

## D. TYPES OF OPERATION functions:

### 1. Value-added :-

Activities providing value added when blending inputs into a product or service, the increased value of outputs compared to the sum of the values of inputs.

### 2. Random fluctuations :-

Influences because of unplanned, uncontrollable activities like strikes, floods etc that may cause the planned and actual output differ.

#### Random fluctuation system

##### EXAMPLES:-

Organization depend on people dependent  
- government policies  
- whether forecast

- factors

They are true forecast without using technology

Problems related to flood.

Employers goes on strike



#### Random fluctuation

so customer purchase from another company that is loss.

### 3. Feedback: Monitoring Input

Information in the control process that allows management to decide whether organizational activities have need of adjustment.

### 4. Technology :-

The level of scientific sophistication in plant, equipment and skills in both the conversion process but it is also acknowledged in different ways of using resources.

With little initial costs compared to ways of using operating resources it is not necessarily not physical task not software and etc.

## \* Framework for managing operations:-

- ① Planning - preparing courses of actions which can be adopted to be performed.
- ② Organizing - means grouping
- ③ Controlling - timing, quality, formality, accuracy, reliability (functions)
- ④ Behavior
- ⑤ models and activities

### 1. Planning :-

Activities that establish course of action and guide future decision making.

The operations manager defines the objectives for the operations/ its subsystems of the organization and the policies, programs and procedures for achieving them.

Planning of IT also involves IT product Planning, facilities designing and using the conversion process (program, function, profitably, benefit, management).

Example; Algorithm

## 1. Planning

Activities that establish a structure of tasks and authority.

Example: ERT system.

## 3. Controlling:

Activities that assure that actual performance is in accordance with planned performance.

Controlling costs, quality and schedules is the very heart of operations management.

## 4. Behavior:

Operations managers are concerned with how their efforts to plan, organize, and control affect human behavior.

They also want to know how the behavior of subordinates can affect management's planning, organizing and controlling actions.

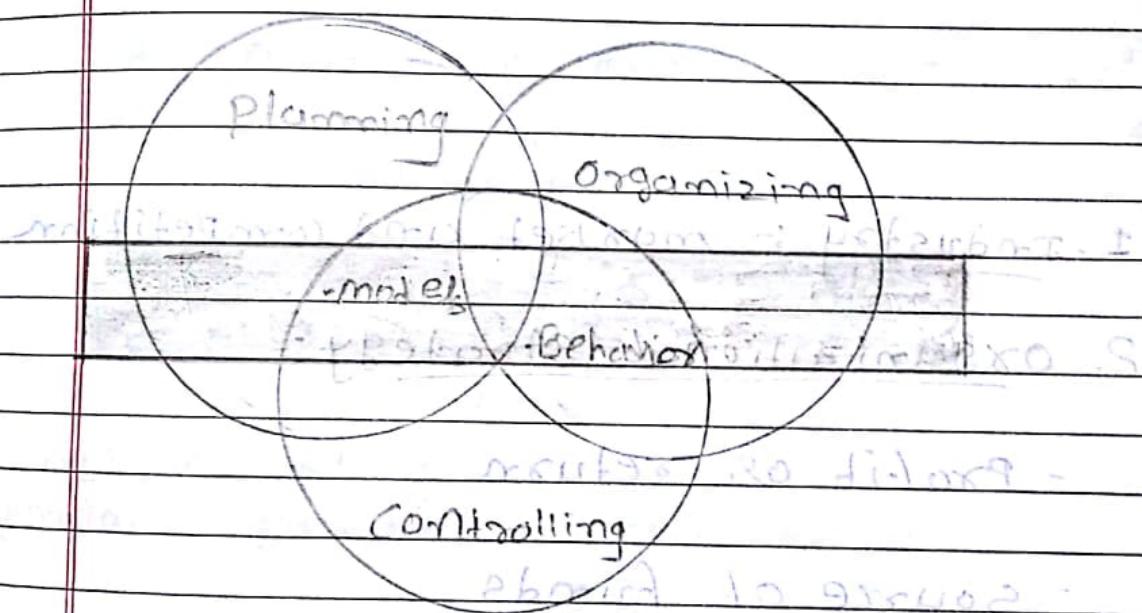
5  
Date \_\_\_\_\_  
Page \_\_\_\_\_

## 5. models: ~~and~~ ~~to~~ ~~an~~ ~~model~~

As operations managers plan, organize and control the conversion process, they encounter many problems and must make many decisions.

They can frequently simplify these difficulties by using models.

~~models~~ ~~to~~ ~~the~~ ~~effect~~ ~~of~~ ~~IT~~



Planning involves ~~the~~ ~~of~~ ~~the~~ ~~process~~ ~~of~~ ~~operations~~ ~~is~~ ~~to~~ ~~plan~~ ~~the~~ ~~work~~ ~~of~~ ~~the~~ ~~organization~~ ~~in~~ ~~order~~ ~~to~~ ~~achieve~~ ~~its~~ ~~objectives~~.

Organizing involves ~~the~~ ~~of~~ ~~the~~ ~~process~~ ~~of~~ ~~operations~~ ~~is~~ ~~to~~ ~~organize~~ ~~the~~ ~~work~~ ~~of~~ ~~the~~ ~~organization~~ ~~in~~ ~~order~~ ~~to~~ ~~achieve~~ ~~its~~ ~~objectives~~.

Controlling involves ~~the~~ ~~of~~ ~~the~~ ~~process~~ ~~of~~ ~~operations~~ ~~is~~ ~~to~~ ~~monitor~~ ~~the~~ ~~work~~ ~~of~~ ~~the~~ ~~organization~~ ~~in~~ ~~order~~ ~~to~~ ~~achieve~~ ~~its~~ ~~objectives~~.

Planning involves ~~the~~ ~~of~~ ~~the~~ ~~process~~ ~~of~~ ~~operations~~ ~~is~~ ~~to~~ ~~plan~~ ~~the~~ ~~work~~ ~~of~~ ~~the~~ ~~organization~~ ~~in~~ ~~order~~ ~~to~~ ~~achieve~~ ~~its~~ ~~objectives~~.

Organizing involves ~~the~~ ~~of~~ ~~the~~ ~~process~~ ~~of~~ ~~operations~~ ~~is~~ ~~to~~ ~~organize~~ ~~the~~ ~~work~~ ~~of~~ ~~the~~ ~~organization~~ ~~in~~ ~~order~~ ~~to~~ ~~achieve~~ ~~its~~ ~~objectives~~.

Controlling involves ~~the~~ ~~of~~ ~~the~~ ~~process~~ ~~of~~ ~~operations~~ ~~is~~ ~~to~~ ~~monitor~~ ~~the~~ ~~work~~ ~~of~~ ~~the~~ ~~organization~~ ~~in~~ ~~order~~ ~~to~~ ~~achieve~~ ~~its~~ ~~objectives~~.

