Review Questions for Aggregate Planning

Describe the role of record accuracy in Wheeled Coach’s successful use of MRP. Is this company’s experience the exception or the rule? Answer in a well-developed paragraph.

Wheeled Coach’s record integrity is excellent. They have accurate bills of material and of inventory; they use cycle counters for material audits and error detection. Record accuracy is recognized as a fundamental ingredient of successful MRP implementation. Thus Wheeled Coach’s excellent record integrity is expected; they would not have successful use of MRP without it. (Global company profile, easy)

What is MRP? Identify four benefits from its use.

MRP or material requirements planning is a dependent demand technique that uses a bill of material, inventory expected receipts, and a master production schedule to determine material requirements. The benefits of MRP include better response to customer orders, faster response to market changes, improved utilization of facilities and labor, and reduced inventory levels. (Introduction and Dependent demand, easy)

How does the process choice of an organization affect the basis of its master production schedule?

In a continuous focus (make-to-stock) company, the MPS will likely be expressed in end items; in a process focus (make-to-order) company, customer orders will likely be the basis of the MPS; and in a repetitive process (assemble-to-stock) company, the basis will be its modules. (Dependent inventory model requirements, moderate)

If the explosion of the bill of material tells MRP how much of each part is needed, how does MRP learn when each of these parts is needed?

Timing is established with the time-phased product structure, which factors item quantities with item lead times. The lead times are cumulative, in the sense that the lead time for a child part is the sum of its lead time and that of all of its parent components. (Dependent inventory model requirements, moderate)

Explain the difference between a gross requirements plan and a net requirements plan.

A gross requirements plan multiplies each part quantity in the bill of material by the number of top level parents needed. This ignores any inventory on hand, whether of parents or children. A net requirements plan starts with the top level requirements from the bill of material, then subtracts inventory of that item on hand. This net requirement becomes the gross requirement to the next level of the product structure. (MRP structure, easy)

Describe briefly the information requirements of basic and extended MRP systems. Comment on the challenge of maintaining timely, accurate information for a large manufacturing operation based on MRP.

MRP requires very high accuracy of inventory data file. MRP needs inputs from the master production schedule, bills of material, inventory records, and expected receipts. As MRP is extended to MRP II and ERP, the information needs are intensified. (MRP structure and Extensions of MRP, moderate)

What information is necessary for an operations manager to make effective use of a dependent inventory demand model?

The information necessary for an operations manager to make effective use of a dependent inventory demand model are the master production schedule (what is to be made, and when); specifications or bills of material (how to make the product); inventory availability (what is in stock); purchase orders outstanding (what is on order); and lead times (how long does it take to get or make each component). (MRP structure, moderate)
121. A working MRP system allows a firm to react to even minor changes in production requirements. Discuss both the advantages and disadvantages of having such ability. The advantages are it allows the firm to react quickly and, conceivably, to minimize costs. The disadvantages are the reaction to a large number of minor changes may introduce instability (nervousness) into the purchasing and production departments. (MRP structure, moderate)

An error has been detected in the technical drawing of a product about to be placed on a master production schedule. The part should be 9” by 12”, not 9 cm by 12 cm; further, the part should be stainless steel, not ordinary steel. What document transmits the needed change? Where is the corrected information recorded? Why is this important to the master production schedule?

An engineering change notice or ECN is the document that corrects the error; the correction is made on the bill of material for that product. Accurate records are a necessity for successful use of MRP. In this case, the wrong part would be made or purchased, then sent to assembly. The product could not be correctly made, the schedule could not be met, and the customer’s order could not be delivered. (Dependent inventory model requirements, moderate)

What are time fences? Why are they used?
Time fences allow a segment of the master schedule to be designated as "not to be rescheduled." They are used to reduce system nervousness in MRP environments. (MRP management, moderate)

Explain what is meant by "nervousness" of the MRP schedule. Provide an example. Name two tools that are particularly useful in reducing system nervousness in MRP systems. Nervousness is the reaction to a large number of minor changes that may introduce instability into the purchasing and production departments. Two tools for reducing system nervousness are time fences and pegging. (MRP management, moderate)

