
THE INDIAN
CONTRACT
ACT, 1872


CONTRACT

CONTRACT - According to sec.2(h), a contract is defined as an agreement enforceable before the law.

AGREEMENT - According to sec.2(e), every promise or set of promises forming consideration for each other.

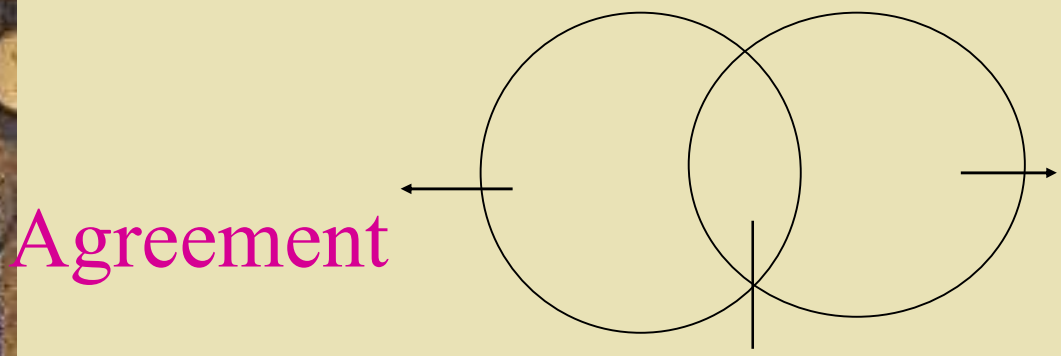
PROMISE - According to sec.2(b), when a person made a proposal to another to whom proposal is made, if proposal is assented there to.

OFFER - According to Sec.2(a), when a person made a proposal, when he signifies to another his willingness to do or to abstain from doing something.

AGREEMENT = OFFER + ACCEPTANCE

CONSENSUS - AD – IDEM-

According to Sec.13, meeting of minds or identity of minds or receiving the same thing in same sense at same time.



“All agreements are contract but all contracts are not agreements.”

CONTRACT = AGREEMENT + ENFORCIBILITY BEFORE LAW

ESSENTIAL ELEMENTS OF A VALID CONTRACT (Sec.10)

1.Offer & acceptance.
2.Intention to create legal relationship.
3.Consensus - ad - idem.
4.Consideration.
5.Capacity to contract.
6.Free consent.
7.Legality of object.
8.Possibility of performance.
9.Writing & registration.

TYPES OF CONTRACTS

VALID CONTRACTS

- *Absolute contract*
- *Contingent contract(Sec. 31-36)*
- *Express contract*
- *Implied/Quasi contract(Sec.68- 72)*

Valid contract *- If all the condition are fulfilled it is called as a valid contract.*

Contingent contract *- In a contract to do or not to do something, if an event is collateral, does or doesn't happen.*

Express contract *- When contracts are either in writing or in oral.*

Implied contract *- When contracts are neither in writing nor in oral.*

Absolute contract *- A contract which is not dependent on fulfillment of any condition.*

INVALID CONTRACTS

- Void contract
  - *Is void(Void - ab - initio)*
  - *Becomes void*
- Voidable contract
- Illegal contract
- Unenforceable contract

Invalid contract - In a contact if any one condition is not fulfilled.

Is void (Void-ab-initio) - An agreement which is not valid from the beginning.

Becomes void - An agreement which is valid in the beginning but due to some supervening impossibility the contract becomes void.

Voidable contract - A contract which is valid unless until avoided by either the party.

Illegal contract - An agreement forbidden by law.

Unenforceable contract - It is valid but due to some technical defect the contract becomes void. In case defects are removed the contract is enforceable.(lack of registration, lack of signature etc.,)

OTHER TYPES OF CONTRACTS

- ***Executed contract***
- ***Executory contract***
- ***Unilateral contract***
- ***Bilateral contract***

Executed contract - *In a contract where both the parties have performed their obligation, there is remaining nothing to perform.*

Executory contract - *In a contract where both the parties are yet to perform their obligation.*

Unilateral contract - *In a contract one party has performed his obligation and other person is yet to perform his obligation.*

Bilateral contract - *In a contract where both the parties have performed their obligation. Bilateral & Executory are same and inter - changeable.*


OFFER

OFFER

According to Sec.2(a), when a person made a proposal, when he signifies to another his willingness to do or to abstain from doing something.

TYPES OF OFFER

- *Express offer*
- *Implied offer*
- *Specific offer*
- *General offer*
- *Cross offer*
- *Counter offer*
- *Standing offer*

Express offer *- When offer is given to another person either in writing or in oral.*

Implied offer *- When offer is given to another person neither in writing nor in oral.*

Specific offer *- When offer is given to a specific person.*

General offer *- When offer is given to entire world at a large.(Carlill Vs. Carbolic smoke ball Co.,)*

Cross offer - *When both the persons are making identical offers to eachother in ignorance of other's offer.*

Counter offer - *When both the persons are making offers to eachother which are not identical in ignorance of other's offer.*

Standing offer - *An offer which remains continuously enforceable for a certain period of time.*

LEGAL RULES FOR OFFER

- *Offer must be given with an intention to create a legal relationship.(Balfour Vs. Balfour)*
- *Offer must be definite.(Taylor Vs. Portington)*
- *There is a clear cut difference between offer, invitation to offer, invitation to sale. (Harris Vs. Nickerson)*


ACCEPTANCE

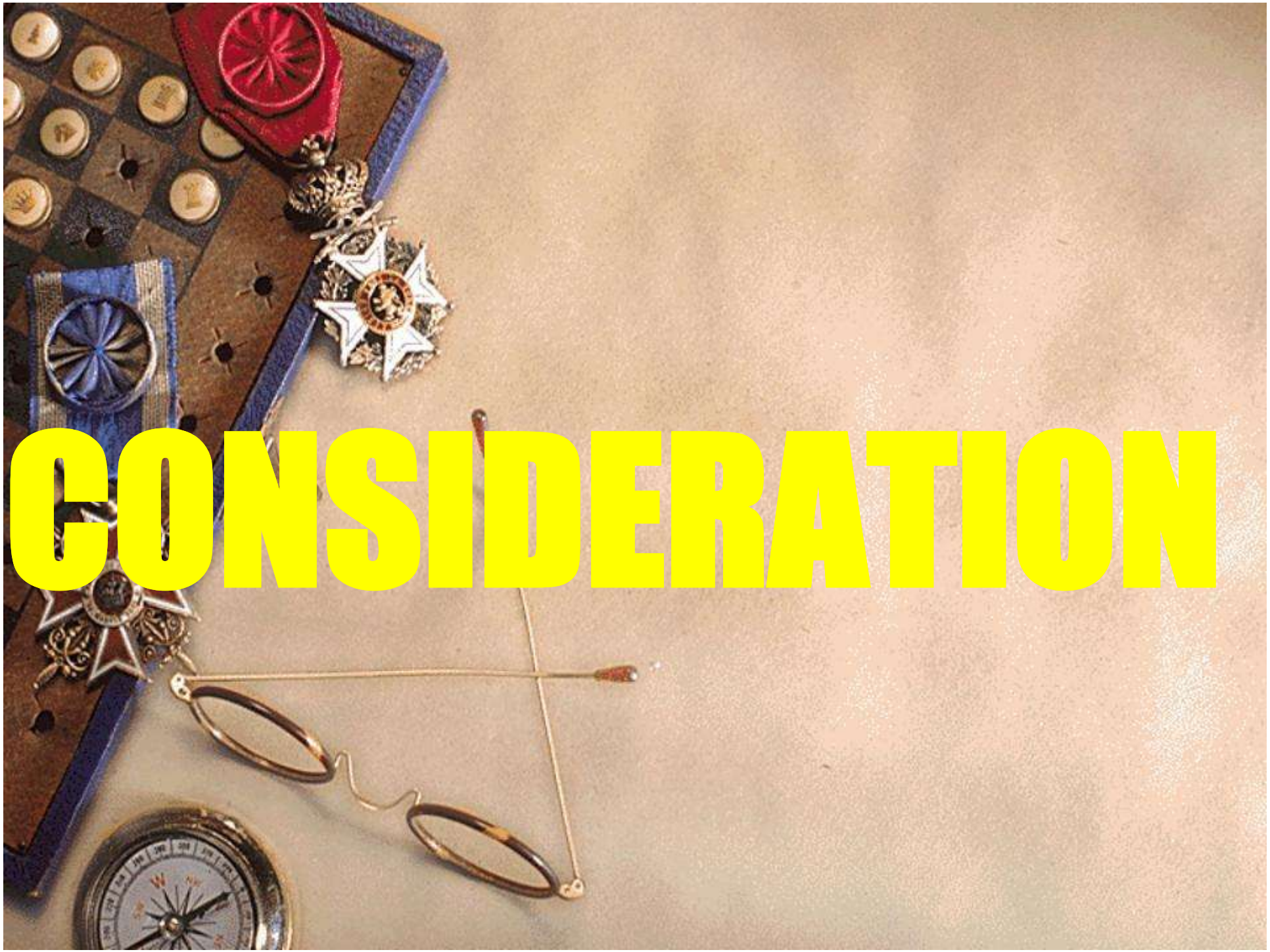
ACCEPTANCE

According to sec.2(b), when a person made a proposal to another to whom proposal is made, if proposal is assented there to, it is called acceptance.

LEGAL RULES FOR ACCEPTANCE

- Acceptance must be given as per the mode prescribed by the offerer.
- Acceptance must be given before the lapse of time or within reasonable time.
- Acceptance must be unconditional.
- Acceptance may be given by any person in case of general offer.

- ***Acceptance may be given by any specific person in case of specific offer.***
- ***Acceptance must be communicated. (Bordgon Vs. Metropolitan Rly. Co.)***
- ***Mental acceptance is no acceptance or acceptance must not be derived from silence.***
- ***Acceptance must not be precedent to offer.***


CONSIDERATION

CONSIDERATION

According to sec 2(d) consideration is defined as "when at the desire of the promisor , or promisee or any other person has done or abstained from doing or does or abstains from doing ,or promises to do or to abstain from doing , something , such an act or absinence or promise is called a consideration for the promise .

When a party to an agreement promises to do something he must get "something" in return .This "something" is defined as consideration.

LEGAL RULES AS TO CONSIDERATION

1)It must move at the desire of the promisor.

[Durga Prasad v. Baldeo]

2)It may move by the promisee .

[Chinnaya v. Ramayya]

3)It must be past ,present or future .

4)It need not be adequate .

5)It must be real .

6)It must not be illegal , immoral or opposed to public policy .

STRANGER TO CONTRACT

It is general rule of contract that only parties to contract can sue & be sued on that contract. This rule is known as 'Doctrine of privity' i.e relationship between the parties to contract.

Exceptions

1)A trust or a charge.

2)Marriage settlement, partition or other family arrangements.

3)Estoppel

4)Assignment of contract.

5)Contract with agent.

6)Convenants running with land.

Contract without consideration is void – Exceptions

Love & affection .

[Venkataswamy v. Rangaswamy]

Compensation for voluntary service .

Promise to pay a time – barred debt .

Completed gift .

Agency sec (185) .

Charity .

Contract of bailment sec(148) .


CAPACITY
TO
CONTRCT

Capacity to contract

Following are the condition for a person to enter into contract

- *He must be major*
- *He must be sound mind*
- *He must not be disqualified by any other law.*

Disqualified persons to enter into a contract

a) Minor

b) unsound person

c)others

i.e alien enemy,

insolvent,

convict,

company/corporationagainst MOA / AOA .

Minor

According to Indian majority act sec(3) minor is defined as any person under the age of 18 years . In the following cases a person is said to be minor if he does not complete the age of 21 years

a) any person under the guardian & wards act ,1890

b)any person which comes under superintendence of law/legal representative

Legal rules

- *An agreement with minor is void ab initio*

  [Mohiri Bibi v. Dharmadas Ghase]
- *Minor can be promisee*

  [Shrafat Ali v. Noor Mohd]
- *Minor cannot ratify his agreement on attaining the age of majority*

  [Indra Ramaswamy v. Anthiappa Chettier]

- *Minor as a shareholder ,*
- *Minor as a partner,*
- *Minor as a agent ,*
- *Minor as a member of trade union ,*
- *No estoppel against minor ,*
- *He can plead his minority ,*
- *He can enter into contract for his necessary*

  [Robert v. Gray]
- *On behalf of minor his parents , guardian or any other person can enter into void contract to acquire movable property.*

Unsound person

- According to sec(12) a person generally sound , occasionally unsound can enter into a contract when he of sound mind
- A person generally unsound occasionally sound can enter onto contract when he is sound mind .