## \* Problems of the Operations Management

Pg NO - 19  
Fig - 1.3  
Topic -

Operating managers face complex problems with many different problem cases:

- cost control in brokerage houses,
- quality services in hospital and
- dates of production output in furniture factories.

## \* The Strategic role of Operations

Pg NO - 16  
Fig - 1.6

1. Industry :- market and competition

2. Organizational Strategy :-

- Profit or return - default strategy of any company
- Source of funds
- Product or Service quality

### 3.0 Operations Policy

Product variety management - Product design flexibility

Delivery capability (sum) supplying change

- Location of facilities

- Processing technology

- Control systems

### 4. Managing Conversion Operations :-

Quality management -

- Efficiency

- Schedule

### 5.1 Results of Some Outputs :-

6. Information feedback - Analysis

Information from market analysis

Marketing activities to find out

the demand of products

plant utilization

etc.

★

List different Parameters to  
distinguishing between manufac-  
turing operations and service operation

- Tangible/intangible nature of op-
- Consumption of O/P
- Nature of work (Jobs)
- Degree of customer contact
- Customer participation in conversion
- measurement of performance

→ Throughput :-

Items going through the conversion process contrasted with output coming out of the conversion process.

→ Define system and subsystems:-

Set of intermediate/inter-related elements to accomplish the particular tasks

or

Collection of objects related by regular interaction and interdependence.

Group of elements with regular intervals to form a functional system.

Sub-System: itself is the system, but if system is large enough or too complex then we divide it into further level

We continue this till we reach at lowest part which we cannot divide.

and so on.

It is a hierarchical naming of system.

Dividing of system into smaller parts.

From which each part has its own name.

and so on.

and so on.

It is a hierarchical naming of system.

It is a hierarchical naming of system.

and so on.

Pg No - 11 to 14

~~MINUTE~~~~for 2.~~~~1, 2, 3, 6~~~~MURKIS~~~~Cambodia~~~~asked~~

## Operation Management

Management of conversion

Process which converts the land, labour, capital and management into desired outputs of goods and services.

The operation's manager is responsible to manage the process of converting inputs into desired outputs.

Following are different views of operations management:-

1. Classical management :-

Classical management one of three primary theories of management emphasizing efficiency at the production core, the separation of planning and doing work and management principles and function.

Classical management has contributed the scientific management and process orientation theories to the operation manager's knowledge.

## → Sim Scientific management:-

### 1. Planning

The basis of scientific management is a focus on economic efficiency at the production core of the organization.

## Productivity (Percentage %)

$$\text{Productivity} = \frac{\text{Output}}{\text{Input}} \times 100$$

## → Process management:-

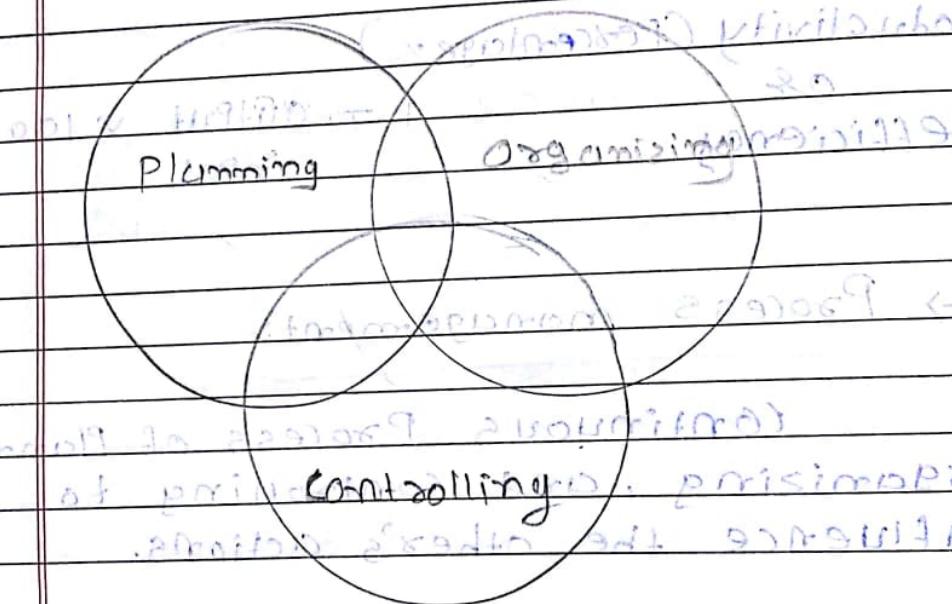
Continuous Process of Planning, Organizing, and Controlling to influence the other's actions.

1. Planning :- includes all activities that establish a course of action.

These activities guide future decision making.

2. Organizing :- Includes all activities that help establish a structure of tasks and authority.

3. Controlling: includes all activities that ensure that actual performance is in accordance with planned performance.



Activities in the management process

Planning, organizing, controlling

Planning

## 2. Behavioural Management -

Behavioural management

Emphasizing human relationships and the behavioral sciences.

Ex: Incentives

Promotion from within

→ Human Relations School fail ★

→ Assumptions (Motivating &)

People are complex and have multiple needs and that the supervisor-subordinate relationship directly affects productivity.

→ Behavioral Science :-

A science that explores how human behavior is affected by leadership, motivation, communication, interpersonal relationships and attitude change.

### 3. Modeling Management :-

modeling management is concerned with decision-making system and mathematical modeling, it is concerned with all management activities, problem of optimization, planning, how about planning, what is the best solution?

optimization problems, what is the best solution?

situational factors?

what is the best solution?



## List Various characteristics of Organization Strategies :-

1. Quality :- (Product Performance)

2. Cost efficiency :- (low Product Price)

3. Dependability :- (reliable & timely delivery of products to customers)

4. Flexibility :- (responding rapidly to changes in market requirements or changes in O.P. volume)

## Operations Objectives :-

The overall objective of the Operations subsystem is to provide conversion capabilities for meeting the organization's goals and strategy.

The characteristics of operations:-

1. Product / Service

2. Process :-

### 3. Efficiency :- ~~primarily~~ ~~significantly~~ \$

↳ 3.1. Effective employee relations  
↳ 3.2. cost control of labor.

↳ 3.3. cost control of material

↳ 3.4. cost control in facility utilization

### 4. Product / Service Quality

↳ quality and ~~primarily~~ ①

### 5. Customer Service (schedule)

↳ managing production

↳ Producing quantities to meet expected demand. ↳ ②

↳ meeting the required delivery date for goods or services.

↳ impact on production

↳ 6. Adaptability for future survival.

