



**Mgt 613**

## **S u b j e c t i v e**

**Reorder point determinants (3 marks)**

1. The rate of demand
2. The lead time
3. Stock out risk (safety stock)
4. Demand and/or lead time variability

**Why the waiting lines are formed? What are its effects on services operations? Give an example? (5 marks)**

**Waiting Lines**

4. Waiting lines are non-value added occurrences
5. Are formed at airports, cricket stadiums, post offices.
6. Formed due to non scheduled random arrivals
7. Often regarded as poor service quality

**Waiting Line Examples**

1. Orders waiting to be filled
2. Trucks waiting to be loaded or unloaded
3. Job waiting to be processed
4. Equipment waiting to be loaded
5. Machines waiting to be repaired.

**Service Station as a Waiting Line Example**

Service station is usually designed to provide service on average service time. At macro level system is unloaded at micro level the system is overloaded a Paradox

Customers arrive at random rate

Service requirements vary only oil change or even tuning or maintenance activity in order to change oil.

**2. What is critical ratio? How to compute it? (3 marks)**

CR - critical ratio: Jobs are processed according to smallest ratio of time remaining until due date to processing time remaining.

**Factors to be consider for using the sampling plan (5 marks)**

Sampling plans are the plans that specify lot size, sample size, number of samples, and acceptance/rejection criteria

Factors to be considered for using sampling plan

- Single-sampling
- Double-sampling
- Multiple-sampling

Single Sampling Characteristics

- One random is drawn from each lot.
- Every item in the sample is examined
- Each item after examination is classified good or defective.
- If the sample contains more than a specified number of defectives say  $c$ , then that lot is rejected.

Double Sampling Plan Characteristics

- Takes care of limitation of Single Sampling Plan by taking another sample if results of the initial sample are inconclusive.
- A double sampling plan specifies the lot size, the size of the initial sample,
- If defects are greater than  $c_2$ , then lot is rejected.

Multiple Sampling Plans

- Similar to double sampling plan but allows more than two samples.
- A sampling plan will specify each sample size and two limits for each sample.
- The values increase with number of samples.
- If the cumulative number of defects (in current and previous samples) exceed the upper limit, then sampling is terminated and the lot is rejected.

4. Advantages and disadvantages of concurrent engineering (5 marks)

Concurrent Engineering

Concurrent engineering is the bringing together of engineering design and manufacturing personnel early in the design phase.

Concurrent Engineering Advantages

- Manufacturing Personnel are able to identify production capabilities and capacities. They have thus the opportunity to inform the design group about the suitability of certain materials on the flipside the designer would know the suitability of certain designs in aiding in cost reduction and quality improvement in production/assembly process.
- Early opportunities for design or procurement of critical tooling, some of which might have long lead times.
- early consideration of the Technical Feasibility of a particular design or a portion of a design. Again this can avoid serious problems during production.

Concurrent Engineering Disadvantages

- long standing existing boundaries between design and manufacturing can be difficult to overcome. Simply bringing a group of people together and thinking that they will be able to work together effectively is probably naive.
- There must be extra communication and flexibility if the process is to work, and these can be difficult to achieve.
- Computer-Aided Design
- Computer-Aided Design (CAD) is product design using computer graphics.
- increases productivity of designers, 3 to 10 times
- creates a database for manufacturing information on product specifications
- provides possibility of engineering and cost analysis on proposed designs

**Numerical question of annual carrying cost**  
**Learn from the example 2 page no 146 of handouts**

**Philosophy of JIT system? (Marks 3)**

Just In Time Production or Lean Production systems focus on the efficient delivery of products or services. Some of the distinguishing elements of the JIT systems are a pull method to manage material flow, consistently high quantity, small lot sizes, uniform work station loads. The JIT systems provide an organizational structure for improved supplier coordination by integrating the logistics, production and purchasing processes. When Operations Manager focuses on their organization's competitive advantage they aim for low cost of production, consistent quality with reductions in inventory, space requirements, paperwork and increases in productivity, employee participation and effectiveness.'

**EDI rewards? (5 marks)**

Electronic data interchange (EDI) is the structured transmission of data between organizations by electronic means. It is used to transfer electronic documents or business data from one computer system to another computer system, i.e. from one trading partner to another trading partner without human intervention.

Electronic Data Interchange gives an organization the following benefits and advantages.

