

**GOVT. ENGG. COLLEGE JHALAWAR**

**MBA (2nd Semester)**  
**SUBJECT-OSM**

**MID TERM 1**  
**CODE-M-205**

All Questions are Compulsory

Max time : 1 hr

1. You have just determined that your service employees have used a total of 2400 hours of labor this week to process 560 insurance forms. Last week the same crew used only 2000 hours of labor to process 480 forms.
  - a) Which productivity measure should be used?
  - b) Is productivity increasing or decreasing? 3)
2. Why we study Operations Management? 2)
3. Discuss various types of Plant Layout with examples. 2)
4. What is Break Even Point (B.E.P.)? Calculate the B.E.P. in units and in sales value: 3)

Output	3000 units
Selling price per unit	Rs. 30
Variable cost per unit	Rs. 20
Total fixed cost	Rs. 20000

**SOLUTION TO MID TERM 1**

**SUBJECT -OSM**

**ANSWER 1.**

a): Labor Productivity (Partial Measure).

b): Last week's productivity =  $480/2000 = 0.24$ , and this week's productivity is =  $560/2400 = 0.23$ . So, productivity is decreasing slightly.

**ANSWER 2.**

It is well known that operation and supply chain management is an integral part of most businesses and is essential to company success and customer satisfaction.

OM (operation management) is an integrative body of knowledge; whose skills are needed in industries as diverse as health care, education, telecommunications, lodging, food service, banking, consulting and manufacturing

OM is one of the three major functions of any organization, and it's integrally related to all the other business functions.

- We study OM because we want to know how goods and services are produce.
- We study OM to understand what operations managers do.
- We study OM because it is such a costly part of an organization.

**Whereas, importance of supply chain management is mentioned below**

**Boost Customer Service**

- Customers expect the correct product assortment and quantity to be delivered.

- Customers expect products to be available at the right location. (i.e., customer satisfaction diminishes if an auto repair shop does not have the necessary parts in stock and can't fix your car for an extra day or two).
- Right Delivery Time – Customers expect products to be delivered on time (i.e., customer satisfaction diminishes if pizza delivery is two hours late or Christmas presents are delivered on December 26).
- Right After Sale Support

### Reduce Operating Costs

- **Decreases Purchasing Cost** – Retailers depend on supply chains to quickly deliver expensive products to avoid holding costly inventories in stores any longer than necessary. For example, electronics stores require fast delivery of 60" flat-panel plasma HDTV's to avoid high inventory costs.
- **Decreases Production Cost** – Manufacturers depend on supply chains to reliably deliver materials to assembly plants to avoid material shortages that would shutdown production. For example, an unexpected parts shipment delay that causes an auto assembly plant shutdown can cost \$20,000 per minute and millions of dollars per day in lost wages.
- **Decreases Total Supply Chain Cost** – Manufacturers and retailers depend on supply chain managers to design networks that meet customer service goals at the least total cost. Efficient supply chains enable a firm to be more competitive in the market place. For example, Dell's revolutionary computer supply chain approach involved making each computer based on a specific customer order, then shipping the computer directly to the customer. As a result, Dell was able to avoid having large computer inventories sitting in warehouses and retail stores which saved millions of dollars. Also, Dell avoided carrying computer inventories that could become technologically obsolete as computer technology changed rapidly.

### Improve Financial Position

- **Increases Profit Leverage** – Firms value supply chain managers because they help control and reduce supply chain costs. This can result in dramatic increases in firm profits. For instance, U.S. consumers eat 2.7 billion packages of cereal annually, so decreasing U.S. cereal supply chain costs just one cent per cereal box would result in \$13 million dollars saved industry-wide as 13 billion boxes of cereal flowed through the improved supply chain over a five year period.
- **Decreases Fixed Assets** – Firms value supply chain managers because they decrease the use of large fixed assets such as plants, warehouses and transportation vehicles in the supply chain. If supply chain experts can redesign the network to properly serve U.S. customers from six warehouses rather than ten, the firm will avoid building four very expensive buildings.
- **Increases Cash Flow** – Firms value supply chain managers because they speed up product flows to customers. For example, if a firm can make and deliver a product to a customer in 10 days rather than 70 days, it can invoice the customer 60 days sooner.

### Answer 3.

**Definition:** Plant layout refers to the arrangement of physical facilities such as machines, equipment, tools, furniture etc. in such a manner so as to have quickest flow of material at the lowest cost and with the least amount of handling in processing the product from the receipt of raw material to the delivery of the final product.

