

Bonus  
Management  
043006  
sojib  
part #02

## Management

### Wage

1. Definition: The price of the labour given to the workers are directly related production is the wage.

2. Basis of payment: Wages are paid in hourly, daily, weekly or biweekly.

3. Types: Wages may be time based, production or piece based or incentive based.

4. Additional price: The workers get extra wages for their additional work.

### Salary

1. The remuneration given to the employees indirectly related to production is called salary.

2. Salary is paid in monthly or annual basis.

3. Salary may be a definite period based such as monthly or yearly.

4. The salaried employee do not get extra salary for additional work.

5. Types of work: Manual workers, factory workers, machine operators get wages.

5. Administrative and clerical employees get salary.

6. Nature of workers; the wage receivers are uneducated or half educated.

6. The salary earner are generally educated and trained.

Method of wage payment / wage systems: There are two basic system or method of payment of wages: time wages and piece rate system. Other systems are revised methods of the two systems or a method. There are also some incentive method of wage payment. The different system are described below:

① Time rate / wages system: Time rates are wages calculated by reference to the number of hours worked. Time is the basis of wage determination. The rate of wages may be per hour, per day, per week or per month. For example a work is paid at an hourly rate of taka 5.8 or 10 for 8 hours work a day. The factory workers get a fixed weekly rate of wages for 44 hours work a week.

Response to increasing the bottom up wage stand  
factory workers. factory stand working hours expand and  
in the case of a factory out of the charhouse workers are  
to bottom additional money extra job work + number  
of workers increase benefit will be increased open  
and closed the cost

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## Suitability of time rate system:

Time rate system is suitable

- ① when high quality work is required
- ② when skill rather than speed is the main consideration.
- (iii) when the work is difficult to measure in units or standard hours.
- (iv) when an individual has little or no control over output.
- (v) when the production or output rate is determined by the speed of machines.
- (vi) when a worker can not be guaranteed a steady flow of work.
- (vii) when the work requires a very effective supervision.
- (viii) when the work must be stopped temporarily for an unavoidable reason.

Advantages of time rate system:

(i) Time rate is very easy and simple method.

- (ii) The workers feel secured and they can remove mental anxiety.
- (iii) It improves quality of product.
- (iv) The earning of a worker are not decreased. It does not create differences between workers.

(v) There is a guarantee of wages for a fixed period of time.

(vi) Calculation of wages is easy.

(vii) Trade union thinks it a better method of wage payment.

Disadvantages:

(i) Efficient and inefficient workers get equal rate of wages. So efficient workers are discouraged.

- (ii) Quantity of output is reduced.
- (iii) Supervision costs increased.
- (iv) Speed of work reduces. As a result production decreases and cost of production increases.
- (v) Efficient worker can not produce more though they wish.
- (vi) It gives rise to indeipline and labour turn over.

Def: ② Piece rate system:  
 A piece rate system records a workers according to the number of pieces he produce. The piece may be a single unit, a length of material, a number of components added to a unit or some other measure. If a carpenter get Tk 100 as wages for making a piece of table, he will get Tk 200 for two piece, Tk 300

for three piece.

Application: These system of payment of wages is suitable

- (i) Where the standard of work is easy to determine.
- (ii) Where the unit of production can easily measured.
- (iii) Where the quantity rather than quality is more important.
- (iv) Where the relation of work and quantity direct and clear.
- (v) Where the supervisor can not give sufficient to the performance of work.
- (vi) Where the work run approximately at the same speed.
- (vii) Where the fixed costs are more in amount.
- (viii) Where the production process.

is divided into various steps.

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### Advantages of piece rate system:

- (i) It is a simple system to understand and operate. Workers get fair wages.
- (ii) Efficient workers get more wages.
- (iii) Workers devote their full effort to get more wages.
- (iv) Production increases, cost of production decreases.
- (v) This is a fair wages system.
- (vi) Cost of supervision reduces.

### Disadvantages of piece rate system:

- (i) The wastage of raw material and misuses of machines increases.
- (ii) Workers give importance to quantity rather than quality of product.

- (iii) There is no guarantee of wages, wages may be higher or lower, it may be higher or lower.
- (iv) Health of workers decreases/deteriorates.
- (v) Labour dispute may arise.
- (vi) There is a chance of labour retrenchment.
- (vii) Due to the difference in the earning of workers, jealousy may arise.
- (viii) Incentive wage plan: This wage plan which give the workers extra to work more is called incentive wage plan. It induces the workers to have the highest productive capability. The incentive wage plan are mainly of two type:
- 1) Halsey Premium plan
  - 2) Rowan Premium plan.