1. Increased productivity
2. Reduction of paperwork
3. Lead time and inventory reduction
4. Facilitation of just-in-time systems
5. Electronic transfer of funds
6. Improved control of operations
7. Reduction in clerical labor
8. Increased accuracy

**1:- Elements of Queuing System (3 marks)**

**Elements of Queuing System**

**Population Source, Arrivals, Waiting Lines, Processing Order, Service, System and Exit are the common identifiable elements of a Queuing System.**

**4:- Prior knowledge of job flow times is essential to effective planning, control and management of customer relationships. Explain job flow time and identify various components of job flow time. (1+4 marks)**

**Job Flow Time: The length of time a job is in the shop at a particular workstation or work center.**

**Job Lateness: This is the length of time the job completion date is expected to exceed the date the job was due or promised to a customer.**

**Make span: This is the total time needed to complete a group of jobs. It is the length of time between the start of the first job in the group and the completion of the last job in the group.**

**Average Number of Jobs: Jobs that are considered in a shop are considered to be work in process inventory. Mathematically**

**Average Number of Jobs= Total Flow Time / Make span.**

**5:- What are the various assumptions that you would consider while carrying out aggregate planning?**

**Aggregate planning is an operational activity that does an aggregate plan for the production process, in advance of 2 to 18 months, to give an idea to management as to what quantity of materials and other resources are to be procured and when, so that the total cost of operations of the organization is kept to the minimum over that period.**

**Assumptions for Aggregate Planning**

- 1. The regular output capacity is the same for all periods.**
- 2. Cost (Back Order, Inventory, Subcontracting etc) is a linear function composed of unit cost and number of units. (In reality cost is more of a step function)**
- 3. Plans are feasible (There is sufficient inventory exists to accommodate a plan, subcontractors would provide quality products and outsourcers would be secure)**
- 4. All costs associated with a decision option can be represented by a lump sum or by unit costs that are independent of the quantity involved.**
- 5. Cost figures can be reasonably estimated and are constant over the planning horizon.**
- 6. Inventories are built up and draw down at a uniform rate and output occurs at a uniform rate throughout each period. Backlogs are treated as if they exist for the entire period, even though in reality they tend to build up towards the end of the period**

**What is the role of ABC Classification system in inventory management?**

## **ABC Classification System**

An important aspect of Inventory Management is that items held in inventory are not of equal importance in terms of rupees invested, profit potential, sales or usage volume.

ABC Classification System controls inventories by dividing items into 3 groups A, B and C respectively.

1. Group A consists of High Rupee (Monetary) Value, which account for a small portion about 10% of the total inventory usage.
2. Group B consists of Medium Rupee (Monetary) Value, which account for about 20% of the total inventory usage.
3. Group C consists of Low Rupee (Monetary) Value, which account for a large portion about 70% of the total inventory usage.
4. The level of control reflects cost benefit concerns.
5. Group A items are reviewed on a regular basis.
6. Group B items are reviewed at a less frequency than Group A items but more than Group C items.
7. Group C items are not reviewed and order is placed directly.

Demand for service is usually difficult to predict'  
Comment on this statement in the light of aggregate planning (3 marks)

Senior management of a service firm has initiated a short term project of building a new facility of a designated area. What will be the responsibilities and qualification of a project manager regarding this project (5 marks?)

There is a great deal involved in managing a house-building project, including major renovation projects. Whether you are managing the project yourself, or leaving it all to someone else, the main tasks include:

**1. Preliminaries:**

Arranging finance.

Organizing the design.

**2. Organizing the builder and sometimes the subcontractors:**

Asking selected builders and/or subcontractors for prices or tenders to do the work.

Selecting the form of contract that best suits your needs.

**3. Consents:**

Getting building consents (and resource consents if necessary).

**4. Managing construction:**

Arranging for subcontractors to be available when needed

Dealing with suppliers and making sure materials are ordered and delivered on time.

Monitoring progress once work starts to make sure everything complies with the contract

Answering questions that arise during building, and clarifying anything

Knowing when progress payments are due and checking claims for payment

Processing variations and anything else that crops up along the way.

Arranging amendments to the building consent where necessary.

Arranging the final inspection for the code compliance certificate.