Persons of unsound mind

1)Lunatic ,

2)Idiots ,

3)Drunken or intoxicated persons .


FREE
CONSENT

FREE CONSENT

According to Sec 10 of the Indian Contract Act one of the essentials of a valid contract is “Free Consent”

Sec 13 defines “consent” as “Two or more persons are said to consent when they agree upon the same thing in the same sense”.According to Sec 14, consent is said to be free w
caused by:

1.Coercion

2.Undue influence

3.Fraud

4.Misrepresentation

COERCION

According to Sec 15 coercion means "Committing or threaten to commit any act forbidden by Indian Penal Code 1860 or unlawful detaining or threating to detaining any other persons property with a view to enter into an agreement. It is immaterial whether the IPC is or is not in force where the coercion is employed"

The threat amounting to coercion need not necessarily be from a party to contract , it may also proceed from a stranger to the contract.

Consent is said to be caused by coercion when obtained by:

1.The committing or threatening to commit any act forbidden by the Indian Penal Code

2.The unlawful detaining or threatening to detain any property

It is not important whether the IPC is or not in force where the coercion is taking place.

For example A and B , both Indians are on a voyage trip to America when the ship is on the Atlantic ocean B threatens a that if doesn't transfer his property to B's name then he will push him into the water.now though the IPC is not in force on the Atlantic ocean it is still considered a coercion.

Important cases:

1.Chikkim Ammiraju vs. Seshamma:

In this case a person threatened his wife and son that he would suicide if she doesn't transfer her property in his brother's favour. The wife and son executed the release of the deed under the threat . Held the threat of suicide amounted to coercion within Sec 15 and the release deed was therefore voidable.

This also is a very important case to prove that threat to commit suicide amounts to coercion

2. Ranganayakamma vs. Alwar Setty:

A young widowed girl of 13 years was forced to adopt a boy by her relatives who prevented the removal of his body for cremation until she consented. Held the consent was not free but was induces by coercion.Consequently the adoption was set aside.

UNDUE INFLUENCE

Sometimes a party is compelled to enter into a contract against his will as a result of unfair persuasion by the other party.

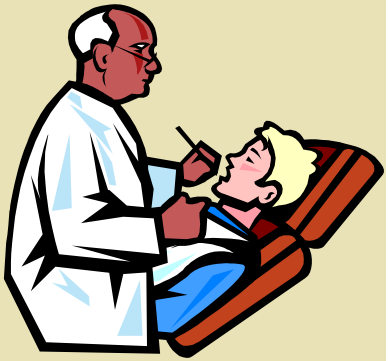
Section 16 defines undue influence as follows

A contract is said to be induced by "undue influence"where the relations subsisting between the parties are such that one of the parties is in a position to dominate the will of the other and uses that position to obtain an unfair advantage over the other

Essentials of undue influence

1. There are two persons
2. The relations are satisfying between them
3. One must dominate the other
4. There must be unfair advantage
5. It involves the moral pressure

There is an undue influence between the following persons:



-Principal and agent

-Superior and and subordinate

- Doctor and patient

- Father and son

- Teacher and student

Promoter and company

Master servant

Spiritual advisor and devotee

FRAUD

According to Sec 17 fraud means and includes any of those acts committed by a party to contract or with his connivance or by his agent with an intent to deceive or induce a person to enter a contract:

1. **The suggestion that a fact is true when it is not true and the person making it does not believe in itto be true**
2. **The active concealment of a fact by a person having knowledge or belief of the fact**
3. **A promise made without any intention of performing it**
4. **Any other act fitted to deceive**
5. **Any such act or omission as the law specially declares to be fraudulent**

The essentials of fraud are:

1. There must be a representation or assertion and it must be false
2. The representation must relate to a fact
3. The representation must have been made with the intention of inducing the other party to act upon it
4. the representation must have been made with a knowledge of its falsity
5. the other party must have subsequently suffered some loss

MISREPRESENTATION

According to Sec 18 there is misrepresentation:

1. When a person positively asserts a fact is true when his information does not warrant it to be so, though he believes it to be true
2. When there is any Breach of duty by a person which brings an advantage to the person committing it by misleading another to his prejudice
3. When a party causes however innocently the other party to the agreement to make a mistake as to the substance of the thing which s the subject of the agreement

MISTAKE

Mistake of law

Mistake of fact

Of the country

Of the foreign country

Bilateral mistake

Unilateral mistake

Mistake as to subject matter

Mistake as to possibility

As to person

As to nature

Physical impossibility

Legal impossibility

existence

identity

quality

quantity

title

price


UNLAWFUL
OBJECTIVES
&
VOID AGREEMENTS

Unlawful agreements

- illegal
- immoral
- Agreement opposing public policy
  - An agreement which interferes with administration of government
  - An agreement interfering with the administration of justice
  - An agreement interfering with administration of personal liberties
    - Restraint of parental rights
    - Restraint of profession
    - Restraint of marriage
    - Restraint of
    - Restraint of
- wager

UNLAWFUL OBJECT

- If the object of an agreement is the performance of an unlawful act, the agreement is unenforceable.
- For a contract to be valid only if the object and the consideration should be legal.
- The word object means purpose or design.

Unlawful agreements

An agreement forbidden by law [Sec 23]

An agreement defecting any provisions of law [Sec 24]

Case: Alexander vs. Rayson

A leased a flat to R at a rent of 1,200 pounds.with the object of deceiving the rating authority two agreements were entered, one fo 450 pounds and one for 750 pounds. A sued R for recovery of an installment of 750 pounds. Held A could not recover and R was entitled t remain in possession of the flat.

If it is immoral

Case: S.Yellappa vs. Y.Sabu

Cohabitation agreements are immoral

Sumitradevi vs. Sulekha Kundu

An agreement between a husband and wife to separate in future is immoral and void

An agreement opposed to public policy

If it is fraudulent

If it is creating damage to person or property

Case: Ramswaroop vs. Bansimandir

B borrowed Rs. 100 from L and executed a bond promising to work for L without pay for a period of two years.In case of default B was to pay interest at a very exorbitant rate and the principal sum of once. Held the contract was void as it involved injury to the person of B.

ESSENTIAL ELEMENTS OF WAGER

- There are two persons.
- There must be an uncertain future event.
- No control over the event by both the parties.
- There must be a reciprocal promise.
- Others are not interested in the contract.

Wager Contract (Sec 30)

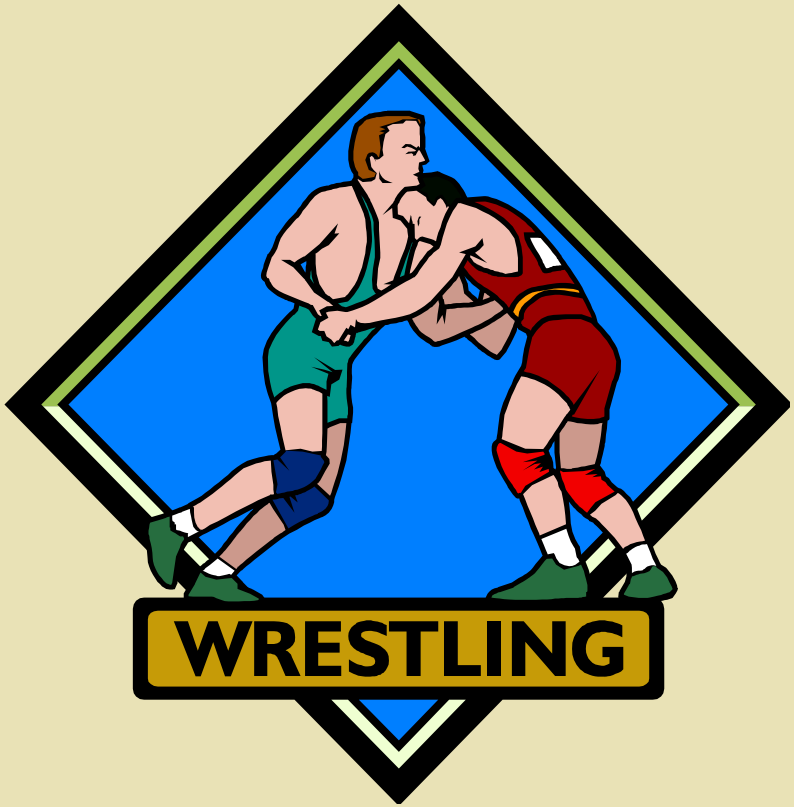
A wager contract is a contract in which one person promises to another to pay money or money's worth by the happening of an uncertain future event in consideration for other person's promise to pay if the event does not happen.

Essential Elements of Wagering

- There are two persons.
- There must be an uncertain future event.
- No control over the event by both the parties.
- There must be a reciprocal promise.
- Others are not interested in the contract.

Example:

In a wrestling bout, A tells B that wrestler no.1 will win. B challenges the statement of A. They bet with each other over the result of the bout. This is a wagering agreement.




CONTINGENT
CONTRACTS

Contingent Contract(sec 31)

A contingent contract is a contract to do or not to do something, if some event, collateral to such contract, does or does not happen. It is also called a conditional contract.

Essential Elements of a Contingent Contract:

- There are two persons.
- There must be an uncertain future event.
- Some control over the event but not absolute control.
- There is no reciprocal promise between the persons.
- Others may be interested in the contract.
- It is a valid contract.

Example:

- A contracts to pay B Rs.10,000 if B's house is burnt. This is a contingent contract.

Rules Regarding Contingent Contracts

- Contingent contracts dependent on happening of an uncertain future event cannot be enforced until the event has happened.(Sec 32)
- Where a contingent contracts is to be performed if a particular event does not happen, its performance can be enforced when the happening of that event becomes impossible.(Sec 33)
- If a contract is contingent upon how a person will act at an unspecified time, the event shall be considered to become impossible when such person does anything which renders it impossible that he should so act within any definite time, or otherwise than under further contingencies.(Sec 34)

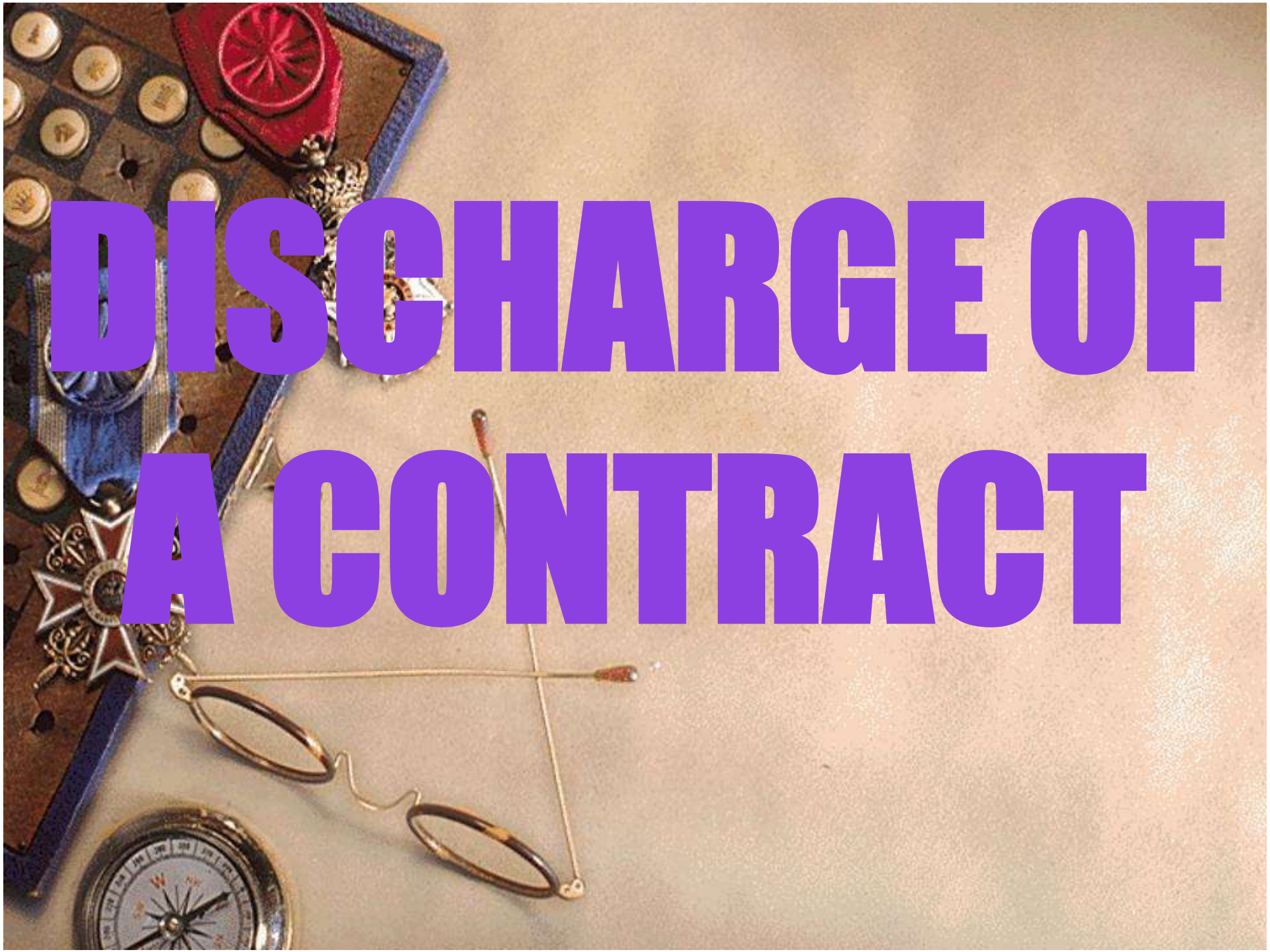
- Contingent contracts to do or not to do anything, if a specified uncertain event does not happen within a fixed time, may be enforced if the event does not happen or its happening becomes impossible before the expiry of that time.(Sec 35)