### TYPES OF LAYOUT:

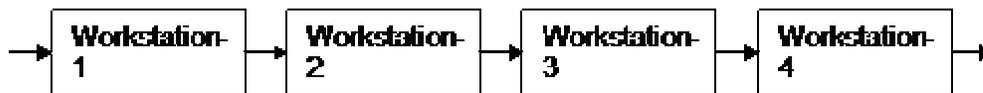
There are mainly four types of plant layout:

- (a) **Product or line layout**
- (b) **Process or functional layout**
- (c) **Fixed position or location layout**
- (d) **Combined or group layout**

### PRODUCT OR LINE LAYOUT:

In this type of layout the machines and equipments are arranged in one line depending upon the sequence of operations required for the product. It is also called as line layout. The material moves to another machine sequentially without any backtracking or deviation i.e the output of one machine becomes input of the next machine. It requires a very little material handling.

It is used for mass production of standardized products.eg assembly of computers , assembly of cars.



### Advantages of Product layout:

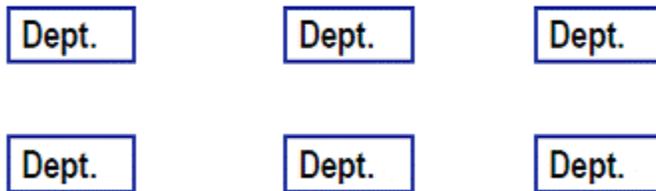
- Low cost of material handling, due to straight and short route and absence of backtracking
- Smooth and continuous operations
- Continuous flow of work
- Lesser inventory and work in progress
- Optimum use of floor space
- Simple and effective inspection of work and simplified production control
- Lower manufacturing cost per unit

### Disadvantages of Product layout:

- Higher initial capital investment in special purpose machine (SPM)
- High overhead charges
- Breakdown of one machine will disturb the production process.
- Lesser flexibility of physical resources.

### **PROCESS LAYOUT:**

In this type of layout the machines of a similar type are arranged together at one place. This type of layout is used for batch production. It is preferred when the product is not standardized and the quantity produced is very small.



### **Advantages of Process layout:**

- Lower initial capital investment is required.
- There is high degree of machine utilization, as a machine is not blocked for a single product
- The overhead costs are relatively low
- Breakdown of one machine does not disturb the production process.
- Supervision can be more effective and specialized.
- Greater flexibility of resources.

### **Disadvantages of Process layout:**

- Material handling costs are high due to backtracking
- More skilled labour is required resulting in higher cost.
- Work in progress inventory is high needing greater storage space
- More frequent inspection is needed which results in costly supervision

### **COMBINED LAYOUT:**

- A combination of process & product layout is known as combined layout.
- Manufacturing concerns where several products are produced in repeated numbers with no likelihood of continuous production, combined layout is followed

### **FIXED POSITION OR LOCATION LAYOUT:**

Fixed position layout involves the movement of manpower and machines to the product which remains stationary. The movement of men and machines is advisable as the cost of moving them would be lesser. This type of layout is preferred where the size of the job is bulky and heavy. Example of such type of layout is locomotives, ships, boilers, generators, wagon building, aircraft manufacturing, etc.



### Advantages of Fixed position layout:

- The investment on layout is very small.
- The layout is flexible as change in job design and operation sequence can be easily incorporated.
- Adjustments can be made to meet shortage of materials or absence of workers by changing the sequence of operations.

### Disadvantages of Fixed position layout:

- As the production period being very long so the capital investment is very high.
- Very large space is required for storage of material and equipment near the product.
- As several operations are often carried out simultaneously so there is possibility of confusion and conflicts among different workgroups.

### ANSWER 4:

The break even point is the production level where total revenues equals total expenses. In other words, the break-even point is where a company produces the same amount of revenues as expenses either during a manufacturing process or an accounting period. Since revenues equal expenses, the net income for the period will be zero.

The company didn't lose any money during the period, but it also didn't gain any money either. It simply broke even.

$$\text{Break - Even Point (in units)} = \frac{\text{Fixed Cost}}{\text{Selling Price per unit} - \text{Variable}} = \frac{20,000}{30 - 20} = \frac{20,000}{10} = 2,000 \text{ units.}$$

$$\text{Break - Even Point (in sales value)} = \frac{\text{Fixed Cost} \times \text{Sales}}{\text{Sales} - \text{Variable Cost}}$$

Fixed Cost = ₹20,000 (given)  
 Sales = 3,000 × 30 = ₹90,000  
 Variable Cost = 3,000 × 20 = ₹60,000

$$\text{Hence, B.E.P. (in sales value)} = \frac{20,000 \times 90,000}{90,000 - 60,000} = \frac{20,000 \times 90,000}{30,000} = ₹60,000$$

Otherwise, as the B.E.P. is 2000 units, break-even sale would be:  
 2,000 × 30 = 60,000