2. Halsey premium plan: According to the plan a standard time is set for doing a particular task. If a worker can perform the task before the standard he is paid for wages for the time taken for the task at the pre-determined time rate. Besides, he is entitled bonus share for the time saved on the standard time. Usually the workers is paid 50% bonus on the time saved. Example:

$$\text{Standard time for job} = 8 \text{ hrs}$$

$$\text{Time rate per hr} = 10/-$$

$$\text{Actual time taken} = 6 \text{ hrs}$$

$$\text{Time saved} (8 - 6) = 2 \text{ hrs}$$

The workers will get taka 60/- for 6 hrs

He will get a bonus of  $(2 \times \frac{50}{100}) = 1 \text{ hr}$   
i.e.,  $2 \times 10/- = \text{taka } 20/-$  for 7 hrs

The employer and workers are benefited by 50:50 by the Halsey premium plan.

Advantages of Halsey plan

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Bio

## Advantages of Halsey

- ① Halsey method rewards efficiency.
  - ② Both skill and unskill workers are satisfied.
  - ③ Profit increases as the cost of production per unit decreases.
  - ④ The method emphasises the savings of standards.
- Disadvantages of Halsey

- ① The worker may be deprived if the standard time, standard production and wages are not fair.
- ② Calculation of wages is complex to some extent.
- ③ The rate of bonus decreases as the efficiency of workers increases, so the workers are not induced to work.
- ④ The method regards the workers as needy animals. Their social and mental need are overlooked.

## 2. Rowan premium plan:

Under the Rowan plan the amount of wages increases according to the ratio of the standard time and the time saved. A standard time is set to perform a task. The workers gets a time rate wage through he can not complete the task within the standard time. He will get a premium (bonus) plus the time rate wage on the basis of the ratio of the standard time and the time saved. Example:

$$\text{Premium or Bonus} = \frac{\text{Time Saved}}{\text{Standard time}} \times \text{Actual time} \times \text{hourly rate}$$

where, Standard time = 8 hrs

$$\text{Hourly rate of wages} = 10 \text{ tk}$$

$$\text{Actual time} = 6 \text{ hours}$$

$$\text{Time saved} = 2 \text{ hours}$$

$$\text{Percentage of standard time and time saved}$$

$$= \frac{2}{8} = \frac{1}{4} = 25\%$$

$$\therefore \text{Wages} = 6 \text{ hrs} \times 10 = 60 \text{ tk}$$

$$\text{Premium or Bonus} = 25\% \text{ of } 60 \text{ tk} = 15 \text{ tk}$$

$$\text{Total wages} = (60 + 15) \text{ tk} = 75 \text{ tk}$$

The worker can earn more by working the rest two hours.

Q. Difference between Halsey premium and Rowan premium plan.

Under Halsey premium plan the bonus is determined on the basis of agreement on the basis of between the owner and workers.

the bonus is determined by the ratio of

### Advantages of Rowan

- ① The plan held to increase the efficiency of workers.
- ② The efficient and skill workers have opportunity to earn more.
- ③ Direct labour cost decrease.
- ④ Indirect cost per unit reduce.

### Disadvantages :

- ① It is a complex system.
- ② The calculation of wages requires a lot of time.
- ③ The rate of bonus reduces as the efficiency of workers increase.
- ④ Due to the difference of labour cost, the amount of cost of wages is difficult to determine.
- (v) As a result of working fast to save time the quality of product deteriorates and there is wastage of raw materials and machinery.

disadvantage ①

disadvantage ②

disadvantage ③

disadvantage ④

## Plant Layout (कार्यालय विनायक)

Meaning and definition: Plan layout is an effective arrangement of machine and services for production purposes.

It is concern with the physical placement of department and arrangement of equipment within them in a planned or service facilities. According to E.S. Bappa "Planned layout is the integrating phase of the designing of a production system"

Types or pattern of plant layout:

- ① Product layout
- ② Process layout
- ③ Static product layout.
- ④ Product and process layout.

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① Product layout: Under product layout machine and services are arranged or placed according to the sequence of operation. In other word, when machine and services are arranged according to the sequence of operation, it is called product line layout. For example a company produces a specific product with the help of five different operation. The operation are done by the following machines.