- Contingent agreements to do or not to do anything, if an impossible event happens, are void, whether or not the fact is known to the parties. (Sec 36)

Differences Between a Wagering Agreement and a Contingent Agreement:

- **Wager agreement**
- **There is a reciprocal promise.**
- **It is a void contract.**
- **Others are not interested in the contract.**
- **It is contingent in nature.**

- **Contingent agreement**
- **There is no reciprocal promise.**
- **It is a valid contract.**
- **Others are interested in the contract.**
- **It may not be wagering in nature.**


DISCHARGE OF
A CONTRACT

DISCHARGE OF A CONTRACT

- DISCHARGE BY PERFORMANCE
- DISCHARGE BY AGREEMENT OR CONSENT
- DISCHARGE BY IMPOSSIBILITY OF PERFORMANCE
- DISCHARGE BY LAPSE OF TIME
- DISCHARGE BY OPERATION OF LAW
- DISHARGE BY BREACH OF CONTRACT

DISCHARGE BY PERFORMANCE

ACTUAL PERFORMANCE

When both parties perform their promises & there is nothing remaining to perform

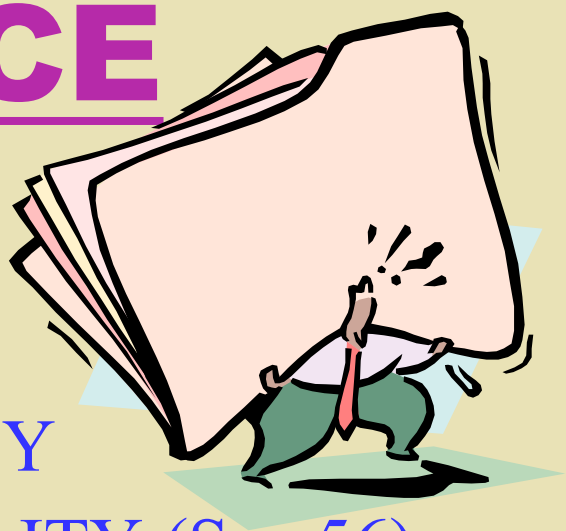
ATTEMPTED PERFORMANCE

When the promisor offers to perform his obligation ,but promisee refuses to accept the performance. It is also known as tender

DISCHARGE BY AGREEMENT OR CONSENT

- **NOVATION (Sec 62):** *New contract substituted for old contract with the same or different parties*
- **RESCISSION (Sec 62) :** *When some or all terms of a contract are cancelled*
- **ALTERATION (Sec 62):** *When one or more terms of*
- *a contract is/are altered by the mutual consent of the parties to the contract*
- **REMISSION (Sec 63) :** *Acceptance of a lesser fulfilment of the promise made.*
- **WAIVER :** *Mutual abandonment of the right by the parties to contract*
- **MERGER :** *When an inferior right accruing to a party to contract merges into a superior right accruing to the same party*

DISCHARGE BY IMPOSSIBILITY OF PERFORMANCE



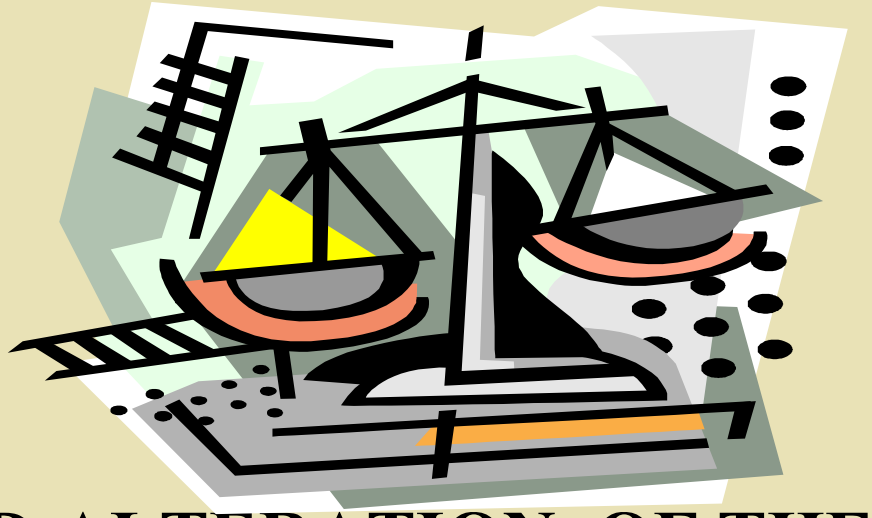
- KNOWN TO PARTIES
- UNKNOWN TO PARTIES
- SUBSEQUENT IMPOSSIBILITY
- SUPERVENNING IMPOSSIBILITY (Sec 56)
  - Destruction of subject matter
  - Non-existance of state of things
  - Death or incapacity of personal services
  - Change of law
  - Outbreak of war

DISCHARGE BY LAPSE OF TIME

- THE LIMITATION ACT 1963, CLEARLY STATES THAT A CONTRACT SHOULD BE PERFORMED WITHIN A SPECIFIED TIME CALLED PERIOD OF LIMITATION

- IF IT IS NOT PERFORMED AND IF THE PROMISEE TAKES NO ACTION WITHIN THE LIMITATION TIME, THEN HE IS DEPRIVED OF HIS REMEDY AT LAW

DISCHARGE BY OPERATION OF LAW



- DEATH
- MERGER
- INSOLVENCY
- UNAUTHORISED ALTERATION OF THE TERMS OF A WRITTEN AGREEMENT
- RIGHTS & LIABILITIES VESTING IN THE SAME PERSON

DISCHARGE BY BREACH OF CONTRACT

❖ ***ACTUAL BREACH :***

- At the time of performance
- During the performance

❖ ***ANTICIPATORY BREACH***

- By the act of promisor (implied repudation)
- By renunciation of obligation (express repudation)


REMEDIES
FOR
BREACH OF
CONTRACT

REMEDIES OF INJURED PARTY

- A remedy is a means given by law for the enforcement of a right
- Following are the remedies
- [1] Rescission of damages.
- [2] Suit upon quantum meruit.
- [3] Suit for specific performance.
- [4] Suit for injunction.

RESCISSION

When a contract is broken by one party,the other party may sue to treat the contract as rescinded and refuse further performance.In such a case,he is absolved of all his obligations under the contract.

The court may give rescission due to

1)contract is voidable.2)contract is unlawful

The court may refuse to rescind if

1)Plaintiff has ratified the contract.2)Parties cannot be restored to the original position.3)The third party has acquired for value.4)When only a part is sought to be rescinded.(sec 27 of specific relief act 1937)

DAMAGES

Damages are a monetary compensation allowed to the injured party by the court for the loss or injury suffered by him by the breech of the contract.The objective of awarding damages for the breech of contract is to put the injured party in the same position as if he had not been injured.This is called the doctrine of restitution.The fundamental basis is awarding damages for the pecuniary loss.

QUANTUM MERUIT

The phrase quantum meruit literally means ‘as much as earned’.A right to sue on a quantum meruit arises when a contract, partly performed by one party,has been discharged by breach of contract by the other party.This right is performed not on original contract but on implied promise by other party for what has been done.

SPECIFIC PERFORMANCE

- In certain cases of breach of contract damages are not an adequate remedy.The court may,in such cases,direct the party in breach to carry out his promise according to terms of the contract.This is a direction by the court for specific performance of the contract at the suit of the party not in breach
- Cases for specific performance to be enforced
- 1)when the act agreed to be done is such that compensation is not adequate relief.2)when there is no standard for ascertaining the actual damage
- 3)when it is probable that compensation cannot
- be agreed to be done.

INJUNCTION

When a party is in breech of a negative term of contract the court may,by issuing an order,restrain him by doing what he promised him not to do. Such an order of the court is called injunction

Court refuses grant of injunction

[1] whereby a promisor undertakes not to do something

[2] which is negative in substance though not in form

THANK YOU

Sale of Goods Act, 1930

Introduction

- The law relating to sale and purchase of goods, prior to 1930 were dealt by the Indian Contract Act, 1872.
- In 1930, Sections 76 to 123 of the Contract Act was repealed and a separate Act known as the Sale of Goods Act, 1930 was passed.
- The provisions of the Contract Act still apply to contracts of sale of goods except where the Sale of Goods Act, 1930 specifically provides for the contrary.

Definition

- A contract of sale of goods is a contract whereby
- the seller transfers or agrees to transfer
- the property in goods to the buyer for a price. (Sec. 4)
- The term contract of sale is a generic term, which includes sale and agreement to sale both.

Essential Features of Sale

- Bilateral Contract
- Money Consideration
- Goods
- Transfer of Property
- Essential Elements of a Contract

Goods

- Goods means every kind of movable property other than
- actionable claims and money and
- includes stocks and shares, growing crops, grass and
- things attached to or forming part of the land
- which are agreed to be severed before sale or under the contract of sale. [Sec 2(7)]

Classification of Goods

- **a) Existing goods** - Goods which either owned or possessed by the seller at the time of contract of sale.
- i) **Specific goods** - Means goods identified and agreed upon at the time a contract of sale is made.
- **ii) Ascertained goods** - When, out of a mass or a lot of unascertained goods, the quantity extracted is identified and earmarked for a given

- **b) Future goods** - Means goods to be manufactured or produced or acquired by the seller after making of the contract of sale.
- **c) Contingent goods** - The goods the acquisition of which by the seller depends upon a contingent event which may or may no happen.

Effect of Perishing of Goods [Sec 7]

- A contract for the sale of specific goods is void if the goods have perished at the time of contract.
- Contract is void ab initio if the goods perished before the formation of contract.
- In agreement to sell it becomes void if
- subsequently the goods have perished before the risk passes to the buyer.

The Price

- Price means the money consideration for a sale of goods. [Sec 2(10)]
- Price can be fixed in the following ways :
- by the contract or terms of agreement, or
- may be determined by course of dealing between the parties.
- It may be the price prevailing on a particular day, or
- price to be fixed by a third party.
- When price is not capable of being fixed by any of the above modes,
- the buyer shall pay the seller a reasonable price.

Conditions and Warranties

- As a general rule, a person buying something, is duty bound to see whether that thing suits his propose.
- This is called the doctrine of *caveat emptor.*
- When a seller gives an express assurance regarding the product, he is bound to honour that.
- Law presumes that product should meet certain minimum standards,
- breach of which has the same effect as the breach of express assurances or stipulations.
- Such legal presumptions are called implied **conditions** and **warranties**.