**Qualification of Project Manager**

PMP certification

**Problems in service schedule (marks 3)?**

**Service Operation Problems**

1. Cannot store or inventory services
2. Customer service requests are random
3. Scheduling service involves
  - a. Customers
  - b. Workforce
  - c. Equipment

**6: labor flexibility helpful in services or not?**

Labor Flexibility can be advantage in Services Labor often comprises a significant portion of service compared to manufacturing. That coupled with the fact that service providers are often able to handle a fairly wide variety of service requirements means that to some extent, planning is easier than manufacturing.

**Define Lean manufacturing?**

Lean Manufacturing is a management philosophy focusing on reduction of the seven wastes.

1. Over-production (Capacity exceeding demand)
2. Waiting time
3. Transportation
4. Processing
5. Costs
6. Inventory
7. Motion (Lack of coordination of body movements)

**Q: what is product structure tree and briefly describe its significance in MRP?**

*Product structure tree: Visual depiction of the requirements in a bill of materials, where all components are listed by levels.*

**Inventory Records**

One of the three primary inputs in MRP

- Includes information on the status of each item by time period
- Gross requirements
- Scheduled receipts
- Amount on hand
- Lead times
- Lot sizes
- And more ...
- Assembly Time Chart
- *Cumulative lead time*: the sum of the lead times that sequential phases of a process require, from ordering of parts or raw materials to completion of final assembly.

**Q:** as operations manager of a manufacturing concern, you are required to carry out aggregate planning. What would be the various outputs of aggregate planning?

**Aggregate Planning Outputs**

1. Total cost of a plan
2. Projected levels of inventory
3. Inventory
4. Output
5. Employment
6. Subcontracting
7. Backordering

**Q:** what is Kanban and explain the process of kanban system? Support your answer by giving an example.

Kanban also spelled kamban and literally meaning "signboard" or "billboard", is a concept related to lean and just-in-time (JIT) production. According to Taiichi Ohno, the man credited with developing Just-in-time, kanban is one means through which JIT is achieved.

**Q:** the project life cycle refers to a logical sequence of activities to accomplish the project's goals or objectives. Identify the various stages of project life cycle and the activities carried out at each stage.

**Project Life Cycle**

The Project Life Cycle comprises of a new concept idea for a unique activity which is then evaluated through feasibility reports, planned with certain sequence of activities, execution of activities and terminated after the project has been completed or shelved due to certain unavoidable. Diverse project management tools and methodologies prevail in the different project cycle phases. Let's take a closer look at what's important in each one of these stages.

#### 1) Initiation

In this first stage, the scope of the project is defined along with the approach to be taken to deliver the desired outputs. The project

manager is appointed and in turn, he selects the team members based on their skills and experience.

## **2) Planning**

The second phase should include a detailed identification and assignment of each task until the end of the project. It should also include a risk analysis and a definition of criteria for the successful completion of each deliverable.

## **3) Execution and controlling**

The most important issue in this phase is to ensure project activities are properly executed and controlled. During the execution phase, the planned solution is implemented to solve the problem specified in the project's requirements. In product and system development, a design resulting in a specific set of product requirements is created.

## **4) Closure**

In this last stage, the project manager must ensure that the project is brought to its proper completion. The closure phase is characterized by a written formal project review report containing the following components: a formal acceptance of the final product by the client, Weighted Critical Measurements, rewarding the team, a list of lessons learned, releasing project resources, and a formal project closure notification to higher management.

### **3- Benefits of PERT Analysis**

#### **Advantages of PERT**

- 1. Forces managers to organize**
- 2. Provides graphic display of activities**
- 3. Identifies**
- 4. Critical activities**
- 5. Slack activities**

#### **4- MRP Processing Components**

##### **MRP Processing**

- 1. Gross requirements**
- 2. Schedule receipts**
- 3. Projected on hand**
- 4. Net requirements**
- 5. Planned-order receipts**

### **6- High-Volume Success Factors lesson no 41**

**Process and product design**

**Preventive maintenance**

**Rapid repair when breakdown occurs**

**Optimal product mixes**

**Minimization of quality problems**

**Reliability and timing of supplies**

**Intermediate-Volume Systems**



Outputs are between standardized high-volume systems and made-to-order job shops  
Run size, timing, and sequence of jobs  
Economic run size.

**Gantt charts are of various types. Give a brief description about at least two types of Gantt charts**

A Gantt chart is a type of bar chart that illustrates a project schedule. Gantt charts illustrate the start and finish dates of the terminal elements and summary elements of a project. Terminal elements and summary elements comprise the work breakdown structure of the project.

