Q.1 Explain briefly elements of operations strategy?

Ans. The six elements of operations strategy are:-

1. **Designing of the production system**
2. **Facilities for production and services**
3. **Product or service design and development**
4. **Technology selection, development, and process development**
5. **Allocation of resources**
6. **Focus on facilities planning**

1. **Designing of the production system: - The designing of the production system involves the selection of the type of product design, processing system, inventory plan for finished goods, etc. The product design has two varieties.**
   - **Customized product design**
   - **Standard product design**

There are two types of production systems. They are product focused and process focused. Product-focused system is adopted where there is mass production by using a group of machines. For example, products like automobiles, computers, etc.

2. **Facilities for production and services: - Certain specialization in production allows the firm to provide the customers with products of lower cost, faster delivery, on-time delivery, high product quality, and flexibility.**
3. **Product or Service design and development**:-
   - **Generating the idea**
   - **Creating the feasibility reports**
   - **Designing the prototype and testing**
   - **Preparing a production model**
   - **Evaluating the economies of scale for production**
   - **Testing the product in the market**
   - **Obtaining feedback**
   - **Creating the final design and starting the production**
4. **Technology selection and process development: - A product selected for production will be analyses for the process and the applicable technology for optimal production. There are many challenges faced by the operations managers in this decision as the alternatives are many. The techno-economic analysis for each alternative will help to decide the required technology.**

5. **Allocation of resources: - The production units face continuous problems of allocating the scarce resources like capital, machines, equipment, materials, manpower, services, etc. Allocation at the right time to the right place of production indicates the efficiency of the production planners. Optimal use of resources will enable economical production. Minimizing waste, optimal utilization of resources, and the best quality product demand a sound operations strategy.**
6. **Facility, capacity, and layout planning: - The location, layout, and facilities creation for the production are the key decision areas for the operations manager. These are critical for achieving the competitiveness. The decision also influences the future expansion of the plant. While evaluating the alternatives, the operations manager will consider the availability of raw materials, access to market, etc. Enormous capital requirement is required and the planning is always long range. Here, the production process adopted and the technology pursued dictates the volume, quality, and cost of production.**

Q.2 Describe the general factors that influence the plant location decision.

Ans. General Factors: - The general factors that influence the plant location are listed as follows:-

1. **Availability of Land**
2. **Availability of inputs**
3. **Closeness to market places**
4. **Communication facilities**
5. **Infrastructure**
6. **Transport**
7. **Government support**
8. **Housing and recreation**

1. **Availability of Land: - Availability of land plays an important role in determining the plant location. On several occasions, our plans, calculations. However, availability of land may be in question. In such cases, we will have chosen the second best location.**
2. **Availability of inputs: - While choosing a plant location, it is very important for the organization to get the labor at the right time and good quality raw materials. The Plant should be located:**
    - **Near to the raw material source**
    - **At the market place**
    - **Close to the market when universally available, so as to minimize the transportation cost**

3. **Closeness to market places: -** Organizations can choose to locate the plant near to the customers' market or far from them, depending upon the product they produce. It is advisable to locate the plant near to market place.
4. **Communication facilities:** - Communication facility is also an important factor which influences the location of a plant. Regions with good communication facilities namely postal and telecommunication links should be given priority for the selection of sites.
5. **Infrastructure:** - Infrastructure plays a prominent role in deciding the location. The basic infrastructures needed in any organization are: Power, Water, and Waste disposal.
6. **Transport: -** Transport facility is a must for facility location and layout of location of the plant. Timely supply of raw materials to the company and supply of finished goods to the customers is an important factor. The basic modes of transportation are by air, road, rail, water, and pipeline.
7. **Government support: -** The factors that demand additional attention for plant location are the policies of the state governments and local bodies concerning labor laws, building codes, and safety.
8. **Housing and recreation:** - Housing and recreation factors also influence the plant location. Locating a plant with or near to the facilities of good schools, housing and recreation for employees will have a greater impact on the organization. These factors seem to be unimportant, but there is a difference as they motivate the employees and hence the location decisions.