- **Implied Conditions**
- A condition is a stipulation essential to the main purpose of the contract, the breach of which gives rise to a right to treat the contract as repudiated. [Sec 12(12)]
- **Implied Warranties**
- A warranty is a stipulation collateral to the main purpose of the contract, breach of which gives rise to a claim for damages, but not a right to reject the goods and treat the contract as repudiated. [Sec 12(3)]

Types of Implied Conditions

- a) Condition as to title
- b) Sale by description
- c) Sale by Sample
- d) Sale by description as well as sample
- e) Condition as to fitness or quality
- f) Condition as to Merchantability
- g) Conditions implied by trade usage
- h) Condition as to wholesomeness
- i) Marketability

Caveat Emptor & Exceptions [Sec16]

- Where the seller makes a misrepresentation of fact;
- where the seller actively conceals a defect in the goods;
- where goods are supplied by description and they do not corresponds with the description;
- where the goods are supplied by description and they are not of merchantability quality;
- when goods are sold by sample, and the goods do not correspond with the sample;

- when the goods are sold by sample as well as description, and the bulk of the goods do not match either the sample or description, or both;
- where the buyer relies upon the skill and judgement of the seller;
- where trade usages or customs implies some condition or warranty and the seller deviates from that.

Implied Warranties

- Warranties as to Quite Possession.
- Warranties as to free from encumbrance.
- Warranty as to disclosure of dangerous nature of the goods.
- Warranty implied by customs.
- Conditions reduced to Warranty.
- Waiver by Buyer.
- Acceptance of the goods by the buyer.

Modes of Delivery

- a) Actual Delivery
- b) Constructive Delivery
- Constructive delivery may take place in either of the three ways -
- i) seller in possession of goods after sale agrees to hold them on behalf of the buyer; or
- ii) buyer is in possession of the goods and the seller agrees to his holding the goods as owner; or
- iii) a third person in possession of goods acknowledges to the buyer that he is holding them on his behalf.
- c) Symbolic Delivery

Duty of buyer to apply for delivery

- In the absence of any express contract, the seller of goods is not bound to deliver them unless the buyer applies for delivery. [Section 35]
- Even when the goods are to be acquired by the seller, and when they are acquired, and the seller notifies the buyer that the goods are in his possession, the buyer must apply for the delivery.
- The buyer has no cause of action against the seller if he does not apply for delivery, unless

Place of Delivery

- The place of delivery of goods may be specified in the contract itself.
- Where no place is specified in the contract, the foll. shall apply –
- a) in case of sale, goods sold are to be delivered at the place at which they are at the time of sale,
- b) in case of an agreement to sale, goods are to be delivered at the place at which they are at the time of the agreement to sell,
- c) if at the time of agreement to sell the goods are not in existence, they are to be delivered at the place where they are manufactured or produced.

- Where the goods are in the possession of a third person, there is no delivery by seller to buyer until such person acknowledges to the buyer that he holds the goods on his behalf.
- Unless otherwise agreed, the expenses of and incidental to putting the goods into a deliverable state shall be borne by the seller.

Delivery in wrong quantity [Sec 37]

- Short delivery
- Excess delivery
- Delivery of mixed goods
- Installment deliveries

Unpaid Seller

- The seller of goods is deemed to be an "unpaid" seller –
- when the whole of the price has not been paid or tendered; or
- when a bill of exchange or other negotiable instruments has been received as conditional payment,
- the conditions has not been fulfilled by reason of the dishonour of the instrument or otherwise. [Sec 45(1)]

Rights of Unpaid Seller

- Notwithstanding that the property in the goods may have passed to the buyer, the unpaid seller, has, by implication of law-
- a) a lien on the goods for price while he is in possession of them;
- b) in case of insolvency of the buyer a right of stopping the goods in transit; and
- c) a right of resale. [Sec 45(1)]

Rights against goods

- 1. **Unpaid Seller's Lien [Sec 47]**
- a) where the goods have been sold without stipulation as to credit; or
- b) where the goods have been sold on credit, but terms of credit has expired; or
- c) where the buyer becomes insolvent.
- The right of lien exists only for the price of the goods.
- Where part delivery of the goods has been made, he may exercise his right of lien on the remainder.

Termination of lien [Section 49]

- When he delivers the goods to a carrier or other bailee for transmission to the buyer without reserving the right of disposal;
- when the buyer or his agent lawfully obtain possession of the goods; and
- by waiver thereof.

Seller's remedies against Buyer

- Suit for price.
- Damages for non-acceptance.
- Damages are assessed as follows:
- Where the goods have a ready market, the buyer has to pay the loss that the seller has sustained on reselling the goods.
- If the seller does not resell the goods, the difference between the contract and market price on the day of breach is the measure of damages.
- Where the goods are deliverable by installments, the difference in prices is to be reckoned on the day that a particular installment was to be delivered

Buyer's Remedies against Seller

1. Damages for non-delivery.
2. Remedy for breach of warranty.
3. Specific Performance.
4. Anticipatory breach.
5. Recovery of interest.

Auction Sales [Sec 64]

- An auction sale is complete when the auctioneer announces its completion by the fall of the hammer.
- The bidder can withdraw before the acceptance of his bid and his security amount cannot be forfeited.
- The law does not prevent the seller from bidding provided he expressly reserve the right to bid.
- If the seller appoint a puffers (persons who make bids in order to prompt bidding at higher prices), the sale is voidable at the option of the buyer.
- Auction subject to a **reserve** or **upset price**

Knock out Agreement

- An agreement among bidders not to bid against each other.
- It is a combination to prevent competition *inter se.*
- An arrangement that only one of them will bid and dispose of anything so obtained privately among themselves.
- Not illegal per se but if the intention is to defraud a third party then knock out is illegal.

Damping

- An unlawful act discouraging the intending purchaser from bidding –
- by pointing out defects in the goods in the auction sale; or
- by taking away the intending purchaser from the place of auction by some other method.
- Damping is illegal and the auctioneer is entitled to withdraw the goods from the auction.

UNIT 1

E-BUSINESS

Topics of UNIT 1

- Introduction
- E-Commerce – Definition
- History of E-commerce
- Differences between E-Commerce and E-Business.
- Comparison of Traditional Commerce and E-commerce
- Advantages and Disadvantages of E-Commerce
- E-Commerce Business Models – B to B, B to C, C to C, C to B and P to P (Peer to Peer) Models.
- Emerging trends, Web Auctions.
- Virtual Communities, Portals.
- E-Business Revenue Models.

Introduction

- E-Business is application of ICT(Information and communication Technology) to support activities of Business.
- Commerce is exchange of goods and services between one or more persons.
- Using ICT for Commerce is know as E-Business.

E-Commerce – Definition

- The process of buying and selling goods and services electronically involving transaction using the internet, networks and other digital technologies.
- E-Commerce is those commercial transactions carried out using electronic means like internet, networks and digital technologies.

History of E-commerce

- 1950 -1960 IBM pioneers OLTP(On line Transaction processing) a way of handling money transactions on real time basis using sophisticated computers.
- 1980 CompuServe, Prodigy and AOL (American online) let people to shop from home using there computers and Telephone lines.
- 1989 Tim Burns Lee invented WWW which started a revolution in E-Commerce.
- 1994 Jeff Benzos starts Amazon.
- 1994 Marc Andreessen develops Netscape Navigator web browser which allows credit card transaction securely this helps the growth of E-Commerce further

Differences between E-Commerce and E-Business.

E – Commerce	E - Business
Open system [statistics]	Closed System
Not secured	Secured
Deals more with technology	Deals with processes needed to facilitate e-commerce
Always operate on Internet	Always operates on intranet
Involves all types of commerce transaction	Involves explicitly business transaction
Used for small and bulky transaction	Used for bulky transaction
Focused on Business to consumer activities	Focused more on business to business activities
Does not involve the use of EDI	Uses EDI
e-commerce is an extension of a traditional business model	e-business is an online business model

Comparison of Traditional Commerce and E-commerce

Traditional Commerce	**E- Commerce**
Touch and feel	No Touch and feel
Brick and Mortar store (Fixed Place)	On line store (No Fixed Place)
Fixed Time	No fixed time (24/7/365)
Less flexible to add or remove product	Flexible to add or remove product
Cost of doing business is High	Cost of doing business is Low
Middleman cannot be eliminated in some cases so cost of goods will be high	Middleman can be eliminated so cost of goods will be low
Physical visit to the store cannot be eliminated	Physical visit is not there
Inventory is size is huge	Inventory size is small
Market for products is limited	Market for products is world wide

Advantages of E-Commerce

- **Non-Cash Payment: E-Commerce enables the use of credit cards, debit cards, smart cards, electronic fund transfer via bank's website, and other modes of electronics payment.**

- **24x7 Service availability: E-commerce automates the business of enterprises and the way they provide services to their customers. It is available anytime, anywhere.**

- **Advertising/Marketing: E-commerce increases the reach of advertising of products and services of businesses. It helps in better marketing management of products/services.**

- **Improved Sales: Using e-commerce, orders for the products can be generated anytime, anywhere without any human intervention. It gives a big boost to existing sales volumes.**

- **Support: E-commerce provides various ways to provide pre-sales and post-sales assistance to provide better services to customers.**
- **Inventory Management: E-commerce automates inventory management. Reports get generated instantly when required. Product inventory management becomes very efficient and easy to maintain.**
- **Communication improvement: E-commerce provides ways for faster, efficient, reliable communication with customers and partners.**

- **Lower Cost**
- **Doing e-business is cost effective; it reduces logistical problems and puts a small business on a par with giants companies.**
- **For example: A basic over-the-counter transaction costs Rs.50 to process; over the Internet, the same transaction costs about Rs.10.**

- **Economy**
- **Unlike the brick–and–mortar environment, in e–commerce there is no physical store space, insurance, or infrastructure investment. All you need is an idea, a unique product, and a well–designed web storefront to reach your customers, plus a partner to do fulfillment. This makes e–commerce a lot more economical.**

- **Higher Margins**
- E–commerce means higher margins. For example, the cost of processing an airline ticket is Rs500. According to one travel agency, processing the same ticket online costs Rs.100. Along with higher margins, businesses can gain more control and flexibility and are able to save time when manual transactions are done electronically.
- **Quick Comparison Shopping**
- E–commerce helps consumers to do comparison shop. Automated online shopping assistants called hop bots search online stores and find deals on everything from apples to printer ribbons.

- **Better Customer Service**
- E–commerce means better and quicker customer service. Online customer service makes customers happier. Instead of calling your company on the phone, the web merchant gives customers direct access to company personal account online. This saves time and money. For companies that do business with other companies, adding customer service online is a competitive advantage. The overnight package delivery service, where tracking numbers allow customers to check the whereabouts of a package online, is one good example.

- **Productivity Gains**
- Weaving the web throughout an organization means improved productivity. For example IBM incorporated the web into every corner of the firm – products, marketing, and practices. The company figured it would save $750 million by letting customers find answers to technical questions via its website. The total cost savings in 1999 alone was close to $1 billion.
- **Teamwork E–mail is one example of how people collaborate to exchange information and work on solutions. It has transformed the way organizations interact with suppliers, vendors, business partners, and customers. More interactions mean better results.**

- **Knowledge Markets**
- E–commerce helps create knowledge markets. Small groups inside big firms can be funded with seed money to develop new ideas. For example, DaimlerChrysler has created small teams to look for new trends and products. A Silicon Valley team is doing consumer research on electric cars and advising car designers.
- **Information Sharing, Convenience, And Control**
- Electronic marketplaces improve information sharing between merchants and customers and promote quick, just–in–time deliveries. Convenience for the consumer is a major driver for changes in various industries. Customers and merchants save money; are online 24 hours a day, 7 days a week; experience no traffic jams, no crowds, and do not have to carry heavy shopping bags

Disadvantages of E-Commerce

- **Security**
- Security continues to be a problem for online businesses. Customers have to feel confident about the integrity of the payment process before they commit to the purchase.
- **System And Data Integrity**
- Data protection and the integrity of the system that handles the data are serious concerns. Computer viruses are rampant, with new viruses discovered every day. Viruses cause unnecessary delays, file backups, storage problems, and other similar difficulties. The danger of hackers accessing files and corrupting accounts adds more stress to an already complex operation.

- **System Scalability**
- A business develops an interactive interface with customers via a website. After a while, statistical analysis determines whether visitors to the site are one–time or recurring customers. If the company expects 2 million customers and 6 million shows up, website performance is bound to experience degradation, slowdown, and eventually loss of customers. To stop this problem from happening, a website must be scalable, or upgradable on a regular basis. Scalability is a costly affair.