↳ being able to quickly adapt to changes

↳ impact on production. ↳ sales demand ↳

↳ environment - (3)

↳ quality - (4)

↳ primacy (5)



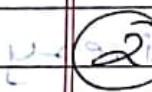
## Strategic Planning :-

A process of thinking through the organization's current mission and environment and then setting forth a guide for tomorrow's decisions and results.



### Planning for Operations :-

Establishing a program of action for converting resources into goods or services.



### Planning the Conversion System:

Establishing a program of actions for acquiring the necessary physical facilities to be used in the conversion process.



### Different modes of Strategic Planning Operation:

(a). Commercial

(b). Adaptive

(c) Planning

Group 1 Imp

W List and explain models of strategic planning  
There are two models.

1. A Strategic Planning Forced choice model.

2. A Strategic Planning Operations model.

Environmental Assessment

External economic assumption

Key governmental/ regulatory threats

Major technological forces

Significant marketing

Opportunities/threats

Organization's Position

Statement of mission

Interrelation set of financial and non-financial objectives

Statement of strengths and weaknesses

Forecast of operations

Profits & cash flows

Explicit competitive strategies for each major competitor

major future programs

Strategic Options

- Strategic options (at least two)
- Requirements for implementing each strategy
- Contingency plans

Fig 1) A forced choice model of Strategic Planning.

Environment and Industry  $\rightarrow$  Corporate strategy

Efficiency  
Dependability  
Quality  
Flexibility

Facility mission

<u>Process</u>	<u>Capacity</u>	<u>Facilities</u>	<u>Vertical Integration</u>	<u>In-facility Structure</u>
Automation	-	-	-	-
product/service specificity	- Loading	- Size	- Supply control	- Plumbline
interconnectedness	- Lead/lag	- Location	- Customer control	- Workforce
			- Interdependencies	- Quality control

Fig. 2 A strategic planning operations model.

## → Strategic Planning & Operational Models:

1. Quality model: Deming PDCA cycle  
Involves quality improvement and management

2. Efficiency model: Total Quality Management  
Focuses on quality and efficiency

### 3. Effectiveness

Measures responsiveness and efficiency

4. Flexibility model: Involves of  
adjustable load distribution and storage

• priorities and commitments

• performance

• reliability ↔

• efficiency ←

which part do we want retained ←

selected principles of

quality and strength

• maintainability

to prioritize principles - maintainability ←

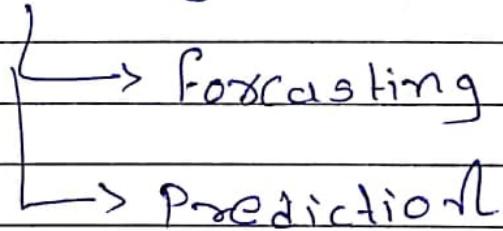
selected soft

## ~~6.2~~ ~~Forecasting~~ ~~Op~~ Operations ~~of~~ ~~future~~

In general terms, forecasting presents an unresolved philosophical dilemma. "You can never plan the future by the past."

Operations managers try to forecast a wide range of future events that potentially affect success.

Forecasting has various meanings.



→ Forecast :- Forecast use of past data to determine future events; an objective computation.

→ Prediction :- Subjective estimates of the future.

## \* Distinguish between Forecasting & Prediction

~~2 min?~~  
✓ ~~Forecast~~ ~~Prediction~~

### Forecasting vs. Prediction

- | Forecasting  | Prediction                                     |
|--|--|
| 1. base to historical data. NO use of computation. | 1. No use of historical data                   |
| 2. objective base computation.                     | 2. Subjective base computation.                |
| 3. use of predetermined formulas and logic         | 3. NO formulas and logic                       |
| ↳ gives guarantee about 40% prediction success     | ↳ gives guarantee about 40% prediction success |

## \* Define Forecast Error:-

It is numeric difference between forecasted demand and actual demand.

Differentiate between.

\* Dependent Demand VS Independent Demand:

→ Dependent Demand :-

Demand of one product

Product linked with demand of another product than it is called

dependent demand

→ Independent Demand :-

If demand of product is not

linked with demand of another product than it is called Independent Demand

→ Long term storage

→ Medium term storage

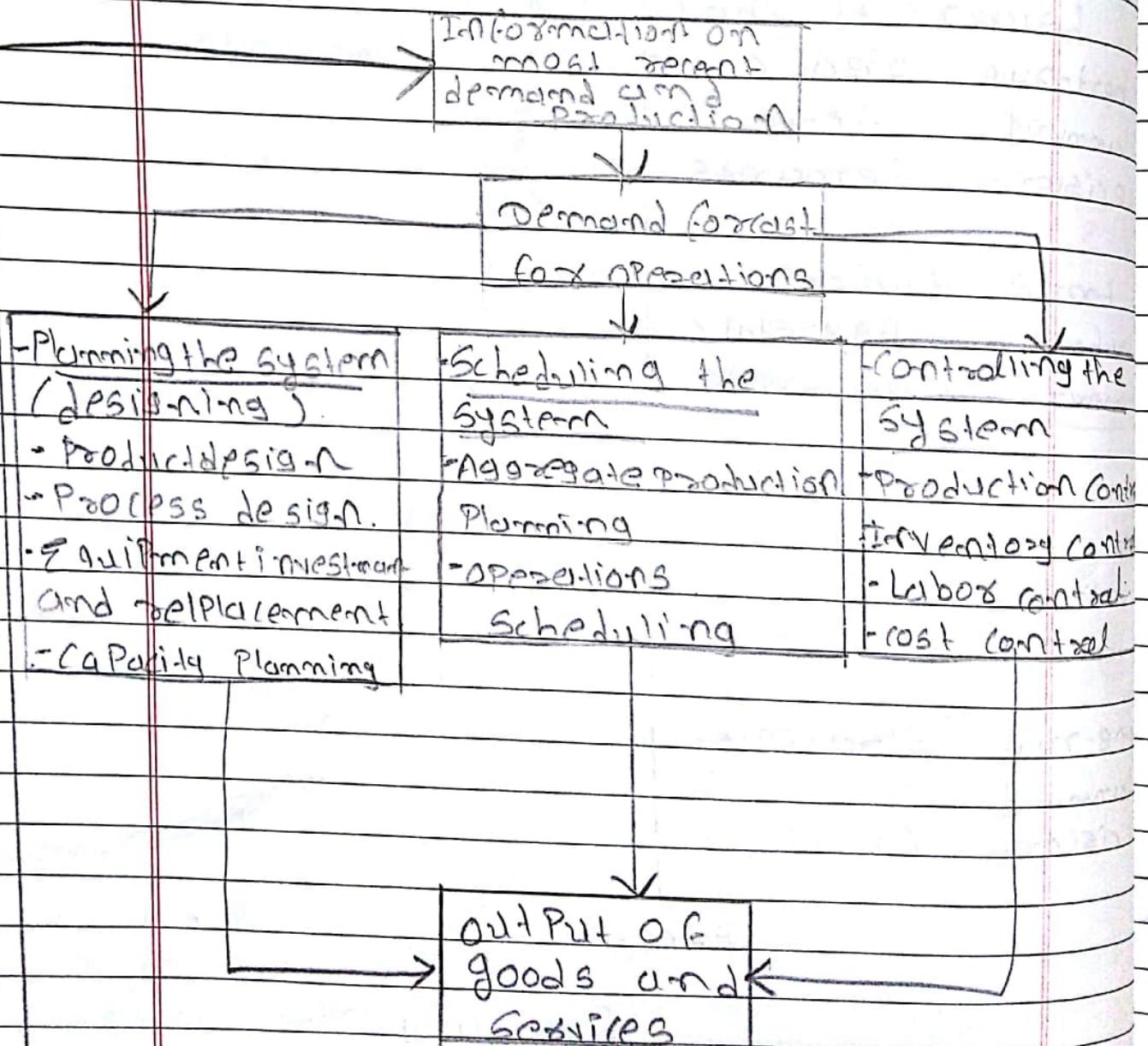
→ Short term storage

# \* Forecasting and Operations Sub-system:

1. Planning the system

2. Scheduling the system

3. Controlling the system



## 1. Planning the system:-

Unit 6 Planning the system.

Managers need to forecast aggregate demands so they can design or redesign processes necessary to meet demand.

## 2. Scheduling the system:-

When deciding how best to use the existing conversion system, accurate demand forecasts are very important.

## 3. Controlling the system:-

Managers need forecasts of demand to make decisions about controlling inventory, production, labour and overhead costs.

## \* Time Series Analysis :-

In forecasting problems, analysis of demand data plotted on a time scale to get patterns of demand.

## \* Demand Patterns :-

General shapes of a time

Series; usually constant, trend  
Seasonal or some combination of  
these shapes.

### 1. Constant demand :-

↳ mostly stiff products.

Eg. toothpaste, soap, salt, sugar  
Wash-mix products changing also  
Ketchup, mayonnaise, pastes etc  
e.g. detergent (from the packaging) okay  
front loading