There are several types of Gantt Charts. The most commonly used types are as follows:

**Load chart** – A type of Gantt chart that shows the loading and idle times for a group of machines or list of departments

**Schedule chart** – A type of Gantt chart that shows the orders or jobs in progress and whether they are on schedule or not.

**"Six sigma is related to quality improvement" Elaborate this statement.**

Six Sigma Programs are always directed towards quality improvement, cost cutting and time saving.

Six Sigma —  $6\sigma$ , Six Sigma combines established methods such as statistical process control, design of experiments and failure mode and effects analysis (FMEA) in an overall framework.

Six Sigma seeks to improve the quality of process outputs by identifying and removing the causes of defects (errors) and minimizing variability in manufacturing and business processes.[3] It uses a set of quality management methods, including statistical methods, and creates a special infrastructure of people within the organization ("Black Belts", "Green Belts", etc.)

Implementation of six sigma aims at reducing defects. What could be the various obstacles in implementing Six Sigma?

Obstacles to Implementing Six Sigma ( TQM) includes the lack of:

1. Company-wide definition of quality.
2. Strategic plan for change.
3. Customer focus.
4. Real employee empowerment.
5. Strong motivation.
6. Time to devote to quality initiatives.
7. Leadership.
8. Poor inter-organizational communication.
9. View of quality as a "quick fix".
10. Emphasis on short-term financial results.
11. Internal political and "turf" wars.

**What are the salient features of six sigma quality management?**

**ANS:** following are the 4 salient features of sigma quality management

1. Selecting and training appropriate people.
2. Providing strong leadership.
3. Selecting projects likely to succeed.
4. Defining performance merits.

**How would you illustrate the problems that you may encounter in scheduling the service operations?**

**ANS:**

Cannot store or inventory services

2. Customer service requests are random
3. Scheduling service involves
  - a. Customers
  - b. Workforce
  - c. Equipment

**What would happen if customer's expected quality and perceived quality do not match? Explain by giving an example.**

Customers expect certain things from certain companies. When someone goes into a McDonalds to order their favorite meal – a Big Mac, they are expecting exactly what they are accustomed to getting (a quick, no hassle, tasty big burger with all the works). If it takes 15 minutes to get a Big Mac that doesn't even have the famous special sauce on it the customer's perceived service of McDonalds is going to plummet.

**Differentiate Big vs Little Just-In-Time System. Which one of the both answers the most pressing questions that an organization faces? 4+1**

1. Big JIT: it has broad focus in, vendor relations, materials and inventory management, technology management, human relation
2. Little JIT: it has narrow focus Internal to organization, Scheduling materials, and Scheduling services of production.

By JIT systems organization can achieve a balanced smooth flow of production, it will flexible their system with reduction in wastes and lead time.

**Reorder point determinants (3 marks)**

**Reorder point:** When the quantity on hand of an item drops to this amount, the item is reordered.

**Following are the determinant of the Reorder point.**

1. The rate of demand
2. The lead time
3. Stock out risk (safety stock)
4. Demand and/or lead time variability

**Example :**

An apartment complex in Quetta requires water for its home use.

Usage= 2 barrels a day

Lead time= 5 days

ROP= Usage X Lead Time

= 2 barrels a day X 7 = 14 barrels

It means when ever our stock fall to 14 barrels we have to place the new order for water.

**What are the primary reasons for holding inventory?**

- 1) To maintain independence of operations
- 2) To meet variation in product demand
- 3) To allow flexibility in production scheduling
- 4) To provide a safeguard for variation in raw material deliver time
- 5) To take advantage of economic purchase order size

**Explain the importance of employee empowerment in TQM.**

Employee empowerment is a new way of managing organizations towards a more complex and competitive future. A TQM strategy is deemed to fail if empowerment of employees is absent. Quality starts with engaging the people responsible for processes- the people who know the processes the best. Total Quality management has proven very successful in fostering responsibility, motivation and belongingness in organizations with high autonomy and flexibility that how important the empowerment of the employees.

**Why do older machines generally exhibit a higher degree of natural variability than do the newer machines?**

The extent of natural variability inherit in a process differs from process to process, and changes over time.

As the older machines will generally exhibit a higher degree of natural variability than the newer machines, partly because of worn parts and partly because of newer machines may incorporate designs improvements that reduce the variability of their output.