- **E–commerce Is Not Easy**
- So far, success stories in e–commerce have forced large business with deep pockets and good funding. According to a report, small retailers that go head–to–head with e–commerce giants are fighting losing battle.
- As in the brick–and–mortar environment, they simply cannot compete on price or product offering. Brand loyalty is related to this issue, which is supposed to be less important for online firms. Brands are expected to lower search costs, build trust, and communicate quality. A search engine can come up with the best music deals, for example, yet consumers continue to flock to trusted entities such as HMV.

- **Consumer Search Is Not Efficient or Cost–effective**
- On the surface, the electronic marketplace seems to be a perfect market, where worldwide sellers and buyers share and trade without intermediaries. However, a closer look indicates that new types of intermediaries are essential to e–commerce. They include electronic malls that guarantee legitimacy of transactions. All these intermediaries add to transaction costs.
- **Products People won't buy online**
- Imagine a website called furniture.com or living.com, where venture capitalists are investing millions in selling home furnishings online. In the case of a sofa, you would want to sit on it, feel the texture of the fabric etc. Beside the sofa test, online furniture stores face costly product returns which make the product harder to sell online.

- **Customer Relations Problems**
- Not many businesses realize that even e–business cannot survive over the long term without loyal customers.
- **Corporate Vulnerability**
- The availability of product details, catalogs, and other information about a business through its website makes it vulnerable to access by the competition. The idea of extracting business intelligence from the website is called web framing.
- **High Risk Of Internet Start–up**
- Many stories unfolded in 1999 about successful executives in established firms leaving for Internet start–ups, only to find out that their get–rich dream with a dot com company was just a dream.

E-Commerce Business Models

- B to B Model
- B to C Model
- C to C Model
- C to B Model
- P to P (Peer to Peer) Model.
- Other Models are G to P, G to G etc..

Business to Business Model

- Business to Business [B2B] : B2B (business – to-business)is a kind of ecommerce, which refers to a company selling or buying from other companies.
- One company communicates with other companies through electronic Medias to buy and sell products.
- Some of these transactions include sending and receiving orders, invoice and shopping orders.
- It is an attractive alternative to the current process of printing, mailing of various business documents.

- Consider a hypothetical example.
- Anand Company sells automobile parts and Vinod Company assembles this part and then sells the automobile to customers.
- Vinod Company comes across the Web site of Anand Company and finds it suitable.
- Vinod Company therefore, requests for more information about Anand Company and finally, decides to purchase automobile parts from Anand Company.
- To do this, Vinod Company places an order on the Web site of Anand Company. After Anand Company receives the order details, it validates the information.
- As soon as the order is confirmed, the payment procedures are settled.
- Finally, Anand Company sends an Acknowledgement of payment to Vinod Company and delivers the goods as per the shipment details decided between the two organizations.

- **Advantages of B2B model are:**
- It can efficiently maintain the movement of the supply chain and the manufacturing and procuring processes.
- It can automate corporate processes to deliver the right products and services quickly and cost-effectively.
- The B2B model is predicted to become the largest value sector of the industry within a few years.
- This is said to be the fastest growing sector of e-commerce.
- By using this model purchasing bureaucracy can be eliminated.
- Improved efficiency in ordering material.

- **Disadvantages of B2B model are:**
- Low barriers to entry for competitors.
- Explosive growth in B2B website leading to bad competition .
- No of fake websites growing on daily basis.
- Increased fraudulent transactions
- Quality of goods are reduced due to competition to supply goods at very low cost
- No direct contact between buyer and seller which may lead to cheating

Business to Consumer Model

- Business – to Consumer [B2C] : Business – to Consumer [B2C] is basically a concept of online marketing and distributing of products and services over the internet.
- It is a natural progression for many retailers or marketer who sells directly to the consumer.
- The general idea is, if you could reach more customers, service them better, make more sales while spending less to do it that would be the formula of success for implementing a B2C e-commerce infrastructure.

- Consider a hypothetical example in which a transaction is conducted between a business organization and a consumer.
- A business house, Reliance retail Store, displays and sells a range of products on their Web site.
- The detailed information of all their products is contained in the huge catalogs maintained by RR Department Stores.
- Now, a consumer, Ashok, wants to buy a gift for his wife.
- He therefore, logs on to the site of RR Department Stores and selects a gift from the catalog.

- He also gets the detailed information about the gift such as, the price, availability, discounts, and so on from their catalog.
- Finally, when he decides to buy the gift, he places an order for the gift on RR Web site.
- This information is then validated by RR Department Store and stored in their database.
- On verification of the information the order is processed.
- Therefore, as you can see, the B2C model involves transactions between a consumer and one or more business organizations.

- **Advantages of B2C are :-**
- Extensive search capabilities by item, corporate name, division name, location, manufacturer, partner, price or any other specified needs.
- Reduced marketing and advertising expenses to compete on equal balance with much bigger companies.
- Reduced price to customer.
- Reduced transaction cost.
- Its eliminate middlemen.
- Reduce customer service and sales support service.
- Unlimited Market Place

- **Disadvantages of B2C are :-**
- It is not always the safest and reliable place to conduct business
- Usually a lot of phone calls and mailings are needed
- Any bad review by customer on the website may damage the image of the company and this may reduce the sales
- Quality of the product may not be guaranteed always

Consumer to Consumer

- The C2C model involves transaction between consumers.
- Here, a consumer sells directly to another consumer.
- Web sites that provide a consumer to advertise and sell their products online to another consumer.
- However, it is essential that both the seller and the buyer must register with the auction site.
- While the seller needs to pay a fixed fee to the online auction house to sell their products, the buyer can bid without paying any fee.
- The site brings the buyer and seller together to conduct deals.

- Example
- When a customer plans to sell his products to other customers on the Web site of eBay .
- He first needs to interact and get registered with an eBay site, which in this case acts as a facilitator of the overall transaction.
- Then, the seller can host his product on www.ebay.com, which in turn charges him for this.
- Any buyer can now browse the site of eBay to search for the product he interested in.
- If the buyer comes across such a product, he places an order for the same on the Web site of eBay.
- eBay now purchase the product from the seller and then, sells it to the buyer. In this way, though the transaction is between two customers, an organization acts as an interface between the two organizations.

- **Advantages of C2C are:-**
- Customers can directly contact sellers and eliminate the middle man.
- Anyone can sell and advertise his product on internet .
- Sellers can reach both national and international customer.
- Simplified buying and searching process.
- **Disadvantages of C2C are:-**
- The number of internet related auction frauds have also increases.
- Unnecessarily inflated prices by creating multiple buyers.
- More credit card/payment frauds.
- Chances of scams like selling stolen goods.

Consumer to Business

- Is a business model where the end consumers creates products and services which are consumed by business and organizations.
- It is diametrically opposite to the popular concept of B2C where the companies makes goods and services available to the end consumers.

P to P (Peer to Peer) Model.

- P to P enables internet users to share files and computer resource directly without having to go through a central web server.
- Under this model people of same group exchange goods and services (Ex : Sharing between students, between same age group individuals etc)

Other types of e-commerce models

- Government-to-Government (G2G) model: This model involves transactions between 2 governments. For example, if the American government wants to buy oil from the Arabian government, the transaction involved is categorized in the G2G model.
- Government-to-Consumer (G2C) model: In this model, the government transacts with an individual consumer. For example, a government can enforce laws pertaining to tax payments on individual consumers over the Internet by using the G2C model.
- Consumer-to-Government (C2G) model: In this model, an individual consumer interacts with the government. For example, a consumer can pay his income tax or house tax online. The transactions involved in this case are C2G transactions.

Emerging trends in E-Commerce

- Real time shopping experience at online shopping
- Using mobiles and android apps for transaction
- Multi-Channel
- Big-Data
- Customization and Personalization
- Valuing customer engagements than conversion ratio
- Push Notifications
- Social Networking sites
- Mobile POS and accessing Via Mobile
- Retailers support to Omni-Channel consumers.

- Real-time shopping Experience at Online shopping
- There is no doubt the people prefer to talk to real sales person and hold the product in their hand but do not think that e-commerce sites cannot offer you such pleasure.
- Most online retailers have facilities to chat online, get suggestions and answer to all your queries, online subscription even allow you to hold the product and touch it and some even lets you chat all along while you are shopping with chat log.

- Using Mobiles and Android apps for transaction
- With the mobile devices out numbering the desktops the use of these devices for buying will increase in the near future.
- Additionally the websites must act like any app and must be very responsive in terms of design.
- We have many kinds of apps now that assist consumers to check out on his own, use payment wallet, store coupon codes like India plaza coupons, loyalties, card numbers and have GPS for proper advertisement of companies.
- There are also apps that will let you compare the prices of the same product at different outlets.

- Multi-Channel: Consumers these days expect a very effortless transaction, and they expect that a commodity added to the cart will be available if one calls the customer care or land up in the store.
- This will encourage the IT directors to invest in commerce packages, e-commerce POS systems and CRM systems.

- BIG DATA :
- Big data are handling a lot of data.
- This has been a concept that has been drawing the interest of the e-commerce site owners, and it is here to stay.
- IT is synching offline data and online data together so that the retailers decision making capacity may be enhanced.
- In a nutshell. It allows retailers to understand the hidden consumer patterns.

- Customization and Personalization
- In an extremely volatile market one must be ready for change all times-not other wise but for personalization. Personalized recommendations will find more prominence in the market.
- Valuing Customer Engagements than conversion ratio
- Till date the conversion rates were given the most priority but with the rise in e-commerce sites, gathering new customers will be very tough. So, naturally retailers will depend on holding on to the existing customers. Customer engagement will ensure people develop a liking for your site and follow you regularly

- Push Notifications :
- Pull browsing is the latest trend now, but it is not far when push browsing will overtake it. Messaging notifications, basket notifications for selective items on your home page are all going to catch up momentum.
- Social Networking Sites :
- As the social networking sites increase in popularity, retailers must be using this platform for marketing and selling their products. Face book, Twitter, LinkedIn will be the platforms where you will get data about the latest discounts and offers

- Mobile POS and Accessing Via Mobile:
- The idea of Mobile POS to make each and every employee work and allow the customer transact without being to the billing counter. Thanks to the Android 4.2 jellybean and iOS6 that allows apps that lets the customer do endless jobs with such apps.
- Retailers Support to Omni-Channel Consumers:
- Now that mobile apps are there in the market that lets you compare prices, check the reviews online and share the product with friends, retailers will be integrating their separate channels into one for offering support to the consumers

Web Auctions.

- An auction is a market mechanism by which sellers place offers and buyers make sequential bids.
- Auctions are characterized by the competitive nature by which a final price is reached.
- Auctions have been an established method of commerce for centuries, and they are especially suited to deal with products and services for which conventional marketing channels are ineffective or inefficient.
- Auctions can expedite the disposal of items that need liquidation or a quick sale, and they ensure prudent execution of contracts.

- The Internet provides an infrastructure for executing auctions at lower cost, and with many more involved sellers and buyers.
- Online auctions are places that people can go in order to buy or sell goods or services online for a small fee. Anyone can sell an item and anyone can bid on an item.
- The highest bidder wins the auction and pay for the good or service and then expects for to receive their winning in the next couple of days through the mail or some other way of delivery.
- Example:
- • Auction-Warehouse - http://www.auction-warehouse.com
- • Craigslist - http://www.craiglist.org
- • E-Bay – http://www.ubid.com

- Individual consumers and corporations alike can participate in this rapidly growing form of e-commerce.
- There are several types of auctions, each with its motives and procedures.
- Auctions are divided here into two major types:
- Forward auctions,
- Reverse auctions.

- Forward auctions.
- Forward auctions are used mainly as a selling channel.
- A single seller auctions item(s) to many potential buyers.
- Different mechanisms in a forward auction are as follows.
- English auctions.
- Buyers bid on one item at a time.
- The bidding price increases with additional bids.
- The highest bidder wins (if price is the only criterion).

- Yankee auctions.
- These are similar to English auctions, but multiple identical items are offered.
- You can bid on any number of items.
- Biddings prices are escalating.
- Dutch auctions.
- These are usually for multiple, identical items (e.g., flowers).
- Prices are set high and are reduced as the auction clock runs down until a bid for a specific quantity is submitted.

