparation | Burring | Fabrication | Assembly | Inspection |
| Sarissa | 0.6 | 0.4 | 0.9 | 1.9 | 0.2 |
| Javelin | 0.8 | 0.2 | 1.2 | 2.2 | 0.2 |
| Pilum | 0.9 | 0.3 | 1.4 | 2.5 | 0.3 |

13. How many hours would be required to meet January’s demand for Sarissa drones in Preparation?

|  |  |
| --- | --- |
| a. | 160 |
| b. | 180 |
| c. | 190 |
| d. | 210 |

ANS: B PTS: 1 DIF: Easy

14. How many hours would be required to meet February’s demand for Javelin drones in Burring?

|  |  |
| --- | --- |
| a. | 60 |
| b. | 76 |
| c. | 84 |
| d. | 96 |

ANS: A PTS: 1 DIF: Easy

15. How many hours would be required to meet March’s demand for Pilum drones in Fabrication?

|  |  |
| --- | --- |
| a. | 98 |
| b. | 156 |
| c. | 189 |
| d. | 226 |

ANS: C PTS: 1 DIF: Easy

16. How many hours would be required to meet April’s demand for Sarissa drones in Assembly?

|  |  |
| --- | --- |
| a. | 920 |
| b. | 960 |
| c. | 1050 |
| d. | 1140 |

ANS: D PTS: 1 DIF: Easy

17. How many hours would be required to meet May’s demand for Javelin drones in Inspection?

|  |  |
| --- | --- |
| a. | 80 |
| b. | 94 |
| c. | 110 |
| d. | 128 |

ANS: A PTS: 1 DIF: Easy

18. What would be the total number of hours required in Preparation during January for the three types of drones?

|  |  |
| --- | --- |
| a. | 165 |
| b. | 370 |
| c. | 540 |
| d. | 740 |

ANS: B PTS: 1 DIF: Medium

19. What would be the total number of hours required in Burring during March for the three types of drones?

|  |  |
| --- | --- |
| a. | 167.5 |
| b. | 196.0 |
| c. | 233.0 |
| d. | 256.5 |

ANS: D PTS: 1 DIF: Medium

20. What would be the total number of hours required in Inspection during June for the three types of drones?

|  |  |
| --- | --- |
| a. | 188 |
| b. | 283 |
| c. | 312 |
| d. | 425 |

ANS: B PTS: 1 DIF: Medium

21. Across the 6 months, what would be the total required number of hours to produce all of the Sarissa drones?

|  |  |
| --- | --- |
| a. | 8.720 |
| b. | 9.620 |
| c. | 10,340 |
| d. | 11,200 |

ANS: D PTS: 1 DIF: Hard

22. Across the 6 months, what would be the total required number of hours to produce all of the Javelin drones?

|  |  |
| --- | --- |
| a. | 7,120 |
| b. | 7,890 |
| c. | 8,717 |
| d. | 9.230 |

ANS: C PTS: 1 DIF: Hard

23. Across the 6 months, what would be the total required number of hours to produce all of the Pilum drones?

|  |  |
| --- | --- |
| a. | 4,340 |
| b. | 5,076 |
| c. | 5,970 |
| d. | 6,380 |

ANS: B PTS: 1 DIF: Hard

YoYo Dyne prides itself on operating in a lean fashion. This is particularly true with respect to personnel. YoYo Dyne plans on running two 8-hour shifts every day and to operate 25 days every month. They are planning to assign 1 worker in each shift for Preparation; 1 worker in each shift for Burring; 3 workers in each shift for Fabrication; 5 workers in each shift for Assembly; and 1 worker in each shift for Inspection.

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|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Product | January | February | March | April | May | June |
| Sarissa | 300 | 400 | 450 | 600 | 550 | 500 |
| Javelin | 125 | 300 | 180 | 290 | 400 | 600 |
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In order to plan for production, YoYo Dyne gathered information of standard labor times for the five major operations required. These data are given below.

Standard Hours per Unit per Employee

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Product | Preparation | Burring | Fabrication | Assembly | Inspection |
| Sarissa | 0.6 | 0.4 | 0.9 | 1.9 | 0.2 |
| Javelin | 0.8 | 0.2 | 1.2 | 2.2 | 0.2 |
| Pilum | 0.9 | 0.3 | 1.4 | 2.5 | 0.3 |

24. Given the 1 worker in each shift for Preparation, what would be the utilization in Preparation in January?

|  |  |
| --- | --- |
| a. | 80% |
| b. | 93% |
| c. | 100% |
| d. | 120% |

ANS: B PTS: 1 DIF: Medium

25. Assuming that a worker performs an 8-hour day for 25 days a month, what would be the total number of required workers across the 2 shifts in Preparation for June? (If needed, round up.)

|  |  |
| --- | --- |
| a. | 1 |
| b. | 3 |
| c. | 5 |
| d. | 6 |

ANS: C PTS: 1 DIF: Medium

26. The plan is to have 1 worker in each shift for Burring operations. In how many of the 6 months would that be sufficient?