### 2. Trend-wise demand (from medicine)

↑ demand fall is possible

↑ demand fall NP product with odd

periodic availability offerings. Examples

Snacks, perfume, perfumes

Some electronic items Go design web

### 3. Cyclical / Seasonal demand :-

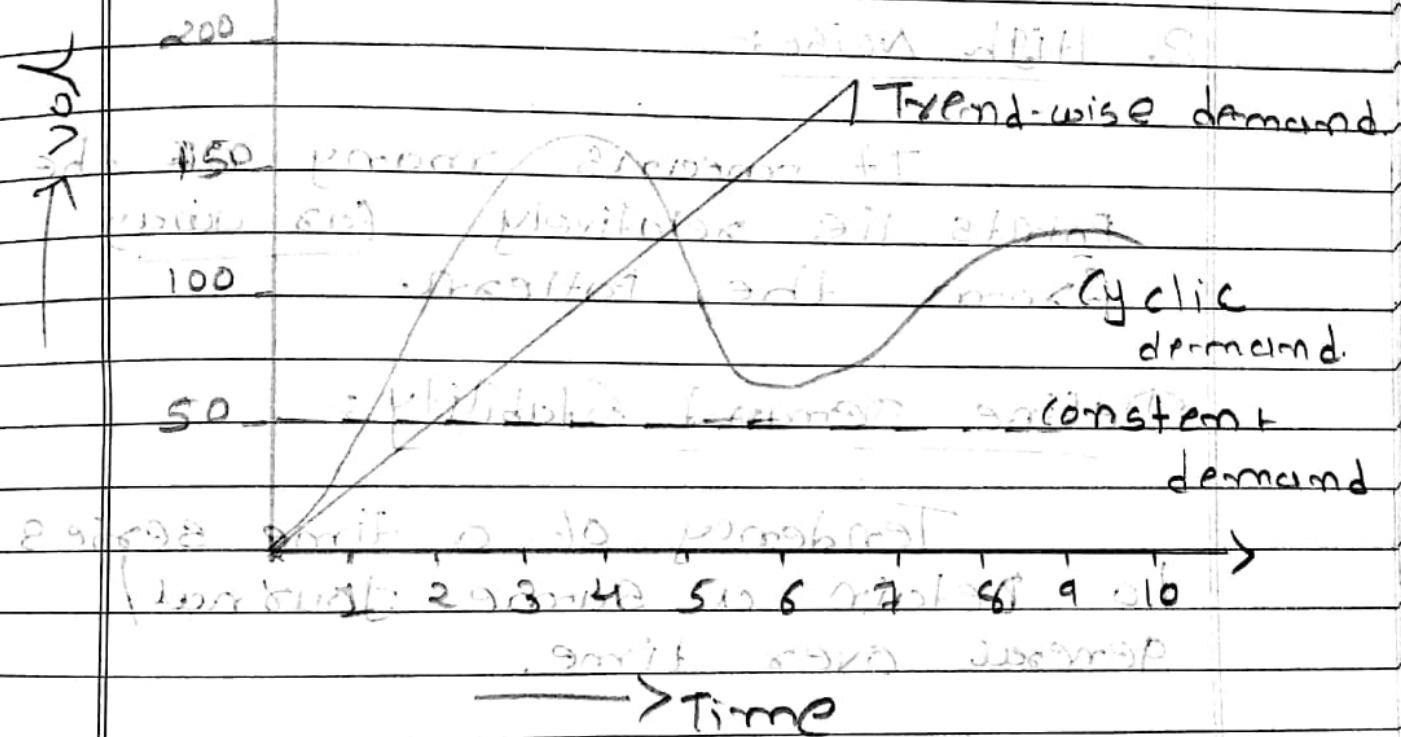
up and down

e.g. umbrella

in July-August & March to

June-July as well April  
to June

~~Seasonal & short term~~  
~~Irregular & random~~



~~Time~~  
~~Demand~~

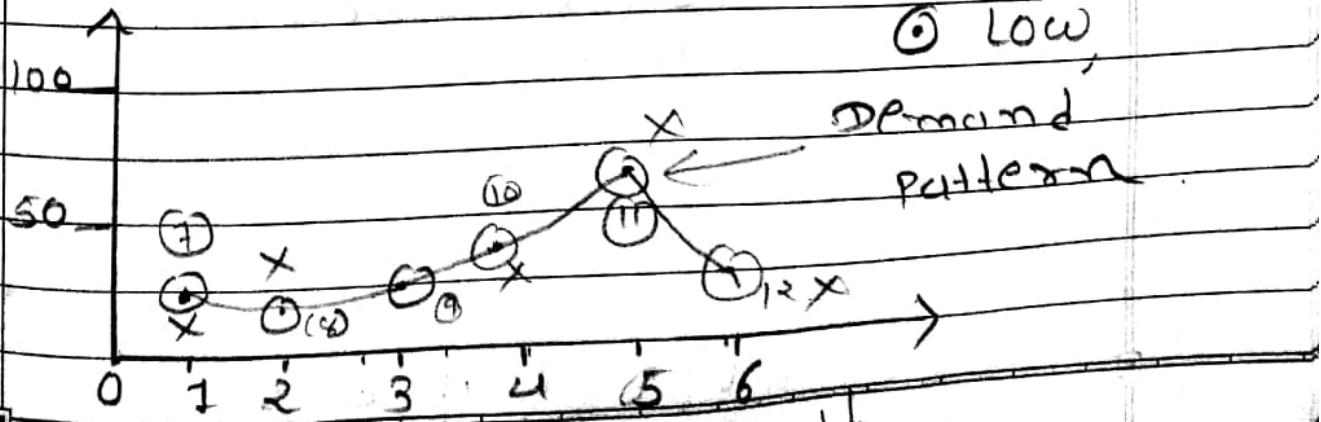
### Noise in Demand :-

Difference of demand about a demand pattern.

X high.

O Low,

Demand pattern



## TYPES OF NOISE:-

### 1. Low Noise:-

It means all or most of the Points lie very close to the pattern.

### 2. High Noise:-

It means many of the Points lie relatively far away from the pattern.

## Define Demand Stability :-

Tendency of a time series to retain a same general/ general over time.

To steady demand to maximize profit by removing

PG. NO: 83

Date \_\_\_\_\_  
Page \_\_\_\_\_

## \* Mean Absolute Deviation (MAD):-

(Average's of absolute deviation)

method of finding standard deviation

$$\text{MAD} = \frac{1}{n} \sum_{i=1}^n |F_i - A_i|$$

not same as MAD in statistics

plot of F.D. vs. F.D. is as follows

minimum value in F.D. is 10

$$= \frac{1}{n} \sum_{i=1}^n |F_i - A_i|$$

$$(n=3) \text{ IS } = \frac{1}{3} (10 + 20 + 0)$$

F.D.

Total error

$$= \frac{(60 - 50) + (40 - 60) + (70 - 70)}{3}$$

$$(10 + 20 + 0) / 3$$

$$= \frac{10 + 20 + 0}{3}$$

$$= \frac{30}{3} = 10$$

$$= \frac{30}{3} = 10$$

both method  
use forecast  
errors

$$= \frac{10}{3} = 3.33$$

E.g.

	F.D	A.D
M1	50	60 - 50 = 10
M2	60	40 - 60 = 20
M3	70	70 - 70 = 0

	F.D	A.D
M1	50	60 - 50 = 10
M2	60	40 - 60 = 20
M3	70	70 - 70 = 0

$$(n=3)$$

(Ques) All forecast errors are measured that is the average forecast error without regard to direction, calculated as - the sum of absolute value of forecast errors for all periods divided by the total number of periods evaluated.

$$(\text{f} \cdot \text{A} - \text{f} \cdot \text{D}) / n$$

D.N. 40

$$\text{Q2. Bias} = \frac{1}{n} \sum_{i=1}^n (\text{f}_i \cdot \text{E}_i)$$

WORKS

on  
Actual  
Value

$$(01 - 05) + (03 - 02) + (02 - 01) =$$

$$= \frac{1}{n} \sum_{i=1}^n (\text{f}_i \cdot \text{D}_i - \text{A}_i \cdot \text{D}_i)$$

Total Prod

$$10 + 20 + 10 =$$

Actual

$$3$$

$$05 =$$

$$= \frac{10}{3}$$

$$01 =$$

$$= 3.333 \quad \text{P.A.} \quad \text{Q.D.} \quad \text{P.B.}$$

E.g. Let  $1000 \text{ f.D} = 600 - 900 = 100$   
 $900 = \text{A.D}$

600	OF	OF	100
900	OF	OF	J

Negative  
for  
company

-ve is good for company

+ve is not good for company

Date \_\_\_\_\_  
Page \_\_\_\_\_

E.g. Let ~~1000 f-2~~ = 1000 - 1000 = 0

$$1000 - 1000 = -100 \rightarrow \text{positive}$$

for company

- Forecast error minimized

minimum forecast error

- Mean Absolute Forecast Error measure  
that is the average absolute error with  
regard to direction and shows  
any tendency consistency to over or  
under forecast is calculated f.e.  
for all periods divided by the  
total no. of periods evaluated.

mean absolute error

sum of absolute deviation  
minimum from average period  
absolute

calculated period based formula [E]

Mean period based formula A

formulae used are also based  
on the same principle

calculated no based on F

period based on based on F

and no based on formula

## \* Types of Forecasting:-

### [1] Intuitive forecasting:-

Forecasts that essentially  
reflects manager's guesses and  
judgements concerning future  
events (Prediction) of business

### [2] Statistical forecasting:-

Using past data in some  
systematic method; like time  
series analysis and projection  
method.

### [3] Demand-based Forecasting Model

A statistical forecasting model  
based only on historical demand  
data.

### [4] Causal Forecasting Models:-

It is based on historical  
demand data as well as on  
variables believed to influence  
demand.

Import  
Technique

### [5]. Delphi Technique:-

A qualitative forecasting technique in which a panel of experts working separately and not meeting, find a collective solution through summarizing different ideas.

### [6]. Nominal Group Technique:-

It is an qualitative forecasting technique in which a panel of experts working together in a meeting, arrive at solution through discussion and sharing of their ideas.

### [7]. Regression Analysis:-

A causal forecasting model in which, from historical data a functional relationship is established between variables and then used to forecast dependent variable values.

Q

## Productivity and Quality

Productivity = Output / Input

Efficiency helps in improving productivity

from right technique, methods, standards

ratio of Outputs to inputs from

minimum input making

Types of Productivity :-

① Total factor productivity :-

It is the ratio of O/P to the total inputs of labour, capital, materials, and energy.

② Partial factor productivity :- It is a ratio of O/Ps to one, two or three of few of all inputs.

Productivity = Output / Input × 100

Efficiency = Output / Input × 100

It is minimum standard setting - materials

time, additional requirements, etc.

to reach standard of basic work

Productivity / efficiency = Ratio of O/Ps to inputs

- Labour efficiency :- is part of ~~part of~~  
partical factor  
~~part of~~ productivity.

E.g. 300 customers served

by 4 workers in ~~minimum~~

~~in 8 hours per day work by~~  
~~each of 4 workers~~

$$4 \times 8 = 32.$$

300  $\rightarrow$  no. of customers served,  
32 per hours.