List of Operation	machines
1.	Lathe
2.	Drill
3.	Milling
4.	Drill
5.	Lathe

Let us suppose that each operation requires one specific machine. According to the product

Layout machines and equipment are arranged in such a way that effective sequence is present. In other word, machines are arranged according to the sequence of operation.

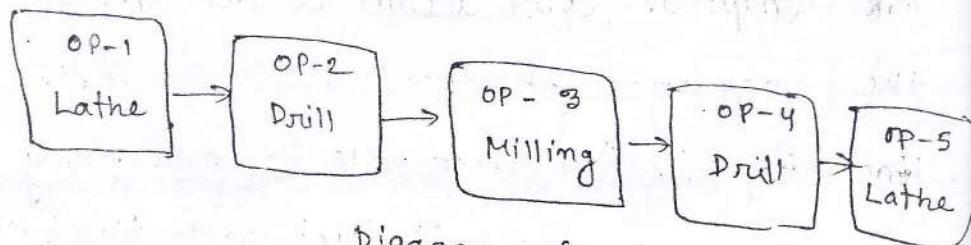


Diagram of product layout.  
Product layout is suitable for continuous production function.

- ⑪ Process layout: According to the process layout machine and services of similar characteristic are grouped in department. For example, separate departments are formed for welding, painting, drill machines. All welding are set in welding department. All drill machines are set in drill department and all painting

machines are in painting department and so on. So, all welding function are done in welding department and all drill function are done in drill department and all painting function are done in the painting department.

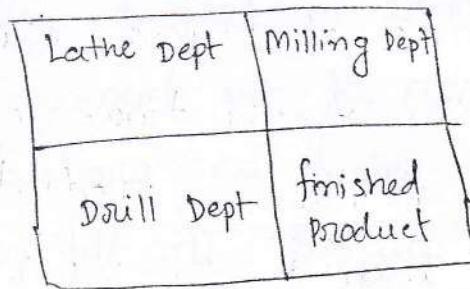


Diagram of process layout.

process layout is suitable for intermittent process.

### ③ Static product layout: (एक स्थान पर काम)

Static product layout is done in the case where the products are big or bulky in nature and which can not be moved from one place to another. Under the layout machines and workmen are taken to the product to perform the function.

Such layout is found in the construction of tank, building, ship etc.

#### ④ Product and process layout:

Complete product layout and process layout are not found in practice.

A new type of layout, which is a combination of the two, are found.

This is known as product and process layout. In the previous example of product layout, a drill machine has been set in two places.

Let us suppose, the work of two drill machine is possible to do by one machine. Under the product and process layout one drill machine is set instead of two machine. It reduces capital investment in machine.

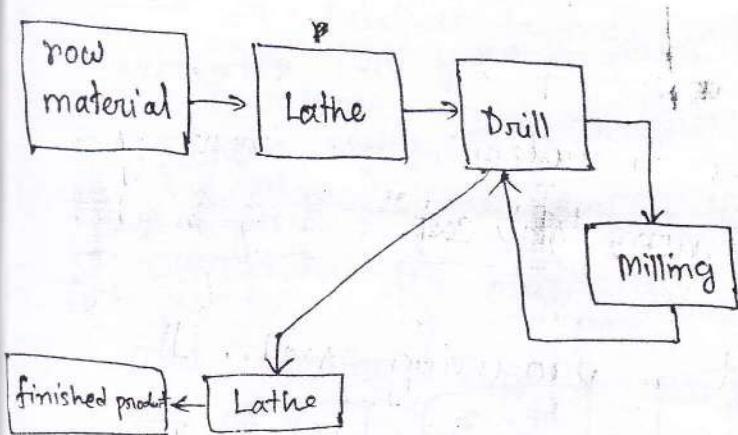


Diagram of product and process layout.

4-05-86

EOQ / Economic order quantity

Q. What is EOQ ?

EOQ is an ancient/old technique of inventory control. According to F.W. Harris invented first the EOQ model in 1915. Now it has been largely used. EOQ is the quantity of goods which incourage minimum inventory.

According to H.M. Broom "The order size associated with such minimize cost is called an economic order quantity."

According to A.C. Laufer "The economic lot size is that quantity of an item which can be order to replenish the inventory at the minimum total cost."

EOQ is used in procuring goods. It determines the order quantity of goods which encourage minimum cost.