|  |  |
| --- | --- |
| a. | 0 |
| b. | 2 |
| c. | 4 |
| d. | 6 |

ANS: D PTS: 1 DIF: Medium

27. Given the 1 worker in each shift for Inspection, what would be the utilization in January?

|  |  |
| --- | --- |
| a. | 29% |
| b. | 45% |
| c. | 75% |
| d. | 93% |

ANS: A PTS: 1 DIF: Hard

28. Given the 5 workers in each shift for Assembly, what would be the utilization in June?

|  |  |
| --- | --- |
| a. | 40% |
| b. | 80% |
| c. | 100% |
| d. | 140% |

ANS: D PTS: 1 DIF: Hard

29. How many workers in each shift would be required in Assembly to meet the expected demand in June?

|  |  |
| --- | --- |
| a. | 5 |
| b. | 6 |
| c. | 7 |
| d. | 8 |

ANS: C PTS: 1 DIF: Hard

30. The plan is to have 1 worker in each shift for Inspection operations. In how many of the 6 months would that be sufficient?

|  |  |
| --- | --- |
| a. | 0 |
| b. | 2 |
| c. | 4 |
| d. | 6 |

ANS: D PTS: 1 DIF: Medium

Precision Pumps’ plant in Dayton, Ohio, produces three types of commercial pumps. Manufacturing of the pumps is broken down into three broad categories: Preparation, Assembly, and Inspection. The per unit standard machine and labor requirements for the three types of pumps in each category is provided below.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **Preparation** | | **Assembly** | | **Inspection** | |
| **Product** | **Machine** | **Labor** | **Machine** | **Labor** | **Machine** | **Labor** |
| **K-110** | **4** | **2** | **6** | **12** | **1** | **3** |
| **K-220** | **3** | **5** | **8** | **15** | **2** | **4** |
| **M-440** | **10** | **9** | **10** | **8** | **4** | **6** |

The plant manager is looking at the production schedule for the next week. The daily demands for the three types of pumps are as follows.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Product | Monday | Tuesday | Wednesday | Thursday | Friday |
| K-110 | 25 | 35 | 40 | 51 | 70 |
| K-220 | 35 | 32 | 40 | 27 | 25 |
| M-440 | 19 | 12 | 15 | 18 | 15 |

31. How many hours of Machine time in Preparation would be required to produce Monday’s demand of K-110?

|  |  |
| --- | --- |
| a. | 4 |
| b. | 25 |
| c. | 100 |
| d. | 200 |

ANS: C PTS: 1 DIF: Easy

32. How many hours of Labor time in Assembly would be required to produce Tuesday’s demand of K-220?

|  |  |
| --- | --- |
| a. | 32 |
| b. | 180 |
| c. | 360 |
| d. | 480 |

ANS: D PTS: 1 DIF: Easy

33. How many hours of Machine time in Inspection would be required to produce Wednesday’s demand of M-440?

|  |  |
| --- | --- |
| a. | 25 |
| b. | 60 |
| c. | 100 |
| d. | 125 |

ANS: B PTS: 1 DIF: Easy

34. How many hours of Labor time in Preparation would be required to produce Thursday’s demand of K-110?

|  |  |
| --- | --- |
| a. | 60 |
| b. | 92 |
| c. | 102 |
| d. | 122 |

ANS: C PTS: 1 DIF: Easy

35. How many hours of Machine time in Assembly would be required to produce Friday’s demand of K-220?

|  |  |
| --- | --- |
| a. | 180 |
| b. | 200 |
| c. | 280 |
| d. | 360 |

ANS: B PTS: 1 DIF: Easy

36. How many hours of Labor time in Preparation would be required to produce Monday’s demand of M-440?

|  |  |
| --- | --- |
| a. | 86 |
| b. | 94 |
| c. | 100 |
| d. | 114 |

ANS: D PTS: 1 DIF: Easy

37. What would be the total number of Machine hours required in Preparation to produce all three products on Monday?

|  |  |
| --- | --- |
| a. | 350 |
| b. | 395 |
| c. | 445 |
| d. | 495 |

ANS: B PTS: 1 DIF: Hard

38. What would be the total number of Labor hours required in Assembly to produce all three products on Tuesday?

|  |  |
| --- | --- |
| a. | 676 |
| b. | 724 |
| c. | 882 |
| d. | 996 |

ANS: D PTS: 1 DIF: Hard

39. What would be the total number of Machine hours required in Inspection to produce all three products on Wednesday?

|  |  |
| --- | --- |
| a. | 120 |
| b. | 180 |
| c. | 240 |
| d. | 270 |

ANS: B PTS: 1 DIF: Hard

40. What would be the total number of Labor hours required in Preparation to produce all three products on Thursday?

|  |  |
| --- | --- |
| a. | 277 |
| b. | 303 |
| c. | 399 |
| d. | 421 |

ANS: C PTS: 1 DIF: Hard

41. The operations manager at Precision Pumps has scheduled that there will be 500 Machine hours and 600 Labor hours available for Preparation, 800 Machine hours and 1,200 Labor hours available for Assembly, and 200 Machine hours and 400 Labor hours available for Inspection. What will be the Machine utilization across all three products in Preparation for Monday?

