**Theoretical Questions with answers on Inventory theory CBOT (2017-2018)**

**Sheet(1)**

**Q.1 what is inventory? Describe its various types.**

**Answer**

* In broad sense, inventory may be defined as the stock of goods, Commodities or other economic resources that are stored or reserved in order to ensure smooth and efficient running of business affairs. This may be kept in two groups…
* Direct inventory
* Indirect inventory

Direct inventory further can be described as

* **Raw material inventory**: raw materials which are kept in stock for using in production of goods. It is utilized

(i) For economic bulk purchasing (ii) To enable production rate changes(iii) To provide production buffer against delays in transportation.(iv)for seasonal fluctuation

* **Work in progress inventory**: Semi finished goods or goods in process which are stored during the production process. It is used

(i) To enable economic lot production (ii) To cater the variety of products.(iii) for replacement of wastages (iv)To maintain uniform production even if amount of sales may vary.

* **Finished goods inventory**: Finished goods waiting for the shipment from the factory. It is used

(i) For maintaining off self delivery. (ii)To allow stabilization of production level.(iii) For sales promotion.

* **Work in progress inventory**
* **Indirect inventory:** Indirect inventories include those items which are necessarily required for manufacturing but do not become the component of finished production, e.g. oil, grease, lubrication, petrol, office-material, maintenance material.

**Q:** 2 **describe various types of inventory models.**

* **Answer:**
* **Fluctuation inventory model:** these have to be carried because sales and production times cannot be predicted accurately. In real life problems, there are fluctuations in the demand and lead times that affects the production of items. Such type of reserve stocks or safety stocks is called fluctuation inventories.
* **Anticipation inventory**: These are built in advance for the season of large sales, a promotion programme or a plant shut- down period. In fact anticipation inventories store the men and machine hours for future requirements.
* **Cycle inventories:** In practical situations it seldom happens that the rate of consumption is same as the rate of production or purchasing. So the items are procured in large quantities then they are required. This results in cycle inventories.
* **Transportation inventories:** Such inventories exist because the materials are required to move from one place to another. When transportation time is long the items under transport cannot be served to customers. These inventories exist solely because of transportation time
* **Decoupling inventory :** Such inventories are needed for meeting out the demands during the decoupling period manufacturing or purchasing

**Q:3 How an inventory model is developed?**

**OR**

**Write the necessary steps to develop an inventory model.**

* Inventory models are concerned with two main decisions how much to order at a time and when to order so as to minimize the total cost. Some basic steps are needed to develop an inventory model…
* First take the physical stock of all the inventory items in an organization.
* Then classify the stock of items into various categories Although several methods are available to classify the inventories , but the selected method must serve the objectives of inventory management
* E.g. Inventory items may be classified as raw materials , work in process , purchased components consumable stores and maintenance spares, finished goods,etc.

Each of the above classifications may be further divided into several groups. e.g. building materials , hand ware items , lubricants and oils textiles and fibers , electric spares , mechanical spares , stationary items.

* After the classification of inventories, each item should be assigned a suitable code. Coding system should be flexible so that new items may also be permitted for inclusion.
* Since the number of items in an organization is very large, separate inventory management model should be developed for each category of items.
* Use A –B- C or V- E –D classifications which provide a basis for a selective control of inventory through formulation of suitable inventory policies for each category.
* Now decide about the inventory model to be developed. e. g fixed order quantity system may be developed for ‘A’ class and high valued ‘B’ class items. Whereas periodic review system, may be developed for low valued ‘B’ class and ‘C’ class items.
* For this collect data relevant to determine ordering cost, shortage cost, inventory carrying cost etc.
* Make an estimate of annual demand for each inventory item and their prevailing market price.
* Estimate lead time, safety stock and reorder level, if supply is not instantaneous.
* Develop this inventory Model now.
* Finally review the position and make suitable alterations, if required due to current situations or constraints.

**Q:4** **What are the various costs involved in an inventory? Also give detail of their components.**

**Answer:**

* **(i) Holding cost:** (C1 or Ch) the cost associated with carrying or holding the goods in stock is known as holding cost which is usually denoted by C1 or Ch per unit of goods for a unit of time. Holding cost is assumed to vary directly with the size of inventory as well as the time for which the item is held in stock. There are some important components of holding cost. as
* **Invested capital cost**: This is the interest charge over the capital investment. Since this is the most important component, a careful investigation is required to determine its rate.
* **Record keeping cost:** This signifies the need of keeping funds for maintaining the records and necessary administration**.**
* **Handling cost**: These include all costs associated with movement of stock such as: cost of labour, over head cranes, gantries and other machinery required for this purpose.
* **Storage cost:** These involve the rent of storage space depreciation and interest even if own space is used.
* **(ii) Depreciation , deterioration and Obsolescence Cost:** Such cost arise due to items in stock being out of fashion or the items undergoing chemical changes during storages.(e.g. rusting in steel)
* Taxes and insurances cost: All these costs require careful study and generally amount 1% to 2% of the investment capital
* **(iii)Purchase Price or Production cost**: purchase price per- unit item is affected by the quantity purchased due to quantity discounts or price-breaks. Production cost per unit item depends upon the length of production run. For long smooth production runs this cost is lower due to more efficiency of men and machine. So the order quantity must be suitably modified to take the advantage of these price discounts. If P is the purchase price of an item and I isThe stock holding cost per unit item expressed as a fraction of stock value(In Rs) then the holding cost is C1=IP
* **(iv)Salvage costs or selling price:** When the demand for an item is affected by its quantity in stock, the decision model of the problem depends upon the profit maximization criterion and includes the revenue(sales tax etc) from the sale of the item . Generally ,salvage costs are combined with the storage costs and not considered independently
* **(v) Shortage costs or Stock –out cost: (C2 or Cs** ) The penalty costs that are incurred as a result of running out of stock(i.e. shortage) are known as shortage or stock-out costs . These costs arise due to shortage of goods, sales may be lost, and good will may be lost either by delay in meeting the demand or being quite unable to meet the demand at all. In the case where unfilled demand for the goods can be satisfied at a later date. These costs are usually assumed to vary directly with the shortage quantity and the delaying time both. On the other hand, if the unfilled demand is lost , shortage costs become proportional to shortage quantity only.

1. **Set-up cost: C3 or Co:** these include fixed cost associated with the obtaining goods through placing of an order or purchasing or manufacturing or setting up machinery before starting production. They are supposed to be independent of the quantity ordered or produced.