Q. EOQ vs ELS: ELS → without answer Economic lot size.

V.V.1  
There is no difference in the ideas of EOQ and ELS. There is difference only in the use of the two formula. EOQ or economic order quantity is used in procuring goods, that is, EOQ determines quantity of order which is economical. On the other hand ELS or economic lot size is advised to determine the quantity of size.

of production in a lot. i.e. ELS determined what quantity of production is economical in a lot.

Determination of EOQ: We can determine EOQ mathematically in the com following way;

formula:  $EOQ/\alpha = \sqrt{\frac{2AO}{IC}}$

Where, A = Annual demand

O = Order of cost / procurement

Ic = inventory carry cost / holding cost.

Example: The annual demand for an item 40,000 unit, ordering cost 125/- and holding cost 0.50/- per unit. What is EOQ.

$$\begin{aligned} EOQ/\alpha &= \sqrt{\frac{2AO}{IC}} \\ &= \sqrt{\frac{2 \times 40,000 \times 125}{0.50}} \\ &= \sqrt{\frac{10000000}{0.50}} = \end{aligned}$$

$$= \sqrt{20000}$$

$$= 4472 \text{ per unit.}$$

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Optimum number of order per year

$$\text{Optimum order quantity} = \frac{A}{Q}$$

Where, A = Annual demand

Q = Economic order quantity.

Total inventory cost =  $(TC) = \frac{A}{Q}(O) + \frac{Q}{2}(IC)$

where A = Annual cost

Q = Economic order quantity

O = Order cost

IC = Inventory carry cost.

Re-order cost point = Minimum inventory

+ Procurement time  $\times$  rate of use

Q1 If the requirement for a particular inventory is 10,000 unit per year, Ordering cost Tk 4/- and carry cost Tk 4/-.

① What is the EOQ?

② Find out the optimum number of order per year

③ What is the total inventory cost of the year

$$\textcircled{a} \quad EOQ = \sqrt{\frac{2AO}{IC}}$$

$$= \sqrt{\frac{2 \times 10,000 \times 4}{2}}$$

$$= \sqrt{40,000}$$

$= 200 \text{ units}$  Ans—

$\textcircled{b}$  optimum number of order per year  $= \frac{10,000}{200}$

$$= 50 \text{ times}$$

The enterprise should give 50 times order per year.

$\textcircled{c}$  Total inventory cost  $= (TIC) = \frac{A}{Q}(O) + \frac{Q}{2}(I)$

$$= \frac{10,000}{200} \times 4 + \frac{200}{2} \times 2$$

$$= 200 + 200$$

$$= 400 \text{ } \text{₹}$$

A firm determined re-order quantity and minimum inventory after analysing the relevant matters for example, a firm desires to maintain always 200 units of inventory i.e., the minimum inventory is 200 units and re-order quantity is 800 units.

But at what point the firm will reorder for 800 units of goods? If requires some invention such as procurement time and rate of use of the inventory.

Let us suppose that procurement of 800 unit of goods will require 1 month time and the rate of use of inventory for a month is 300 units. Now we can determine the reorder point,

$$\begin{aligned}\text{Reorder point} &= \text{Minimum inventory} \\ &\quad + \text{procurement time} \times \text{rate of use} \\ &= 200 + 1 \times (200 - 300) \\ &= 500 \text{ units}\end{aligned}$$

v.v.i Q. What is lead time?

The ~~entire~~ period of making the order for goods and receiving the order thereof goods is called lead time.

Procurement of goods always takes

some time after making order of the same. This procurement time is the lead time. For example an order placed for some goods on 1st March and it is received on 15th March. The procurement is 15 days. This 15 days is the lead time. Lead time must be consider in determining re order point.

Example:

$$\text{Annual demand} = 1000 \text{ units}$$

$$\text{Average daily demand} = \frac{1000}{365}$$

$$\text{Ordering cost} = 5 \text{ TK/order}$$

$$\text{Holding cost} = 1.25 \text{ TK/unit/year}$$

$$\text{Lead time} = 5 \text{ days}$$

$$\text{cost per unit} = 12.50 \text{ TK}$$

Find ① EOQ. ② Re order point and

③ Total cost

$$\text{① } EOQ = \sqrt{\frac{2AO}{Ic}} = \sqrt{\frac{2 \times 1000 \times 5}{1.25}} = \sqrt{\frac{10,000}{1.25}} = \sqrt{8,000} = 89.4 \text{ units}$$

= 89 units

$A = \text{Annual demand} = 1000$

$O = \text{Ordering cost} = 5$

$I_c = \text{Inventory carry cost/Holding cost} = 1.25 \text{ TK}$

① Re-order cost = Minimum inventory +  
 Lead time / procurement time × rate of use

$$= 0 + 5 \times \frac{1000}{365}$$

$$= \frac{1000}{73}$$

$$= 13.69 \text{ Units}$$

$$= 14 \text{ Units}$$

(W) i.e. reorder should be made with 14 units  
 of goods in stock.