**Mr. Ali is appointed as a quality inspector at ABC Company. He is responsible for quality assurance that requires acceptance sampling. What are the various factors that he would consider for deciding which sampling plan to use?**

**Choosing a Plan**

- Cost and time are prime determinants of choosing a plan.
- Primary considerations are number of samples needed and total number of observations required.
- Single sample has only one sample but large sample size.
- Where the cost to obtain a sample is high than cost of analyzing the sample, single sample plan is followed.

□ Where inspection costs are higher than costs of obtaining the sample, multiple samples are carried to ensure that a good or bad result can help terminate the sample testing thus ensuring savings in inspection cost.

Ali takes vitamin tablets at a rate of 2 per day, which are delivered to his home 4

days after an order is placed. At what point should Ali reorder?

Note: Provide answer with complete working. Failure to show working will result in deduction of marks.

Usage = 2 vitamins a day

Lead time = 7 days

ROP = Usage × Lead time

= 2 vitamins per day × 7 days = 14 vitamins

Thus, Ali should reorder when 14 vitamin tablets are left.

Prior knowledge of job flow times is essential to effective planning, control and management of customer relationships. Explain job flow time and identify various components of job flow time. (1+4 marks)

**Job Flow Time:** The length of time a job is in the shop at a particular workstation or work center.

**Job Lateness:** This is the length of time the job completion date is expected to exceed the date the job was due or promised to a customer.

**Make span:** This is the total time needed to complete a group of jobs. It is the length of time between the start of the first job in the group and the completion of the last job in the group.

**Average Number of Jobs:** Jobs that are considered in a shop are considered to be work in process inventory. Mathematically

Average Number of Jobs = Total Flow Time / Make span.

What would be the annual ordering cost, if annual demand is 300 units where the order size is 250 units and ordering cost is Rs. 10 per order?

Note: Provide answer with complete working. Failure to show working will result deduction of marks.

Annual ordering cost = no. of orders placed in a year × cost per order

= annual demand/order quantity × cost per order

annual demand= 300

order quantity=250

cost per order= 10

=300/250x10

= 12

Annual ordering cost is 12

Illustrate the role of inventory as a capacity changing option in aggregate planning.

Capacity Option in changing Inventory levels:

- Increase inventory in low demand periods to meet the high demand in the future
- Increase costs associated with storage, insurance, handling obsolescence and capital investments
- Shortages can mean lost sales due to long lead times and poor customer service

Being the head of a quality control team of ABC company, what considerations would you take into account for using control charts?

At what point in the process to use control charts

What size samples to take?

What type of control chart to use?

1. Variables

2. Attributes

Comment on the statement "Labor flexibility can be an advantage in services."

Labor Flexibility can be advantage in Services Labor often comprises a significant portion of service compared to manufacturing. That coupled with the fact that service providers are often able to handle a fairly wide variety of service requirements means that to some extent, planning is easier than manufacturing

What are the various causes of disruptions and why is it important to eliminate disruptions in a JIT system?

causes of disruptions:

- Disruptions are caused by variety of causes:
- poor quality
- equipment breakdowns
- changes to the schedule
- late deliveries
- Installation of new equipment

Elimination of disruptions:

- To Make system flexible
- To Eliminate wastes
- To maintain excess inventory
- To maximize the productivity
- To reduce uncertainty of the system
- 

What is service level? Generally speaking, how is service level related to the amount of safety stock held?

Service Levels refer to the important elements of the service to be provided, usually stated in terms of results produced for customers.

Both are directly proportional. The lower the service level, the lower the requirement for safety stock.

What is bullwhip effect? What are its consequences?

Bullwhip effect represents the real life time situation that Inventories are progressively larger moving backward through the supply chain.

What would happen if customer's expected quality and perceived quality do not match? Explain by giving an example.

This gap is directly related to everyone's perception of service quality

- Customers expect certain things from certain companies
- When someone goes into a McDonalds to order their favorite meal – a Big Mac, they are expecting exactly what they are accustomed to getting (a quick, no hassle, tasty big burger with all the works). If it takes 15 minutes to get a Big Mac that doesn't even have the famous special sauce on it the customer's perceived service of McDonalds is going to plummet.

Define aggregate planning. Discuss its role in FMCG department of a departmental store./

Aggregate planning is the process of developing, analyzing, and maintaining a preliminary, approximate schedule of the overall operations of an organization. The aggregate plan generally contains targeted sales forecasts, production levels, inventory levels, and customer backlogs..