Q.3 Write short notes on

- **Total productive Maintenance**
- **GNATT Chart**
- **Bullwhip effect in SCM**
- **Scheduling in services**

Ans. **Total Productive Maintenance (TPM):-** Maintenance is a function in any operation system. Maintenance keeps the equipment in good condition. Generally, equipment deteriorates because usage causes wear and tear to the parts causing inaccuracies to the products made by them. When the deterioration produces components which exceed the permitted deviations rendering them unacceptable, maintenance is undertaken to bring back the machine to produce acceptable components. Total productive maintenance puts the responsibility of maintenance where it belongs to and on the operator who uses the equipment. It is a company-wide activity which

involves all the people. The focus is on the operating personnel because they would know about malfunctioning earlier more than anybody else.

GANTT chart: - "A GANTT chart is a graphical representation to the duration of tasks against the progression to time." A Gantt chart is a useful tool for planning and scheduling projects as well as for monitoring and controlling the project deliveries. There are a number of advantages of Gantt charts such as:

- **A Gantt chart uses a 'fill in the bar' method to indicate the progress of the project.**
- **It lays out the order in which the tasks need to be carried out.**
- **It helps in planning the time required for completion of a project.**
- **A Gantt chart shows dependencies between tasks.**
- **It allows planning for the remedial actions, if any delay, to complete the project back on time.**
- **Along with a 'milestone chart', helps you to represent the planned bar which indicates the deadlines and other significant events of the project.**

Bullwhip Effect in SCM: - An organization always goes through ups and downs. A Bullwhip effect may arise because of the following factors:

1. **Increase in the lead time of the project due to increase in variability of demand**
2. **Increase in the stocks to accommodate the increasing demand arising out of complicated demand models and forecasting techniques**
3. **Reduced service levels in the organization**
4. **Inefficient allocation of resources**
5. **Increased transportation cost**

Four rational factors create the bullwhip effect:

1. **Demand signal processing**
2. **The rationing game**
3. **Order batching**
4. **Manufacturer price variations**

Scheduling in Services: - There are distinctive difference between the scheduling followed for manufacturing and services. All these differences have a direct impact on scheduling. Normally the service center capacity is fixed, but the demand will be varying. Forecasting the

demand in advance for service activities is difficult and scheduling such variable demand poses certain problems. In order to provide timely service and utilize the capacity to the maximum extent, the scheduler has to adopt certain systems/methodologies. There are there methods normally used by the scheduler in services. They are:

1. **Backlogs**
2. **Reservations**
3. **Appointments**

Q.4 Explain the steps and tools for changing project management process.

Ans. changing project management process: - The project members should be responsive enough to handle the changes demanded by the situation. The following are the processes involved in bringing about a change.

1. **Request for a change: - The need for the change is identified first. Based on the need a formal request is made. This request can come from either a member of the project team or a client or a coordinator or key stakeholder.**
2. **Identify alternate solutions: - Evaluate the change request and identify several alternative solutions. Assess the alternatives with respect to the functional scope, schedule, effort, and cost.**
3. **Decide on the actions for the change: - Present the change request, alternative solutions and recommendation to the project management team. The project management team is required to accept the recommendation, choose an alternative solution, or request further investigation. Based on this, a final action plan for the change is selected.**
4. **Implement change: - Once the project management approves a solution for the change, make appropriate schedule and other project plan adjustments to accommodate the change, communicate these to team members, monitor progress, and execute quality control on the changes.**

Tools for changing a process:-

1. **Change Management System (CMS):- CMS is a methodology which requires collection of all formal documented procedures, defining:**
   - **How project performance is monitored and evaluated**
   - **How project plans are updated**
   - **How various measures are implemented to control the change process**

2. **Configuration Management (CM):- Configuration management involves:**
    - **Identifying the configuration items**
    - **Defining the naming and numbering scheme**
    - **Structuring the changes**
    - **Defining a backup procedure**
    - **Following the methods for tracking the status of configuration items**
    - **Defining the responsibility and authority of the CMS**

Q.5 Under capacity options the company decides to vary the production output by varying the time, workforce or outsourcing. What are the basic capacity options a company can choose to meet demand?