- Reverse auctions.
- In reverse auctions, there is one buyer, who wants to buy a product or a service.
- Suppliers are invited to submit bids.
- The supplier who submits the lowest bid wins.
- Several rounds may take place if the lowest bid is not satisfactory to the seller.
- Auctions are used in B2C, B2B, C2B, e-government, and C2C commerce, and they are becoming popular in many countries.

- Electronic auctions started in the 1980s on private networks, but their use was limited.
- The Internet opens many new opportunities for e-auctions, and millions of sellers and buyers to participate.
- Auctions can be conducted from the seller‘s site or from a third-party site.
- For example, eBay, offers hundreds of thousands of different items in several types of auctions .
- Major companies, including Amazon.com, offer online auctions as well.

- Bartering.
- Bartering is exchange of goods or services without a monetary transaction.
- In addition to the individual-to-individual bartering ads that appear in some newsgroups, bulletin boards, and chat rooms, there are several intermediaries that arrange for corporate bartering
- (e.g., barterbrokers.com). These intermediaries try to find partners to a barter.

- **BENEFITS OF WEB AUCTIONS TO SELLERS**
- Increased revenues from broadening customer base and shortening cycle time
- Optimal price setting, determined by the market (more buyers)
- Saves on the commission to intermediaries. (Physical auctions‘ fees are very expensive compared to e-auctions.)
- Can liquidate large quantities quickly
- Improved customer relationship and loyalty (in the case of specialized B2B auction sites and electronic exchanges).

- **Benefits of Web Auction to Buyers**
- Opportunities to find unique items and collectibles
- Chance to bargain, instead of buying at a fixed price
- Entertainment. Participation in e-auctions can be entertaining and exciting.
- Anonymity. With the help of a third party, buyers can remain anonymous.
- Convenience. Buyers can trade from anywhere, even with a cell phone; they do not have to travel to an auction place.
- **Benefits of Web Auction to Auctioneers**
- High stickiness : to the Web site (customers stay sticky to sites longer and come back more often) generates more ad revenue to auctioneer
- Expansion of the auction business.

Virtual Communities

- The term is originally attributed to Howard Rheingold's book "The Virtual Community," which was published in 1993.
- A virtual community is a group of people who share common interests, feelings or ideas, or pursue similar goals over the Internet or over any collaborative network.
- Social media is the most common vehicle for this sharing and interaction, which can potentially transcend geographical boundaries, race, culture, political views and religion when people are connected by common interest or agenda.

- Importance of Virtual community
- Instant information exchange that is not possible in a real-life community.
- Interaction allows people to engage in many activities from their home, such as shopping, paying bills, and searching for specific information.
- Users of online communities also have access to thousands of specific discussion groups where they can form specialized relationships and access information in such categories as: politics, technical assistance, social activities, health and recreational pleasures.

- Virtual communities provide an ideal medium for different types of relationships because information can easily be posted and response times can be very fast.
- Communities can give users a feeling of membership and belonging.
- Users can give and receive support, and it is simple and cheap to use.
- Virtual communities can be commercially successful, making money through membership fees, subscriptions, usage fees, and advertising commission.

Portals.

- A web portal is most often one specially-designed Web page / catalogue at a website which brings information together from diverse sources in a uniform way.
- Usually, each information source gets its dedicated area on the page for displaying information often, the user can configure which ones to display.

- Types of Portals:
- The portals can be differentiated on the basis of their content and intended users.
- **Vertical Portal:**
- These are web portals which focus only on one specific industry, domain or vertical.
- Vertical portals provide tools, information, articles, research and statistics on the specific industry or vertical.
- Examples: Construction Plus (www.constructionplus.com), Chemical Industry (www.chemindustry.com)

- **Horizontal Portal:**
- These are web portals which focus on a wide array of interests and topics.
- They focus on general audience and try to present something for everybody.
- Examples: Yahoo (www.yahoo.com), MSN (www.msn.com)

- Geographical Portals:
- Geographical portal can be either horizontal or vertical portals which caters to a particular region or place.
- Examples:
- Craiglist (www.craiglist.com),
- Countyweb (www.countyweb.com)

- **Marketplace portals:**
- Market space portals exist to support the business-to-business and business-to-customer e-commerce,
- software support for e-commerce transactions and ability to find and access rich information about the products on sale also, ability to participate in discussion groups with other vendors and/or buyers.
- They may be vertical, horizontal or geographical in type.
- Example:EC21 (www.ec21.com), eBay (www.eBay.com).

- **Search portals:**
- Search portals aggregate results from several search engines into one page.
- Here the main focus is on searching for information wanted by the customer.
- Example: Google (www.google.com), (www.ask.com) .

- **Media Portals:**
- Media portals focus on entertainment, business or consumer news.
- Popular media portals update users on current news, affairs and information.
- Some media portals provide access to local and foreign TV programs such as soap operas, sports and live events.
- Examples: BBC (www.bbc.co.uk),Guardian (www.guardian.co.uk).
- **Access Portal:**
- Access portal can be defined as a type of portal associated with Internet Service Provider (ISP).
- Examples: Wanadoo (www.wanadoo.com) and now (www.orange.co.uk),AOL (www.aol.com).

E-Business Revenue Models.

- **Web Catalogue Revenue Models:-**
- This model would use electronic catalogue and shopping cart providing access to customers throughout the world.
- Business using this type of a model include online sellers of computers, electronic items, books, music, videos, toys, flowers, gifts, clothes etc.
- Payment received from customers is the source of earning revenue.

- **Digital Content Revenue Model:-**
- Information services such as legal information, corporate information, government information, news and resources for libraries etc.
- Normally, a customer has to subscribe to such services by paying certain amount as subscription fee.
- This fee becomes the main source of generating revenue for the e-business.

- **Advertising, Subscription Mixed Revenue Model:-**
- In this type, subscribers pay a fee and accept some level of advertising.
- Thus an e-business can earn its revenue from both the sources, that is, through subscription and advertisement.

- **Advertising Supported Revenue Model:-**
- In this model services/information is provided free of charge to certain audience and advertisement is given in this service and the amount paid by advertising company is the revenue for the e-business.

- **Fee for Transaction Revenue Model:-**
- There are business offering services for which they charge a fee based on the number or size of transactions they process.
- The business provides information to the customers which is required to complete a transaction and revenue is purely earned on that basis.

- **Fee For Service Revenue Model :-**
- The fee is charged on the basis of value of some service rendered.
- Professional services provided online by lawyers, doctors, accountants etc relate to this type of revenue model.

UNIT II

SECURITY FOR E-BUSINESS

TOPICS

- Security threats – An area view – implementing E-commerce security – encryption – Decryption,
- Protecting client computers
- E-Commerce Communication channels and web servers Encryption,
- SSL protocol, Firewalls, Cryptography methods, VPNs, protecting, networks, policies and procedures

Security threats – An area view

- With worldwide retail e-commerce sales projected to increase, the industry is booming without plans to stop any time soon.
- Because of this, many businesses are unprepared for the security threats that come with running an **e-commerce** company. In an ideal world, brick-and-mortar stores can run without worrying too much about security due to systems and setups put in place by the government of their respective localities.
- Things are quite different with e-commerce businesses, however; the onus to protect yourself is on you, and having a clear understanding of the various security threats and ways to protect yourself is important

6 DANGEROUS E-COMMERCE SECURITY THREATS TO WATCH OUT FOR

- **1. Phishing attacks**
- Many e-commerce business owners aren't aware of how much of a threat phishing poses to their business, yet it is consistently one of the main ways hackers take over e-commerce sites.
- **Phishing** is a method in which a hacker sends deceptive emails disguised as an email from someone or an organization that you know in an attempt to get you to reveal your login details.

- **2. Spam emails**
- Spam emails are also one of the major threats to e-commerce stores, and it is one of the major ways through which some of the attacks on this list are carried out.
- In a lot of cases, phishing attacks and malware attacks are carried out through spam emails. Spammers also occasionally hack the email accounts of individuals or organizations you know and then use these emails to send spam emails aimed at compromising your ecommerce store hoping that you will believe them to be legitimate.
- These emails can sometimes link to phishing sites or link to infected sites that can compromise your computer security.

- **3. Distributed denial of service (DDoS) attacks**
- A distributed denial of service attack, or **DDoS attack**, is an attack in which an attacker uses multiple computers to hit your server with fake traffic in order to make your website inaccessible, or unable to function properly, for legitimate users.
- While many are used to hearing about sites “hacked” or compromised in a way that leads to data being exposed, very few are familiar with DDoS attacks and how damaging they can be; even the biggest e-commerce brands have fallen victim to these attacks.
- There have been **reports** of major e-commerce platforms such as Etsy, Shopify and PayPal suffering significant downtimes due to these attacks. Smaller e-commerce businesses are particularly at risk if measures are not taken to protect against malicious traffic.

- **4. SQL injections**
- SQL injections are generally regarded as the **most common form of cyber attack** today, and e-commerce businesses aren't exempt.
- These attacks involve hackers trying to gain access to your e-commerce site by injecting malicious SQL commands into existing scripts that your site needs to operate. Once successful, this changes how your site reads key data and allows the hacker to execute certain commands on your site or shut it down at will.
- Pretty much any e-commerce site that uses an SQL database is vulnerable to an SQL attack. Methods you can use to prevent an SQL attack includes making use of whitelists that ensure only certain people can access certain portions of your website, making sure your website is regularly updated and making use of latest technology, and regularly scanning your web applications for vulnerabilities.

- **5. Malware**
- Hackers will sometimes take things to the next level and target the computer of a key person who has advanced-level access to an e-commerce site or target the server hosting the e-commerce site itself. When they want to do this, they often use malware.
- **Malware** will often allow a hacker to take over your e-commerce server and execute commands as if you were the one doing so in the worst case scenario; in the best case scenario, they will allow hackers to gain access to data on your system/server or hijack some of your traffic. This could result in lots of lost revenue for your e-commerce business.

- **6. Credit and debit card fraud**
- Credit and debit card fraud is even more insidious, and research shows it is the number one kind of identity theft fraud, responsible for a whopping **35.4 percent of all identity theft fraud**. Credit and debit card fraud is so serious that an estimated $24+ billion is lost to it annually.
- In essence, credit and debit card fraud occurs when users steal the credit card or debit card details of unsuspecting victims and then use it to make a purchase on your e-commerce store. Not knowing that the details used to purchase from you is stolen, you go ahead and release the product or service to them. When the real user learns of this fact, they request a refund or issue a chargeback to your e-commerce business.
- This results in lost revenue and could potentially hurt your standing with your payment processor.

.Encryption

- As our use of E-commerce continues to soar, the need for encryption of customer data (as well as inventories, company financial information, etc.) increases exponentially as well.
- You must be knowing the fact that whenever you sign up on a website for a membership, club, or even just for their weekly newsletter, your personal information is stored in a certain database.
- Once you start to purchase products or services from that retailer or service company, those transactions are stored in your ―history‖ for a record of your activity with that company.
- If you think about it, you now have a majority of your personal information tied to your purchase history, including your basic personal details and the most secret of all the information and that is none other than your credit card information and more.

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- If it weren't for encryption, if a hacker were to breach the initial security of these websites, they would have access to all of your vital information.
- To try and prevent our system from this unethical approach that generally leads to a serious consequences of mishap, companies have special and dedicated teams within their organization that, not only are responsible for encrypting the data to keep it secure, but are also constantly reviewing new technologies to support an even stronger encryption and data security solution.

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- It is INTERNATIONAL JOURNAL OF SCIENTIFIC & TECHNOLOGY RESEARCH VOLUME 8, ISSUE 10, OCTOBER 2019 ISSN 2277-8616 2882 IJSTR©2019 www.ijstr.org a continuing fight and commitment to an increased vigilance that keeps these experts steps ahead of hackers and thieves to keep your data safe.
- Here at Unleaded Group, we are committed to keeping our clients and their customers safe with the latest encryption technologies.

IMPLEMENTING E-COMMERCE SECURITY – ENCRYPTION – DECRYPTION,

- **Encryption** is the process of translating plain text data (plaintext) into something that appears to be random and meaningless (ciphertext).
- **Decryption** is the process of converting ciphertext back to plaintext. ... A symmetric key is used during both the **encryption and decryption** processes

- **E-commerce** relies on **encryption** to secure data transmission by controlling data access and protect information on the internet and in the end improve consumer confidence.
- **Decryption** is reverse of **encryption**; it transforms **encrypted** data back into original, intelligible form.

