Sample Answers to In-Text Questions

# Chapter 18: Master Scheduling and Material Requirements Planning

## Discussion Questions

1. What are the immediate inputs to the master scheduling process?

Answer: Inputs are the inventory balance, the S&OP forecast for the item, and customer orders.

1. What are the outputs from the master scheduling process?

Answer: The outputs are the on hand inventory, the MPS, and the ATP inventory

1. Define available-to-promise (ATP).

Answer: The ATP is uncommitted inventory for that period, that is available to book orders.

1. Discuss briefly the different functions of the master schedule.

Answer: Functions of the MPS are disaggregation of the S&OP plan, a check of the capacity, (RCCP), generation of the MRP plan by period, and providing production planning information to the rest of the company.

1. Describe the time fencing concept used to achieve stability in the master schedule.

Answer: The time fences bring stability to the MPS, by limiting the amount of changes to the schedule in the slushy area, and severely limiting the changes in the frozen area, where production has already begun. The process also provides who needs to approve changes at the different fences.

1. How does the master scheduling process differ for the various production environments?

Answer: ATO: MS focuses on scheduling the standard modules and subassemblies as well as the final assembly schedule when orders are received. MTO: the focus of MS is to acquire the materials when customers are received, ETO: Purchases of materials are made after the design has taken place. The production control takes the form of management of the project schedule.

1. What are some of the guidelines for effectively managing and controlling the performance of a master schedule?

Answer: The Master Schedule is updated on a rolling schedule, and is constantly evaluated to ensure that the schedules are being met. If they are not, more product will be called for.

1. What is the difference between independent and dependent demand?

Explain the difference with an example.

Answer: Independent demand is demand for a completed product such as a bicycle with all of its product dimensions. A dependent item is like a component, such as the tires, which sizes and styles are dependent on the amount of bicycles that use them, and the assembly sequence to produce them; and the inventory status file that indicates if there is any leftover inventory of that item from cancellations, or the last lot size. It has information on the supplier, the cost, and lead times etc. to acquire the item.

1. What are the inputs to an MRP system? What information is provided by each of these inputs?

Answer: The three main inputs are the requirements from the MPS, which has the time phased needs of the parent products; The Bill of materials files which indicate the quantity of materials to build the parent items.

1. Describe the time phasing logic in MRP.

Answer: The MRP requirements begin with the time- phased requirements of the MPS, and therefore prevent the need for just-in-case material inventory, and use just-in-time materials based on the timing of MPS production.

1. Describe the process of MRP explosion.

Answer: The MRP explosion of parts needed, and proceeds level by level to identify the requirements of children part for each parent item. It identifies which parts are required, and the timing of each one.

1. Explain the pegging capability of the MRP system.

Answer: Pegging is the capability to identify the parent items for each level of child parts. Therefore, if a part is delayed, pegging tells the system which items will be late, and therefore which orders will be late, and which customers will suffer, if the shortage cannot be overcome. It creates a backwards implosion of requirements.

1. What are the key outputs from the MRP process?

Answer: Key outputs are planned order schedules for future materials, and planned order releases, offset by the amount of the order lead-time. There are other requirements of control and planning to use, as well as exception reports to call management attention to current problems in the system.

1. What are the differences between a regenerative and a net-change MRP system?

Answer: Since the MRP system takes so much data handling and processing power, instead of running the whole data processing each time a periodic update was needed, some systems run only the net changes through the process to flush out the updated requirements on a rolling schedule. Since this is more efficient, it can be run more often.

1. What is the meaning of “nervousness” in an MRP system? Describe its impact and the mitigation approaches that can be taken.

Answer: Nervousness is a term meaning instability in the system. If you ran an update too often, the system requirements would be constantly changing, making hitting the schedule a moving target. So replanning should be done at an optimal level between reaction, and stability of the production.

1. Describe briefly the different lot-sizing approaches used in MRP?

Answer: Using an EOQ calculation is not very feasible in a lumpy demand situation. It is more of a balancing act between making only what is called for, or a lot for lot system, and taking into consideration the setup costs need to make a product changeover, using a technique like part period balancing. You must strive for the optimal size between waiting and being efficient.

1. Discuss briefly the benefits and limitations of an MRP system.

Answer: MRP systems reduce inventory by ordering products just in time for production. So they reduce costs of excess inventory. You can see what materials might be late for better customer service management, and it is an effective way to use your capacity. A drawback is the need for accuracy in all data, and inventory, or the system efficiency really breaks down.

1. MRP systems are costly, difficult to implement, and complex. It takes a lot of training and education for most employees to use it, and often requires many consulting dollars to implement and make design changes.
2. Discuss the key features and advantages of an integrated MRP–JIT system.

Answer: An MRP system really works best when parts are purchased and lead time are stable. If you are making your own parts, the efficiency of the work center operations are taken more into account.

1. Explain how MRP can be applied in the following service businesses:

(a) a hospital and (b) aircraft scheduling.

Answer: Student examples will vary. Any time you have a kitting operation or a bill of materials/resources/ingredients, etc. you could use an MRP type of logic

1. Suppose you were in charge of your company’s MRP system and received a memo from the CEO stating the need to “search diligently” for ways to improve manufacturing sustainability. Explain how MRP can be used to promote sustainable operations and give three specific actions that you would support, through the MRP, to enhance your company’s sustainability policies.

Answer: Student examples will vary. These “push” strategies are aimed at creating large quantities of standardized products based on forecasts. Marketing departments then focused on convincing potential buyers of the value of these products. The problem with this approach is that it can be wasteful—it ignores sustainability concerns by making excess products or failing to streamline operations and conserve scarce resources. Because MRP systems focus on controlling production flows in manufacturing and service settings, they allow companies to integrate environmental issues such as purchasing materials made from recycled products or reconfiguring bill of materials files (BOM) to eliminate unnecessary steps or hazardous materials.

## Critical Thinking Exercises

Interview the registrar of your university to learn about the course scheduling process. Based on this interview, write a report on how MRP principles can be applied to improve the efficiency of the course scheduling process.

Answer: student examples will vary.