E.g. 300 customers served

3 workers

~~pg no. - 46~~ 8 hours per day

I was not there for half  
day

$$\frac{300}{(3 \times 8) + 2}$$

- Labour efficiency:-

The ratio of outputs to labour input, the labour actually worked to achieve that output. (It is partical factor productivity measure).

Q

Quality :- It is something needed.

The degree to which the design specifications for a product or service are appropriate to its function and use, and the degree to which a product or service confirms to its design specification.

Product life cycle.

## → New Product Design (Product Development)

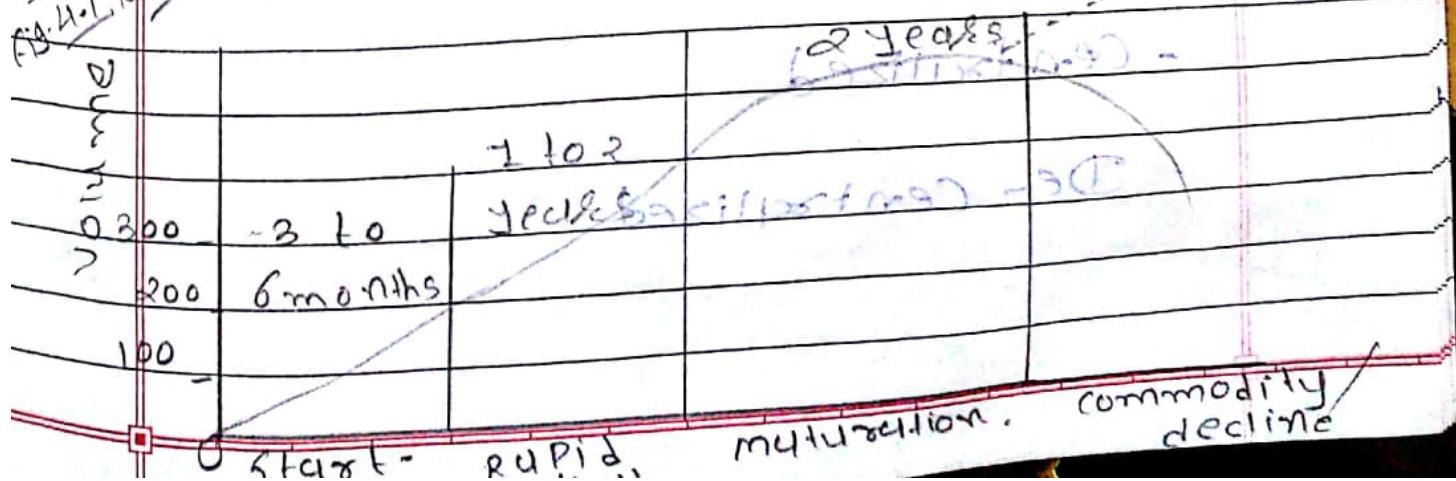
~~product development~~ Industry people frequently foresee new business opportunities in the business of designing products which are needed for services.

## → Product Life cycle :-

Pattern of demand throughout the product's life; similar patterns and stages can be identified for the useful life of process.

The demand for a product in its market acceptance - generally follows a pattern called explosion.

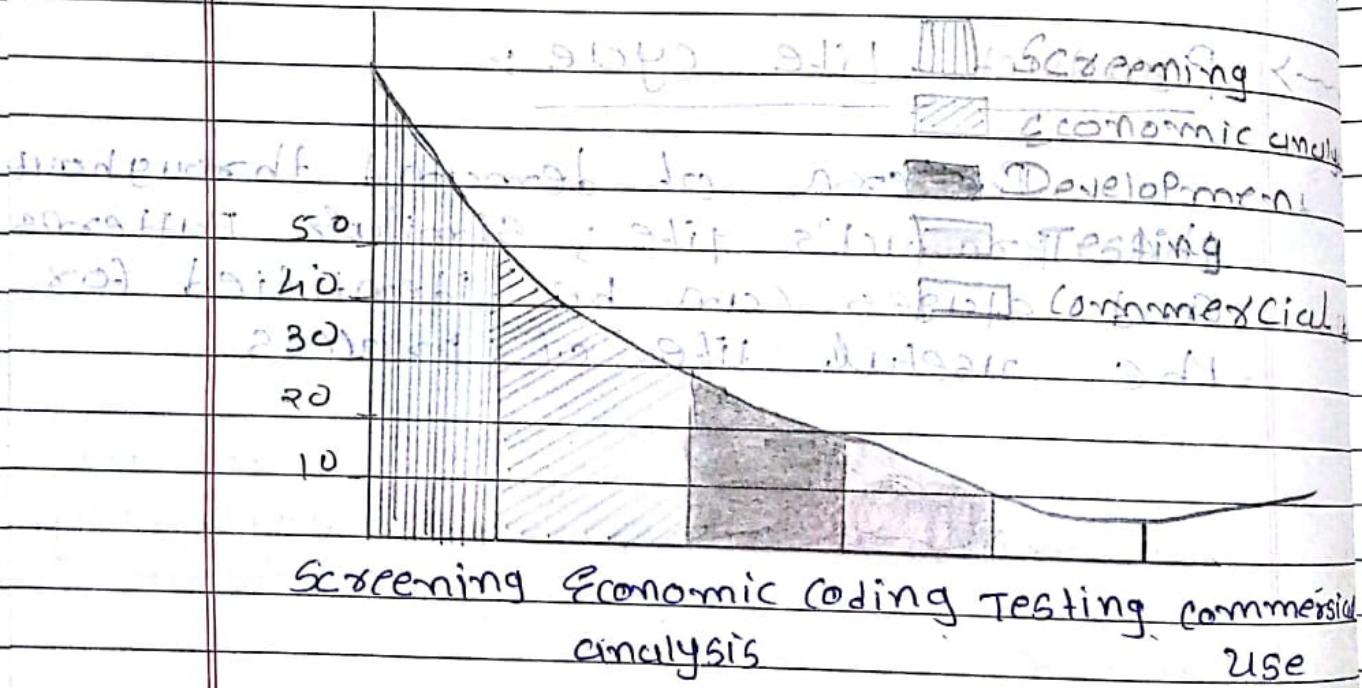
## → Operations issues in the Product life cycle as characteristics of product life cycle:



~~Ques~~ ~~T.M.Y~~ List its components & explain each of them in brief. (10)

## Research and development (R and D)

Organizational efforts directed towards creating products and processes of innovation, includes stages of basic research, applied research, development, and implementation.