Describe finite capacity scheduling. How is it more realistic than MRP?
FCS provides the precise scheduling needed for rapid material movement. MRP schedules work without regard to capacity. Finite capacity scheduling factors department. What is the "supermarket" as it is used in MRP? How does it alter the responsibility for dealing with lead-time offsets?
The supermarket concept applies when parts and assemblies are common to various end items. These items are inventoried in the supermarket so that the master production scheduler does not issue order releases for them. These parts can simply be picked up, and have no lead time. Maintaining the supermarket is done through kanban methods, not MRP.
You have seen several methods for lot sizing in MRP. Why is lot sizing important in MRP? Can too much concern be given lot sizing? Answer in a well-developed paragraph.
Lot sizing is important because, at the very least, it impacts costs. But too much attention can be paid to lot sizing, which can result in false accuracy. Also, several lot-sizing methods may all produce satisfactory results. Finally, proper lot size is often not possible to determine until after actual requirements are known. (Lot-sizing techniques, moderate)

What does the part-period balancing lot-sizing technique attempt to do in deciding the lot sizes?
It balances the setup and holding costs. PPB uses additional information by changing the lot size to reflect requirements of the next lot size in the future.

Describe how MRP II differs from MRP.
MRP II is MRP in which inventory data are augmented by labor hours, material cost, capital cost, or by virtually any resource. (Extensions of MRP, moderate)

How can MRP and JIT be effectively integrated?

One approach is the small bucket approach that involves the following steps:
1. Reduce the MRP buckets from weekly to daily to perhaps hourly.
2. The planned receipts that are part of a firm’s planned orders in an MRP system are communicated to the work areas and are used to sequence production.
3. Inventory is moved through the plant on a JIT basis.
4. As products are completed, they are moved into inventory in the normal way.
5. A back flush is used to reduce inventory balances.

Another approach is the balanced flow. In this system, execution is achieved by maintaining a carefully balanced flow of materials to assembly areas with small lot sizes.

Describe the tactics for load smoothing in MRP.

Overlapping - send pieces to the second operation before the entire lot is completed on the first operation; operations splitting - send the lot to two different machines for the same operation; and lot splitting - break up the order and run part of it ahead of schedule.

What do we mean by closed-loop MRP?

Closed-loop MRP indicates that (a) there is both a planning and execution phase, and (b) information from the execution phase is fed back to the planning phase. Once planning is complete, an attempt is made to execute the “planned” schedule. Information is fed back from the execution of this schedule to the planning phase so the plans can be modified as necessary.

What types of resources might be scheduled via an MRP II system?

Virtually all resources can be evaluated via MRP II. This includes material, labor, cash, and facilities. (Extensions of MRP, moderate)

36. Compare MRP in services to MRP in manufacturing. Utilize a simple example in your comparison.

Services can exhibit dependent demand, just like parts and assemblies in manufacturing. Such services can require product structure trees, bills of material, bills of labor, and scheduling. These are the same features that make MRP attractive to manufacturers. Examples will vary, but here is a sample drawn from food service. One can construct a product structure tree and bill of material for a restaurant meal; lead time offsets are vital; otherwise the elements of the meal would not be served in the right order or at the proper temperature.

What does enterprise resource planning (ERP) allow an organization to do?

It allows them to automate and integrate the majority of their business processes, to share common data and practices across the entire enterprise, and to produce and access information in a real-time environment.

What are the advantages of enterprise resource planning (ERP)?

ERP provides integration of the supply chain, production, and administrative processes; creates commonality of databases; incorporates improved, redesigned, or "best" practices; increases communication and collaboration worldwide; helps integrate multiple sites and business units; comes with software core that is off-the-shelf coding; and provides a strategic advantage over competitors.

What are the disadvantages of enterprise resource planning (ERP)?

ERP is very expensive to purchase, and even more costly to customize; requires major
changes in the company and processes to implement; is such a complex program that many companies cannot adjust to it; involves an ongoing process for implementation, often never completed; and expertise in ERP is limited, with staffing an ongoing problem.