Ans. Capacity options: - Under this option, the company decides to vary the production output by varying the time, workforce, or by outsourcing. A company can choose from the following basic capacity (production) option:

1. **Changing inventory levels: - Under this option the inventory is increased during periods of low demand to meet high demand in future periods. If this strategy is selected, costs associated with storage, insurance, handling, obsolescence, pilferage, and capital invested increase. These costs typically range from 15 percent to 40 percent of the value of an item annually.**
2. **Varying workforce size by hiring or layoffs: - One way to meet demand is to hire or lay off production workers to match production rates. However, new employees often need to be trained and the average productivity drops temporarily as they are absorbed into the firm.**
3. **Varying production rates through overtime or idle time: - It is sometimes possible to keep a constant workforce while varying working hours, reducing the number of hours worked when demand is low and increasing them when it rises. However, when there is a large or high demand there is a limit on how much overtime is possible. Also, such overtime work requires incentives and extra pay which is at least one and a half times more than the normal pay. Further, willingness on the part of the employees, union agreements also have to be considered. Too much overtime can wear out the workers that overall productivity drops off and quality also becomes a casualty.**
4. **Subcontracting: - A firm can acquire temporary capacity by subcontracting work during peak demand periods. Subcontracting, however, has several pitfalls. First, it may be expensive; second, it risks**

opening the client's door to a competitor. Third, it is often hard to find the perfect subcontract supplier, one who always delivers the quality product on time.

5. **Using part-time workers: -** Part-time workers can fill unskilled labor needs, especially in the stores, and supermarkets. There are many organizations where part time workers sometimes called as 'temps' work almost full time but with less compensation than that of a regular employee. Again, the question of getting the right type of temporary workers is a major issue and there are many agencies that specialize in supplying temporary workers.

Q.6 Write short notes on:

- **Relevance of Value Engineering in manufacturing**
- **Vendor Managed inventory**
- **Rating methods for locating a plant**
- **Importance of business process modeling**

Ans. 1. **Relevance of Value Engineering in manufacturing: -** Modern manufacturing can be seen from two important perspectives. One is the management approach which consists of adopting techniques like TQM, JIT, Kanban, concurrent engineering, lean manufacturing, TPM, group technology, cellular manufacturing, and others. Optimization at every level looks into the aspects of cost and benefit. Modern machines like automatic machines, special purpose machines, and robots are built to produce highly accurate components at reduce costs. Value analysis looks at the manufacturing activities with a view to make the components simpler, processes faster, and the products better. In the manufacturing activities, many machine elements work with one another to obtain the transformation on the materials that result in parts, components, and subassemblies. Using machines with appropriate capabilities in terms of power, voltage, distances moved, lifting, and placing them all provides opportunities for value analysis. Modifications may be made to effect savings.

2. **Vendor managed inventory: -** The very purpose of JIT is to reduce inventory at all places in the supply chain. Inventory is considered a waste because inventory is created by using materials, machines, and efforts of persons. All of these are resources which have already been used up and that portion of it which is not consumed and sent up the value chain causes a drag in the system. To make this happen, the calculations involving the following are necessary:

- **Forecasts of the market demand**
- **Capacities of the equipment**
- **Worker absenteeism supplier's lead times**
- **Quality of the produced components**

3. **Rating methods for locating a plant: - In the case of general factors or special factors each factor has its own importance in determining the location of a plant. Therefore, ranking them and giving weightage for them is one of the ways of determining the location. In rating plan method, the various factors for locating a plant are given ratings depending upon the perception of the management. The location which gets the maximum rating, considering all the factors, is chosen for locating the plant.**
4. **Importance of business process modeling: - Business process is a total response that a business undertakes utilizing the resources and delivering the outputs that create a value for the customer. Business process modeling refers to a set of activities undertaken to optimize the business process. The business system involves a combination of people and the applications organized to meet the business objectives. The applications are automated so that it is timely and efficient; to enable the information and reporting system to be accurate. All the elements of the business process have to be structured and controlled for the purpose of analysis, evaluation, modification, implementation, and correction. Some of the elements are activities, parts, products, data, people, processes, software tools, delivery systems, and performance measurement.**