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**KULKARNI ACADEMY**  
**MECHANICAL ENGINEERING**  
**INDUSTRIAL ENGINEERING**  
**By-PRAVEEN KULKARNI SIR**

- Theory
- Explanation
- Derivation
- Example
- Shortcuts
- Previous Years Question With Solution

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# Industrial Engineering

Classroom Notes

*[Handwritten]*

*For GATE | ESE | PSU's*

## Mechanical Engineering

By: Mr. Praveen Kulkarni



# Index

1. Inventory Control
2. Break Even Analysis
3. PERT & CPM
4. LPP- Graphical Method
5. Simplex
6. Transportation
7. Assignment
8. Forecasting
9. Sequencing and scheduling
10. Queuing theory



# Chapter-1

## Inventory Control

# Industrial Engineering

- GATE - 5-6 Marks
- ESE (Pre.) - 4-7 Questions (8-14 Marks)
- Mains - 50 Marks.

## Index.

- Inventory Control (Management)
- Break even analysis (BEA)
- Sequencing and scheduling
- Forecasting
- Queuing theory
- MRP
- Project management (PERT & CPM)
- Linear programming
- Assignment problem
- Transportation
- Assembly line balancing

07/07/21

## ch-1 Inventory Control.

Inventory is defined as any idle resource of an enterprise. It is a physical stock of goods kept for future use.

Inventory may be in the form of raw materials, Semifinished goods, parts. It may also include Furniture, machinery etc.

Note:

- Inventory is stock in hand to meet to unforeseen demand.
- Too much inventory is a sign of inefficiency.

Type's of inventories:

1. Raw materials
2. Bought out parts
3. Work in progress inventory (semi-finished inventory)
4. Finished goods inventories
5. Indirect inventories (Normally they do not form part of ~~operating~~ stores final product but are consumed in production (oil, grease etc.)).
6. Miscellaneous inventories (Ex: office stationary)



## Reason for maintaining inventory:

- To ensure smooth and efficient running of business.
- To provide adequate service to customers.
- To avoid shortage.
- To meet unexpected demand.
- To take advantage of price discount (usually manufactures offer discount for bulk buying and to gain this price advantage, the material are brought in bulk eventhough it is not required immediately. Thus inventory is maintained to gain economy in purchasing).
- To prevent loss of sales.

## Costs associated with inventory:

(1) Unit cost / Item cost ( $C$ )

(2) Order cost / ordering cost ( $C_o$ ):

Assumption: ordering cost is independent of size of order.

→ people

- Transportation

- Inspection / Quality check
- Rejection cost
- Delay cost
- Follow up

(3) Holding or carrying cost ( $C_c$ ):

- Space (rental)
- power (A/c etc.) / special requirement.
- obsolete item
- Pilferage
- Cost of capital
- Insurance / taxes
- Security / staff
- Damage cost

$C_c$  = holding cost / unit / time (year, month etc)

(4) Shortage / back order cost ( $C_s$ ):-

- loss of profit
- lost sale
- loss of opportunity
- under utilisation
- Rescheduling
- Additional capacity / freight charges.
- loss of customer good will.