Protecting client computers

- Secure websites :
- Secure sites use encryption technology to transfer information from your **computer** to the online merchant's **computer**.
- Encryption scrambles the information in order to prevent **computer** hackers from obtaining it from route

7 Must-Have Security Tools for eCommerce Companies

- Firewalls
- SSL certifications
- Biometrics
- Scanning for Loopholes
- Threat Detection Tools
- Security Planners
- Security Plugins

- **1. FIREWALLS**
- Once a website is online, anyone can access it. Not all the traffic received will be genuine, certain malefactors will try and harm your website, especially if it houses sensitive information.
- Firewalls are deployed as protective barriers between the internet and your website/web application. They screen each and every connection request received from private networks, identify possible malicious intent or attacks, and filter out unwanted traffic.
- Firewalls can be hardware or software. However, hardware firewalls can pose some latency and costing issues. So it is always better to go for either software or hybrid configurations.
- In addition to keeping a tab on network and server requests, and ensuring they meet appropriate security criteria, intelligent or advanced firewalls can also further challenge traffic to confirm its legitimacy.
- They also scan your internal networks and servers to identify vulnerabilities and patch them accordingly.

- **2. SSL CERTIFICATIONS**
- **Secure Socket Layer** (SSL) certificates encrypt the communication happening between your website and the user.
- Any third party trying to listen and steal information, will not be able to decipher the content of your interactions. Nowadays, it is mandatory for websites to attain an SSL certificate and operate in an HTTPS environment.
- In fact, Google's algorithm considers HTTP websites to be unsafe and penalizes them by affecting their search engine rankings.

- **3. BIOMETRICS**
- Biometrics use a person's physical characteristics to verify their identity and authenticity. These include your eyes, voice, or behavioral characteristics. Biometric data is perhaps one of the most reliable ways to confirm a person's legitimacy since it can't be replicated or forged easily.
- Here are fives common types of biometric data:
- **Facial recognition**: identifies and remembers the person's unique facial features, patterns, and contours.
- **Iris recognition:** scans the unique patterns of your Iris, the colorful area around your pupil.
- **Fingerprint scanner**: scans the fingerprints and memorized the pattern of various ridges and valleys on your skin.
- **Voice recognition**: measures the sound waves your voice makes when you speak.
- **Behavioral characteristics**: observes how a particular user interacts with computer systems or software. It could be the unique way in which you solve a security-authentication puzzle, or how you move the mouse, your keystrokes, etc.

4. SCANNING FOR LOOPHOLES

- You can use scanning tools like FreeScan by Qualys. FreeScan gives you an overview of your security and compliance profile and recommends fixes and improvements.
- It allows you five free scans which include the following audits:
- Network Vulnerability Scan for Server and App
- Patch Tuesday PC Audit
- OWASP Web Application Audit
- SCAP Compliance Audit
- Periodical scanning will help you detect malicious scripts, misconfigurations, or vulnerabilities present in your website.
- Most tools available online cover a wide range of security areas, from network to server to web application vulnerabilities.
- You can also checkout popular alternatives to FreeScan like Detectify, Pentest Web Server Vulnerability Scanner, Probe.ly, etc.

- **5. THREAT DETECTION TOOLS LIKE TRUSTWAVE**
- One successful mantra for an impenetrable website is being proactive with your security measures. It is always better to prevent cyber attacks than deal with the aftermath of one.
- Trustwave is a threat detection and response company that will detect, assess, and classify vulnerabilities on your web application, network, and databases.
- Their security testing services and SpiderLabs testing give you an insight into the latest loopholes, malwares, attack vectors, and breaches, so that your system's security measures are powerful enough to protect you from the latest cyber attacks and exploits.
- You can also checkout Trustwave's alternatives like Secureworks, Rapid 7, and Qualys.

6. SECURITY PLANNERS

- If you're a small business, then hatching an elaborate security plan that tightens all loose ends in your system might not be feasible.
- You might face budgetary constraints in trying to employ the right resources and manpower.
- If you're facing such an issue, you can use tools like FCC Small Biz Cyber Planner.
- Developed by the Federal Communications Commission, this tool helps you create custom security plans for your business.
- You can select the key security areas you want to focus on, and the tool will automatically generate a plan accordingly.
- Its plans include details like data theft and financial loss mitigation, immediate steps to take in case of an infection, best practices on spyware, and recommendations for installing new security software.
- It also has a cyber security tip sheet that mentions security best practices you should follow.

- **7. SECURITY PLUGINS**
- All eCommerce websites run on some platform, be it Magento, Shopify, WooCommerce, or OpenCart, etc.
- The best part of using an eCommerce CMS is that you'll find a ton of extensions in the platform's repository, which can be used to enhance the functionality of your store.
- Look for appropriate security plugins your platform offers and choose one on the basis of your needs.
- You can either go for end-to-end solutions, or extensions that look after specific aspects of your store's security.

E-Commerce Communication channels and web servers Encryption,

- **Email Marketing**
- Without question, email marketing is the most commonly invested marketing channel.
- It's cost efficient, and it targets consumers directly.
- Popular services such as MailChimp and Constant Contact, allow even the most novice users to design and schedule effective email campaigns.
- Even if you decide to pay a third party to generate email campaigns, the costs are relatively much lower than other forms of advertising.

- The brilliant part about email marketing is that no matter what customers will have eyes on your company, even if it's for a split second before they delete the email.
- Planting your company name in the minds of consumers is an integral part of long term brand growth.
- They may delete an email the first time, but if they don't unsubscribe, it's usually a good indicator that they have interest in your products/services, they're just not ready to buy right now.
- Email marketing can work right away, or farther down the road when the right deal comes along.
- Emails also allow you to use detailed analytics to determine whether or not customers are clicking on your campaigns.
- You can also use A/B testing to identify popular marketing elements and adjust your campaigns on the fly.

- **Pay-Per-Click (PPC)**
- As you can imagine there are a lot of PPC channels out there to choose from, but based on volume of traffic, the two channels you really need to consider are Google Adwords and Facebook Ads.
- Google Adwords works by using a 'query click' system. For instance, you are an online stationery store who has purchased an ad related the specific search query: "stationery products". When a consumer enters "Stationery products" into a Google Search, your ad pops up.
- It's a highly targeted method, however the only downside is cost.
- Google charges a pretty penny these days, which is understandable considering their user base.
- Facebook is not as expensive but it's definitely no slouch.

- Unlike Google's query based system,
- Facebook is content based, so your campaigns not only have to be targeted they have to look good.
- There's many reasons to invest with Facebook Ads:
- Facebook has a massive database of information on its users; gender, age, location, politics, marriage status, career, hobbies, interests, etc.
- This allows marketers to completely customize their target strategy with precise accuracy. Accurate advertising means a much higher return on investment.
- Facebook owns Instagram. Many people just maintain their Facebook accounts, and instead actively use Instagram everyday.
- Facebook Ads allows you to customize your campaign to appear on Instagram as well. Fashion, fitness, and entertainment are three very popular industries on Instagram.
- Instagram targets a younger demographic, so depending on your product, this may be the right option for you.

- **SEO (Search Engine Optimization)**
- Naturally, we can't talk marketing without talking SEO. It's kind of our bread and butter.
- It also happens to be the most effective way to improve your e-commerce rankings in popular search engines like Google and Bing.
- High search engine rankings and indexing is important; according to recent studies around 16% of new e-commerce customers come from organic search.
- The challenge with SEO is that Google's algorithm is always evolving, so as a marketer you have to stay on top of the latest trends in order to stay competitive and maintain a high ranking.
- The primary takeaway from strong SEO is that when a customer organically stumbles upon your site in a search engine, chances are they are looking for a consumer solution that your company can provide.
- In other words, SEO brings you paying customers.

- **Content Marketing**
- Content marketing is not only a great way to improve your SEO.
- it also keeps your customer engaged and acts as a window to your company's industry.
- A blog is a great example of content marketing.
- Let's say you sell nutritional supplements online. If your blog publishes weekly dietary plans, tips, and recipes your customers are going to experience a give and take relationship with your company: you provide them with the strategies and tips, and in return they continue to shop your store.
- By blogging and creating intelligently crafted content you are also setting up your brand as an expert, which motivates consumers to buy your products over a company who provides zero content for their customers.

- **Social Media Marketing**
- This refers to the unpaid side of social media.
- Facebook, Instagram, Twitter, Pinterest, Snapchat, the list goes on.
- The one thing all these platforms share in common is that they're designed to showcase an individual's personality, or lifestyle.
- For an e-commerce business this a great way to build trust with your customers by highlighting your human side.

- You don’t have to post selfies of the CEO, it just means scaling back on the advertising side of things.
- Instead, focus on familiarizing your audience with the business, and engaging followers with contests, replies, reposts and shoutouts.
- Highlighting your company values through posts and engagement will prompt followers with similar values to feel a bond. Think of social media as tool to show your customers what you both have in common.
- We should also mention affiliate marketing which has become very popular.
- There are thousands of popular social media influencers and companies are paying them to advertise their products for their followers.
- The demographic are typically younger, so we recommend researching affiliate marketing to see if it’s right for you.

- **Re-Targeting**
- This is isn't quite a specific channel, but it is a very important strategy to consider.
- Retargeting means marketing to consumers who have already showed interest in your company.
- **Abandon Carts –**
- Any e-commerce business understands the pain of seeing an abandon cart.
- By targeting these customers you are simply reminding them of a purchase that they were considering making.
- The intent to buy is there, they just need a little motivation.

- **Up-selling or cross-selling –**
- When a customer has already made a purchase, it's a good opportunity to highlight complimentary products.
- For instance, if a customer buys a printer, why not offer them some paper?
- How do you accomplish retargeting?
- The best way is through email. In order to retarget a customer you'll need to have some sort of contact information.
- **Wrapping Up**
- Allocating your marketing budget can be a challenge with so many different online channels.
- Every business varies in what will be their most successful course of action.
- A good way to determine what's right for your business is by looking at your audience. Are they young?
- Try advertising on Instagram. Is most of your traffic organic? Ramp up your SEO. Is your brand highly personable? Flex your stuff on social media!

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- **The Tools used for secure channel of communication are:**
- 1.Secure Sockets Layer (SSL)
- 2.Certificate authorities (CAs)
- 3.Virtual private networks
- **Secure Sockets Layer (SSL) :**
- Secure Sockets Layer (SSL) A commonly used encryption technique for scrambling data as it is passed across the Internet from a customer's web browser to a merchant's web server.

- Secure Electronic Transaction (SET)
- A standard for public-key encryption intended to enable secure e-commerce transactions.
- Lead-development by MasterCard and Visa.
- Secure Sockets Layer Protocol (SSL)
- SSL is a security protocol, originally developed by Netscape, but now supported by all browsers such as Microsoft Internet Explorer.
- SSL is used in the majority of B2C e-commerce transactions since it is easy for the customer to use without the need to download additional software or a certificate.
- When a customer enters a secure checkout area of an e-commerce site SSL is used and the customer is prompted that 'you are about to view information over a secure connection' and a key symbol is used to denote this security.

- When encryption is occurring they will see that the web address prefix in the browser changes from http://' to https://' and a padlock appears at the bottom of the browser window.
- The main facilities it provides are security and confidentiality.
- SSL enables a private link to be set up between customer and merchant.
- Encryption is used to scramble the details of an e-commerce transaction as it is passed between sender and receiver and also when the details are held on the computers at each end.
- It would require a determined attempt to intercept such a message and decrypt it.

- The detailed stages of SSL are as follows: -
- Client browser sends request for a secure connection.
- Server responds with a digital certificate which is sent for authentication.
- Client and server negotiate session keys, which are symmetrical keys used only for the duration of the transaction.
- Since, with enough computing power, time and motivation, it is possible to decrypt messages encrypted using SSL, much effort is being put into finding more secure methods of encryption such as SET.
- From a merchant's point of view there is also the problem that authentication of the customer is not possible without resorting to other methods such as credit checks.

- **Certificate authorities (CAs):**
- For secure e-commerce, there is a requirement for the management of the vast number of public keys.
- This management involves procedures and protocols necessary throughout the lifetime of a key — generation, dissemination, revocation and change together with the administrative functions of time/date stamping and archiving.
- The successful establishment of a CA is an immense challenge of trust building and complex management.
- There are two opposing views on how that challenge should be met
- Decentralize& market-driven, creating brand-name-based 'islands of trust' such as the Consumers Association.
- There is a practical need for a local physical office to present certificates of attestable value,
- e.g. passports, drivers' licences. Banks and the Post Office have a huge advantage.