Screening Economic coding Testing commercial analysis use

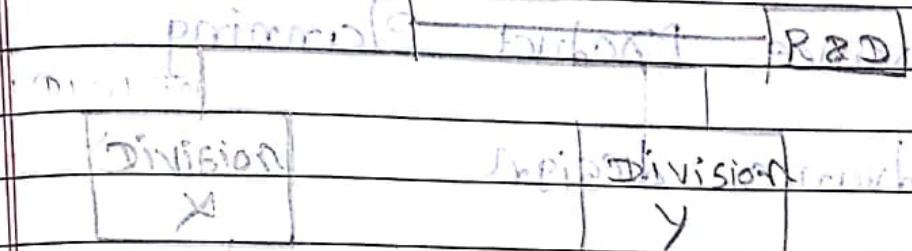
## Organization of R and D / R&D location in organization structure

- Centralized

- De-centralized

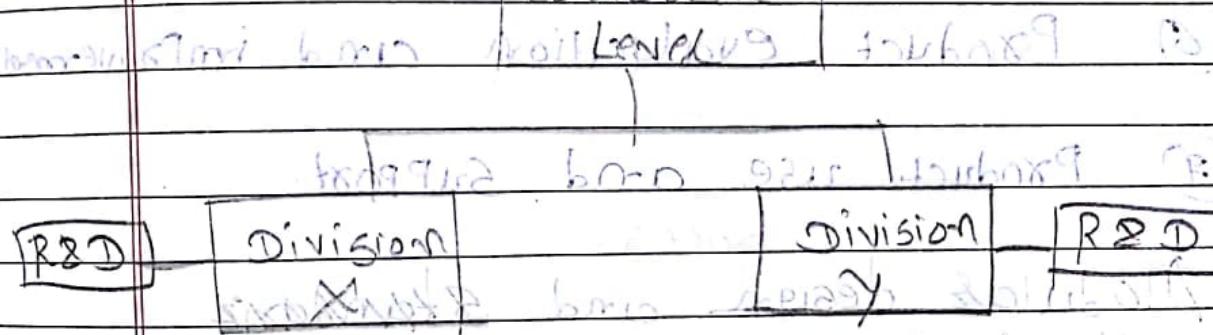
### (a) Centralized R&D

Corporate  
level



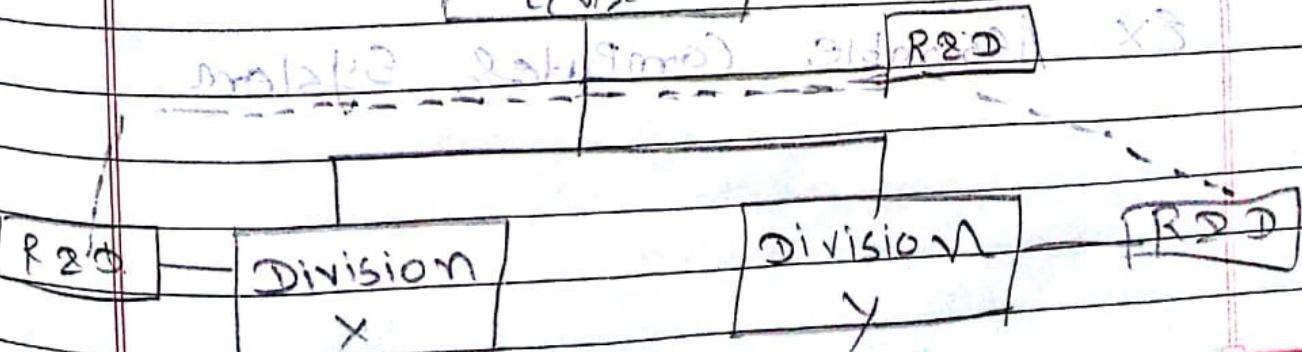
### (b) Decentralized R&D

Corporate



### (c) Combination

Corporate admin. unit



~~2-00~~

## Production development Process:-

- ① Needs identification or requirement gathering.
- ② Advance Product Planning
- ③ Advance design
- ④ Detailed engineering design  
(SRR facilitation)
- ⑤ Production Process design & development.
- ⑥ Product evaluation and improvement
- ⑦ Product use and support.

~~2-00~~  
~~2-00~~  
Modular design and standardization

The creation of products from some combination of basic, pre-existing subsystems.

Ex. Assemble computer system.

Example:

→ How many combinations is possible:-

In selection of personal computer, you may have choice of 3 monitors, 2 keyboards, 2 CPU cabinets and 3 mouse ( $3 \times 2 \times 2$ ). Different computer system possible.

- Standardization

PAGE 130

Product Standardization offers benefits to consumers and producers alike. Customers can count on simplicity and convenience in purchasing standardized products like household doors, screws, nuts and bolts, fasteners, spark plugs, and so on.

The risky side of standardization is that your competitor may upstage you with a new product feature that you cannot match because your design capability have become stagnant.

mca  
65  
66

2 m 3 m 16 m

Define Process Technology. Types of process Technology explain them in brief:-  
  
Ans:- Process Technology is a system of equipment, people and system used to produce products and services.

→ Types of Process Technology:

(1) Project Technology

The process technology suitable for producing one - off kind products.

Ex: Aircraft, Ship, Car etc.

(2) Job Shop Technology

A process technology suitable for a variety of customised products in small volumes (Quantities). It is suitable for initial startup phase of product life - cycle.

### [3] Batch Technology:-

A process technology suitable for a variety of products in varying volumes.

It is suitable for rapid growth phase of product life cycle.

### (4) Assembly Line Technology:-

A process technology suitable for a narrow range of standardized products in high volume.

It is suitable for maturation phase of product life cycle.

### (5) Continuous Flow Technology:-

A process technology suitable for producing a continuous flow of products.

It is suitable for main factories if product is high volume upto capacity.

It is suitable for fast  
phase of product life cycle  
Only commodity phase not  
suitable for decline. It is suitable in fast  
. Sometime erosion

~~High cost of delivery at first~~  
~~High cost of assembly at first~~

~~beginning slow growth~~ [H]

~~Industrialization~~ [B] ~~Industrialization~~ A

~~Johnson's~~ ~~shops~~ Assembly continuous

~~Industrialization~~ Assembly line

~~Industrialization~~ Assembly line

Stabilize? Rapid expansion of commodity  
up { growth

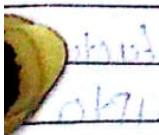
Industrial growth (minimum) (2)