|  |  |
| --- | --- |
| a. | 61.3% |
| b. | 67.8% |
| c. | 79.0% |
| d. | 88.2% |

ANS: C PTS: 1 DIF: Medium

42. The operations manager at Precision Pumps has scheduled that there will be 500 machine hours and 600 Labor hours available for Preparation, 800 Machine hours and 1,200 Labor hours available for Assembly, and 200 Machine hours and 400 labor hours available for Inspection. What will be the Labor utilization across all three products in Preparation for Wednesday?

|  |  |
| --- | --- |
| a. | 58.7% |
| b. | 69.2% |
| c. | 77.6% |
| d. | 82.8% |

ANS: B PTS: 1 DIF: Medium

43. The operations manager at Precision Pumps has scheduled that there will be 500 Machine hours and 600 Labor hours available for Preparation, 800 Machine hours and 1,200 Labor hours available for Assembly, and 200 Machine hours and 400 Labor hours available for Inspection. What will be the Machine utilization across all three products in Preparation for Friday?

|  |  |
| --- | --- |
| a. | 90.7% |
| b. | 93.4% |
| c. | 97.8% |
| d. | 101.0% |

ANS: D PTS: 1 DIF: Medium

44. The operations manager at Precision Pumps has scheduled that there will be 500 Machine hours and 600 Labor hours available for Preparation, 800 Machine hours and 1,200 Labor hours available for Assembly, and 200 Machine hours and 400 Labor hours available for Inspection. What will be the Labor utilization across all three products in Assembly for Monday?

|  |  |
| --- | --- |
| a. | 33.0% |
| b. | 45.6% |
| c. | 67.2% |
| d. | 88.8% |

ANS: A PTS: 1 DIF: Medium

45. The operations manager at Precision Pumps has scheduled that there would 500 Machine hours and 600 Labor hours available for Preparation, 800 Machine hours and 1,200 Labor hours available for Assembly, and 200 Machine hours and 400 Labor hours available for Inspection. What will be the Machine utilization across all three products in Assembly for Wednesday?

|  |  |
| --- | --- |
| a. | 33.0% |
| b. | 45.6% |
| c. | 67.2 |
| d. | 88.8% |

ANS: D PTS: 1 DIF: Medium

46. The operations manager at Precision Pumps has scheduled that there will be 500 Machine hours and 600 Labor hours available for Preparation; 800 Machine hours and 1,200 Labor hours available for Assembly, and 200 Machine hours and 400 Labor hours available for Inspection. What will be the Labor utilization across all three products in Assembly for Friday?

|  |  |
| --- | --- |
| a. | 78.2 |
| b. | 92.8% |
| c. | 100.0% |
| d. | 105.3% |

ANS: D PTS: 1 DIF: Medium

47. The operations manager at Precision Pumps has scheduled that there will be 500 Machine hours and 600 Labor hours available for Preparation, 800 Machine hours and 1,200 Labor hours available for Assembly, and 200 Machine hours and 400 Labor hours available for Inspection. What will be the Machine utilization across all three products in Inspection for Monday?

|  |  |
| --- | --- |
| a. | 77.2% |
| b. | 80.3% |
| c. | 85.5% |
| d. | 99.0% |

ANS: C PTS: 1 DIF: Medium

48. The operations manager at Precision Pumps has scheduled that there will be 500 Machine hours and 600 Labor hours available for Preparation, 800 Machine hours and 1,200 Labor hours available for Assembly, and 200 Machine hours and 400 Labor hours available for Inspection. What will be the Labor utilization across all three products in Preparation for Wednesday?

|  |  |
| --- | --- |
| a. | 78.6% |
| b. | 81.7% |
| c. | 88.3% |
| d. | 92.5% |

ANS: D PTS: 1 DIF: Medium

49. The operations manager at Precision Pumps has scheduled that there will be 500 Machine hours and 600 Labor hours available for Preparation, 800 Machine hours and 1,200 Labor hours available for Assembly, and 200 Machine hours and 400 Labor hours available for Inspection. What would be the Machine utilization across all three products in Preparation for Monday?

|  |  |
| --- | --- |
| a. | 87.5% |
| b. | 90.0% |
| c. | 96.2% |
| d. | 98.3% |

ANS: B PTS: 1 DIF: Medium

50. What would be the average Machine utilization for all three products in Preparation across the five days?

|  |  |
| --- | --- |
| a. | 78.5% |
| b. | 82.3% |
| c. | 86.0% |
| d. | 93.4% |

ANS: C PTS: 1 DIF: Hard