② Total inventory cost =  $(TIC) = \frac{A}{Q} (O) + \frac{Q}{2} \times IC$

$$= \frac{1000}{89} \times 5 + \frac{89}{2} \times 1.25$$

$$= 56.17 + 55.62$$

$$= 111.80 \text{ TK.}$$

Ans:-

$$EOQ = 89 \text{ units}$$

$$\text{Re order point} = 14 \text{ units}$$

$$\text{Total inventory cost} = 111.80 \text{ TK}$$

29-05-06

- Q. Annual demand 20,000 unit, price per unit 5 tk.  
Annual inventory cost 10% of price per unit,  
Order cost 25 tk. determine.

① Economic order quantity (EOQ)

② Optimum number of order.

③ Total inventory cost.

Order cost,  $O = 25 \text{ tk}$

Price per unit,  $P = 5 \text{ tk}$

$$\text{Inventory cost} = 5 \times 0.11$$

$$= 0.50$$

$$\begin{aligned} \textcircled{i} \quad \text{EOQ} &= \sqrt{\frac{2AO}{IC}} = \sqrt{\frac{2 \times 20000 \times 25}{0.50}} \\ &= \sqrt{\frac{1000000}{0.50}} \\ &= \sqrt{2000000} \end{aligned}$$

$$= 1414.2 \text{ unit.}$$

\textcircled{ii} Optimum number of order?

$$= \frac{A}{\text{EOQ}}$$

$$= \frac{20,000}{1414.2}$$

$$= 14.14 \text{ orders}$$

$$\textcircled{(11)} \quad \text{Total inventory carrying cost} = \frac{A}{Q}(0) + \frac{Q}{2}(sc)$$

$$= \frac{20,000}{1414} \times 25 + \frac{1414}{2} (0.50)$$

$$\text{Total carrying cost} = \frac{500000}{1414} + \frac{707}{2}$$

$$= 353 + 353$$

$$= 706 \text{ tk}$$

Q. Ex: A manager has decided to place order a minimum quantity 500 units of a particular item in order to get a discount of 10% from the record it has found out that in the last year 8 order each size 200 unit have been placed. Given ordering cost tk 500 per order, carrying cost 40% of the price of item, The cost per unit tk 400. Is the manager justified in his decision, what is the effect of the decision to the company.

Solution:

First step:

EOQ and T.I.C is to be determined.

$$EOQ_1 = \sqrt{\frac{2A}{IC}}$$

$$= \sqrt{\frac{2 \times 1600 \times 500}{400 \times 0.4}}$$

$$= \sqrt{\frac{1600000}{160}}$$

$$= \sqrt{10000}$$

$$= 100 \text{ units.}$$

Here,  $T.I.C = P \times A + \frac{A}{Q} (O) + \frac{Q}{2} (IP)$

where,

P = price

A = Annual demand

IP = inventory procurement cost

$$= 400 \times 1600 + \frac{1600 \times 500}{100} + \frac{100}{2} \times 400 \times 0.40$$

$$= 640000 + 8000 + 8000$$

$$= 656000 \text{ Tk}$$

Second cost:

Total inventory cost on the basis of previous economic lot size,  $Q_2 = 200 \text{ units}$  is to be determined.

$$T.I.C = (1600 \times 400) + \left( \frac{1600 \times 500}{200} \right) + \left( \frac{200}{2} \times 400 \times 0.40 \right)$$

TC or IP
P - procurement cost
or price

$$400 \times 0.4$$

$$= 640000 + 4000 + 16000$$

$$= 6,60,000 \text{ tk}$$

Third step:

To avail / get a discount of  
10%, minimum 500 units are to be  
purchased so here,

$$Q_3 = 500 \text{ units}$$

$$TIC_3 = (1600 \times 360) + \left( \frac{1600 \times 500}{500} \right)$$

$$+ \left( \frac{500 \times 360 \times 0.40}{2} \right)$$

$$= 576000 + 1600 + 36000$$

$$= 613600 \text{ tk}$$

① We find that total inventory cost will be minimum when order for 500 unit is placed in each lot. So the manager decision is right and reasonable.