Time → Time

Industrialization ~~Industrialization~~ A

Industrialization in prioritized

The process life cycle

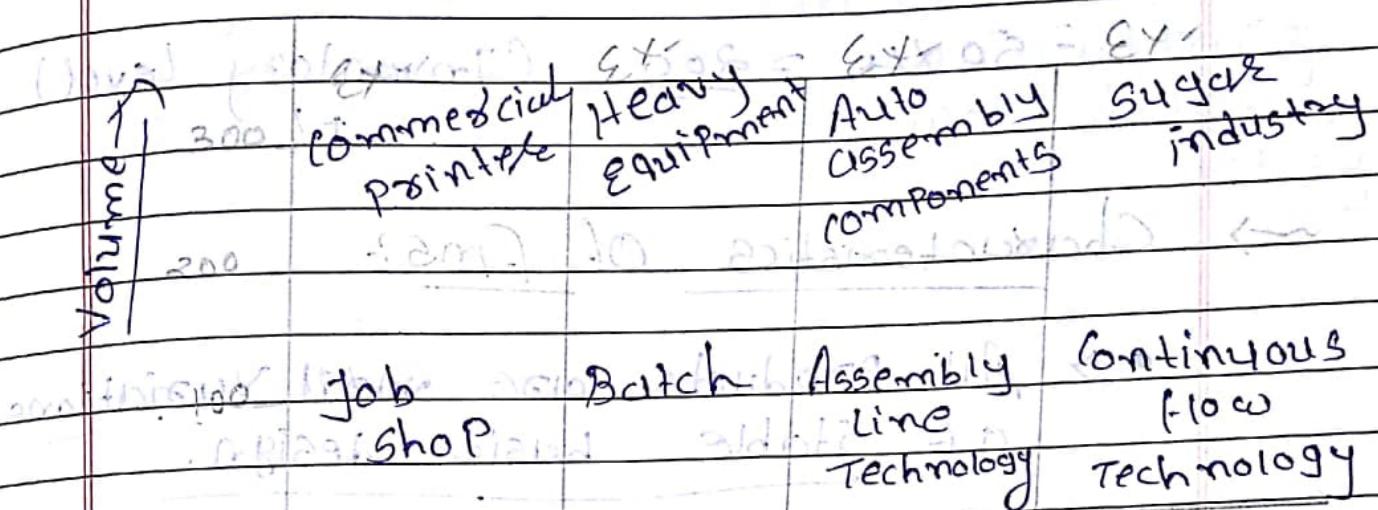


Industrialization

Industrialization

IT IS minimising the operating inventors level.

## FMS :- (Flexible Manufacturing System):



## FMS :-

Computer controlled processed technology suitable for producing a moderate variety of products in moderate volumes.

## Inventory Level :-

Engineering Production PA (Shopping mall)

structured to produce 1000 units per day

daily 50 units demand

Re-order Processing time maximum  
4 days.

$$= 50 \times 4 = 200 \text{ (Inventory Level)}$$

→ Characteristics of FMS:

→ All products have ~~wide~~ ~~variations~~ ~~wide~~ variations of stable basic design.

→ All products utilized the same family of components.

→ The no. of components is only moderate between 10 to 50.

→ The volume of each component is moderate (1000 to 3000 units annually) but it is lot sizes in small size unit.

→ Goal of FMS: ~~high production~~

~~The goal is to produce moderate variety of products in moderate quantities.~~

~~6m: IMP~~

## \* CIM (Computer Integrated Manufacturing)

Computer Information System utilizing a shared manufacturing database for engineering design, manufacturing engineering, factory production and information management.

Q-1 What is operation management system. List different view of it and explain them in brief.

Q-2 What is process technology? List different types (Explain) of process technologies.

Q-3 Explain product life cycle in detail.

## \* CIM Functions:

### [1] Engineering design:-

Engineering function based on problem solving  
Engg 1.1 Physical System analysis  
problem solving problem solving  
representing by drawings

#### 1.3 Computer-aided design [CAD]

Engineering function based on geometric representation of objects - computerization  
and with more efficiency

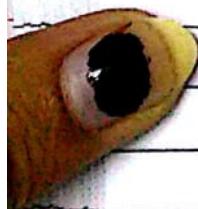
### [2] Manufacturing engineering:-

Engineering function based on problem solving  
2.1 Computer-aided manufacturing [CAM]

2.2 CAD/CAM technology

#### 2.3 Process planning

#### 2.4 Robotics



### [B] Factory Production:

3.1 Automated material handling

Programmed transport, conveyor belt

3.2 Quality Assurance

Visual inspection, gage

3.3 Robots and machine tools

3.4 Distributed numeric control

FMS

3.5 Routine manufacturing

Assembly, machining, forming

3.6 Scheduling, control, prioritization

4. Information management:

4.1 Database Management

4.2 Production Planning & Control

4.3 Management Information

Information system (MIS)

4.4 Decision Support System (DSS)

## → Computer-Aided Design [CAD]

programmed Computer Software A programming that allow designer to carryout geometrical arithmetic transformations rapidly.

plot grid from above

## → Computer-Aided Design/manufacturing [CAM]

manufacturing systems  
Many manufacturing systems utilizing computer software programs that control the actual machine on the shop floor.

## → Robot

Automatic programmable machine capable of moving materials and performing routine, repetitive tasks.

calculation and Examples are at pg No 139 & 141

## → Robotics:-

The science and of selecting robots for various applications.

## → It is about group technology:-

The way of organizing and using data for components that have similar properties and manufacturing requirements.

## ★ Design of Services and Service Processes:-

Process technology for services are different, services vary in the amount of customer contact and they furnish accordingly.

The design of Services involves the same stages as of the design of products.

conversion process - A layout is the physical configuration of departments, workstations, and equipment into it.

6-m Define the term Layout. List 2 Explain  
★ Layouts :- different types of Layout in brief

Pg No To See how Layout Planning  
253 affects operating efficiency and  
255 effectiveness, we need to  
examine how different types  
of layout designs apply to  
different situations.

### ★ Types of Layouts

#### (i) Process Layout - (Process Oriented Layout)

The arrangement of a facility  
so that work centers or  
departments are grouped together  
according to their functional  
type.

A Process-Oriented Layout  
is appropriate for intermittent  
operations when work flow  
is not consistent for each  
output.

## [2] Product Layout - (Product Oriented).

The arrangement of a facility so that work centers and equipment are in ~~line~~<sup>order</sup> to afford a specialized sequence of tasks.

A product-oriented layout is appropriate for producing one standardized product, usually in large volume.

## [3] Job-fixed - Position Layout:-

Arrangement of input facilities

The arrangement of a facility so that the product stays in one location, tools and equipment, including workers, are brought to it as needed.

An job-fixed - position layout is appropriate when because of size, shape or any other characteristic, it is not feasible to move the product.

In this, product stays in one location.

## 4) Combination Layouts

Often combinations of layouts must be used. Most typically a process layout is combined with a product layout.

### Industrial Example - Industry A

Refrigerator manufacturers

use a combination layout  
first they use a process-  
oriented layout to produce

various parts and sub components  
metals, stamping may be one  
work, then welding another  
and various heating, extracting  
processes in this isolated center

for final assembly of the  
product all these functions

are brought together in a

product-oriented layout.

A firm in India, Sitaram Brothers  
has a soft room of

auto body with an

isolated area

## functions of CIM in industry

functions in manufacturing