② If the company places order for 500 units instead of 200 unit in a lot, Total saving's of cost will be equal to

$$\frac{TFC}{TVC} = TFC(500) - TFC(200)$$

$$\text{Or } 6,60,000 - 6,13,600 = 47400$$

Profit per unit =  $\frac{47400}{4}$

The company should order placed of order for 500 unit instead of 200 units.

04-06-06 Production control:

Meaning and definition:

Well the product is being manufactured the production must be control to insure that the programmed output is constantly maintained. This function is known as production control.

According to H.N. Broom "Production control is concerned with planning and time scheduling. Production and with efficient coordinating of manufacturing activities so the product flows through the plant on schedule."

R.R. Mayer defines, "Production control involves the development and implementation of a plant which is capable of yielding the desire result."

In any production organization, a production control involves the process of seeing that production goes in the right quantity and right quality and the right time.

#### Step or function of production control:

There are five step of production control

- ① Production planning
- ② Routing
- ③ Scheduling
- ④ Dispatching
- ⑤ Follow up

① The first function of production control is production planning. The term planning is indicate all the issues concerned with yielding how the production should be carried out. sometime it is referred to as "programming" acknowledging the fact that the detail schedule and programs have to be prepared. In fact, production planning is deciding in advance what should be produced and how is to be produce. When a product is to be manufactured the production must be carefully plan, in order that the manufacturing department are low rate efficiently and within their capacities these function is known as production planning.

② Routing : Routing determined what process are to be done and where and how the processes will be done to produce

a particular product. Routing determines the sequence of operation and processes to be done.

According Alfred & Betty,

"The specification of the flow or sequence of operation and processes to be followed in producing a particular manufacturing lot". The main objectives of routing is to maintain the continuity and economy of function.

(ii) Scheduling: It is another important

function or step of production process.

Scheduling is the next step of routing. Scheduling determines

when to work and finish the work. According Carson & others,

Scheduling is defined most simply as the position of the production control function that determines when

each operation to start and finish".

The scheduling process covers all aspects of the time tabling of production. Precising when each operation of process has to be carried out is determined.

- ④ After routing and scheduling the next step is dispensing. Dispensing deals with all aspects, giving the necessary of all authority to start the work and the obtain tools, materials and other requirement.

According to Alfred and Betty

"The routine and setting of producing activities through the release of order and instructions in accordance with previously plan times and sequences embodied in root sheets and schedule charge"

In fact dispatching is giving the workmen orders to start their work according to the routine.

- ⑦ Follow-up: It is the last step of production control. It sees that the progress of raw materials and semi-finished product processing. Follow up is that function of production control which sees that product work is done according to plan. It insures that the work is carried out as planned, the timetable prepared by the scheduling section has to be complied with. The plan dates have to be made. If there is any deviation the corrective measure is taken.

05-

Introductory → def, diff ad. and management function of management, process of management.

↳ वित्ताधिकार अलंकार, ↳ वित्ताधिकार आवृत्ति (प्रक्रियाएँ)

Scientific management:

V.V.S

# def.

# diff between scientific and traditional management.

(<sup>o</sup>) Authority & responsibility: (03 वाचे नियन्त्रणाला नियम (दर्शक))

# delegation of authority.

# principle of delegation of authority.

#

Span of control:

# What do you mean by span of control?

\*# factors of r

optimum span of supervision.

# factor limiting the span of supervision.

what is the problem? of span of supervision.

Recruitment, selection & training?

① What is R, S, T.

② Method of selection

and training.

↳ On the job /

off the job training

Plant layout: ① What is plant layout?

② What are the different types of plant layout?

\* \* \* EOQ: ~~what are the EOQ~~

Q. What is EOQ

Q. diff EOQ & ELS

Q. Re order point

Q. Calculation EOQ, re order point,  
Total cost, optimum number of orders.

Production control:

① What is P.C.?

② What are the different steps of P.C.?

def

Management, administration,  
Span of control, authority & responsibilities

Wage system: time rate system, piece rate system,

\* \* \* Halsey premium, Rowan premium plan