- **Virtual private networks:**
- A virtual private network (VPN) is a private wide-area network that runs over the public network, rather than a more expensive private network. The technique by which VPN operates is sometimes referred to as 'tunnelling; and involves encrypting both packet headers and content using a secure form of the Internet Protocol known as IPSec.
- VPNs enable the global organization to conduct its business securely, but using the public Internet rather than more expensive proprietary systems

SSL protocol, Firewalls, Cryptography methods, VPNs, protecting, networks, policies and procedures

- The **SSL** certificate in **e-commerce** responds to the acronym Secure Sockets Layer. It was developed by Netscape in 1994. It is defined as a web **protocol** designed to provide greater security in online communications. This certificate provides a secure channel between two devices (mobile phones, computers, etc.)
- **SSL** Stands for secure sockets layer. Protocol for web browsers and servers that allows for the authentication, encryption and decryption of data sent over the Internet.

- when **SSL** is used to secure communication between a web browser and a web server. This turns a website's address from HTTP to HTTPS, the 'S' standing for 'secure'.
- A **Firewall** is a network security device that monitors and filters incoming and outgoing network traffic based on an organization's previously established security policies. At its most basic, a **firewall** is essentially the barrier that sits between a private internal network and the public Internet.

- A **firewall** is an **essential** part of your business' security system. Without it, your network is open to threats. A **firewall** keeps destructive and disruptive forces out, and controls the incoming and outgoing network traffic based on security parameters that you can control and refine.

Cryptography methods

- Definition of 'Cryptography'
- **Definition:** Cryptography is associated with the process of converting ordinary plain text into unintelligible text and vice-versa. It is a method of storing and transmitting data in a particular form so that only those for whom it is intended can read and process it. Cryptography not only protects data from theft or alteration, but can also be used for user authentication.

  Description: Earlier cryptography was effectively synonymous with encryption but nowadays cryptography is mainly based on mathematical theory and computer science practice.

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- *Modern cryptography concerns with:*
- Confidentiality - Information cannot be understood by anyone
- Integrity - Information cannot be altered.
- Non-repudiation - Sender cannot deny his/her intentions in the transmission of the information at a later stage
- Authentication - Sender and receiver can confirm each
- Cryptography is used in many applications like banking transactions cards, computer passwords, and e- commerce transactions.

- *Three types of cryptographic techniques used in general.*

- 1. Symmetric-key cryptography

- 2. Hash functions.

- 3. Public-key cryptography

- **Symmetric-key Cryptography:** Both the sender and receiver share a single key. The sender uses this key to encrypt plaintext and send the cipher text to the receiver. On the other side the receiver applies the same key to decrypt the message and recover the plain text.

- **Public-Key Cryptography:** This is the most revolutionary concept in the last 300-400 years. In Public-Key Cryptography two related keys (public and private key) are used. Public key may be freely distributed, while its paired private key, remains a secret. The public key is used for encryption and for decryption private key is used.

- **Hash Functions:** No key is used in this algorithm. A fixed-length hash value is computed as per the plain text that makes it impossible for the contents of the plain text to be recovered. Hash functions are also used by many operating systems to encrypt passwords.

VPNs,

- A virtual private network, better known as a VPN, protects your identity and browsing activity from hackers, businesses, government agencies, and other snoops. When connecting to the internet, your data and IP address are hidden by a type of virtual tunnel. This keeps others from spying on your online activity.

- When you sign up with a VPN provider, you first log onto that service before you connect to the internet. Once you are connected, others can't see your activity. Your VPN provider will encrypt your data, scrambling it so that hackers, government agencies, and businesses can't see what websites you visit, messages you send, social media sites you use, or files you download.

POLICIES AND PROCEDURES

- Applicable Laws & Regulations
- **Regulatory Technology & Data Protection**
- Foreign Direct Investment Policy
- Foreign Exchange Management Act, 1999
- Companies Act, 2013
- Payment and Settlement Act, 2007 and other RBI regulations on payment mechanisms
- Labelling and Packaging

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- Legal Metrology Act, 2009 read with Legal Metrology (Packaged Commodity) Rules, 2011
- Sales, Shipping, Refunds and Returns
- Moreover, Regulations prescribed by the relevant ministry/state regulations
- Information Technology Act, 2000
- Additionally, Information Technology (Intermediaries Guidelines) Rules, 2011
- Information Technology Act, 2000 (IT Act) and General Data Protection Regulations (GDPR).
- Consumer Protection Act, 1986

- **Tax Legal**
- Income Tax Act, 1961
- Double Taxation Avoidance Agreement
- Good and Services Tax
- Indian Contract Act, 1872
- Indian Copyright Act, 1957
- The Patents Act, 1970
- Intellectual Property Issues
- Labour laws

UNIT III

E- Payments

Syllabus

- E-payment systems – An overview.
  B to C payments, B to B payments.
  Types of E- payment system –
- Credit card payment, debit cards, accumulating balance, online stored value payment systems, digital cash,
- Digital (electronic) wallets, agile wallet, smart cards and digital cheques.
  Secure Electronic Transaction
- (SET) protocol

E-payment systems – An overview

- **Electronic Payment System**:
- Is means of making **payments** over an **electronic** network such as the Internet.

- **E**-Cash: **Electronic** financial transactions conducted in cyberspace via computer networks.

- The emergence of e-commerce has created new financial needs that in many cases cannot be effectively fulfilled by the traditional payment systems.

- The advent of the Electronic commerce has prompted the invention of several payment tools to facilitate the completion of business transactions over the Internet.

- There are different methods to pay electronically. Recognizing this, virtually all interested parties are exploring various types of electronic payment system and issues surrounding electronic payment system and digital currency.

- Broadly electronic payment systems can be classified into four categories:
- Online Credit Card Payment System,
- Online Electronic Cash System,
- Electronic Cheque System and
- Smart Cards based Electronic Payment System.

- Each payment system has its advantages and disadvantages for the customers and merchants.
- These payment systems have numbers of requirements: e.g. security, acceptability, convenience, cost, anonymity, control, and traceability.
- Though Indian economy is basically cash driven, still India is not far behind in adopting E-payment services in retail and banking sector.

- An e-commerce payment system facilitates the acceptance of electronic payment for online transactions.
- Also known as a sample of Electronic Data Interchange (EDI),
- e-commerce payment systems have become increasingly popular due to the widespread use of the internet-based shopping and banking.
- E payment is a subset of an e-commerce transaction to include electronic payment for buying and selling goods or services offered through the Internet.

B to C payments

- The term business-to-consumer (B2C) refers to the process of selling products and services directly between a business and consumers who are the end-users of its products or services.

- B2C **payments** are generally a one-time **payment** for a product and it will usually be a smaller amount.

- B2C e-commerce is relatively simple: products are displayed on a website, consumer details are taken, and then **payment** is made on a secure checkout form with the consumers preferred **payment** type, such as a digital wallet.

B to B payments.

- B2B payments are **payments made between companies for goods or services**.

Types of E- payment systems

- Credit card payment
- Debit cards
- Digital cash
- Digital (electronic) wallets
- Agile wallet
- Smart cards
- Digital cheques

Credit card

Credit card

- A **credit card** is a payment card issued to users (cardholders) as a method of payment.
- It allows the cardholder to pay for goods and services based on the holder's promise to pay for them.

- The issuer of the card (usually a bank) creates a revolving account and grants a line of credit to the cardholder, from which the cardholder can borrow money for payment to a merchant or as a cash advance.
- It is being an ordinary piece of plastic, it - first of all the flexible tool of payment accepted in the majority of the countries of the world and if the balance of a map is paid from each month no percent are added on the buying, made so, in essence, the short-term credit is granted without the consumer paying any percent.

Advantages

1. Represents free application of funds, with known balance.
2. Is more convenient than cash.
3. Supplies the good file of the borrower.
4. Supplies a convenient method of payment for the buying made on the Internet and by phone.
5. Grants bonuses which then can be used.

Disadvantages

1. To cost it is much more than other forms of the credit, such as the arrangement or the personal loan if we do not pay in time.
2. Worsens credit rating, at an irregularity of payments.
3. Allows to create more promissory notes.

Smart Card

Smart card

- A **smart card** is a device that includes an embedded integrated circuit chip (ICC) that can be either a secure microcontroller or equivalent intelligence with internal memory or a memory chip alone.
- The **card** connects to a reader with direct physical contact or with a remote contactless radio frequency interface

- Smart cards are made of plastic, generally PVC.
- Smart cards can be either contact or contactless smart card. Smart cards can provide personal identification , authentication, data storage, and application processing.
- Smart cards may provide strong security authentication for Single sign on (SSO) within large organizations.

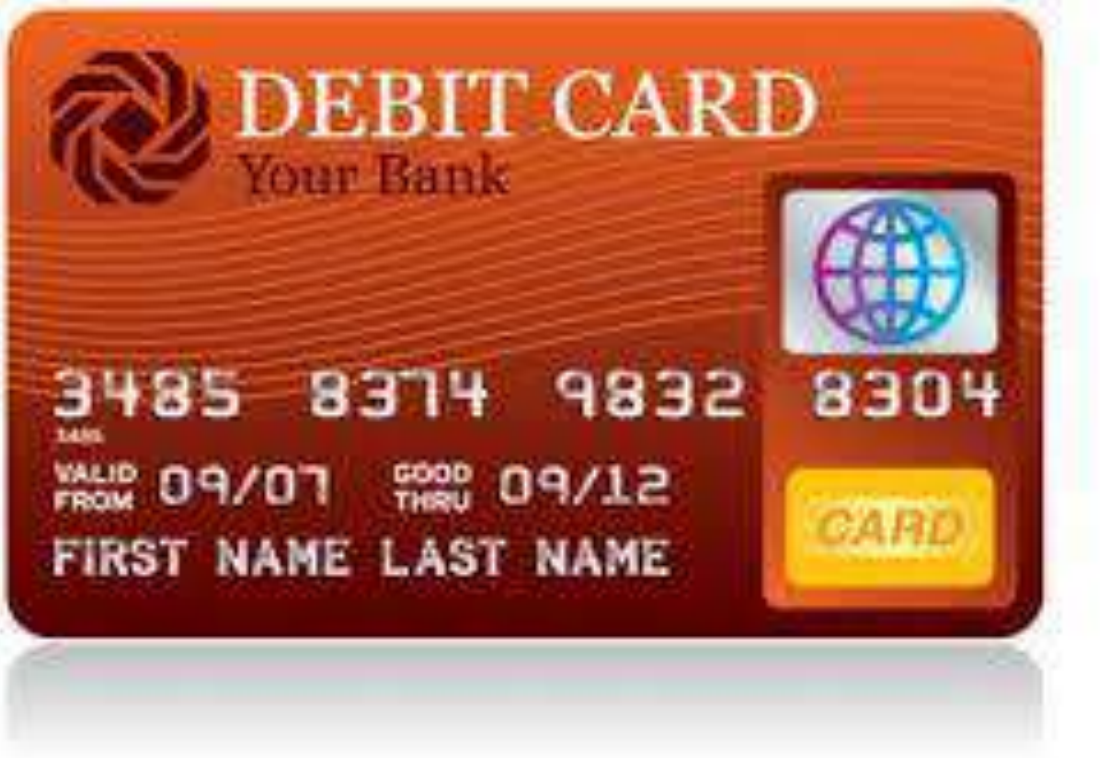
Advantages

- It provides reduction in costs
- It has technical specification standards
- It gives security of information
- It has more organized information
- It has emergency information
- The process doesn't require paper
- One card can access multiple transactions
- It can do transactions off and on-line
- It is more convenient, since people don't have to carry cash or multiple cards
- It reduces fraud
- It has high memory capabilities
- It has the ability for on-site approval
- End-user only accessibility

Disadvantages

- Fees applied with the use of a card
- It gives liability issues if stolen or lost
- The accuracy of information is small
- Lack of technology to support users
- It is potential for too much data on one card if lost or stolen
- It is a potential area for computer hackers and computer viruses

Debit Card


DEBIT CARD
Your Bank
3485 8374 9832 8304
VALID FROM 09/07
GOOD THRU 09/12
FIRST NAME LAST NAME
CARD

Debit card

- A debit card is a plastic card that resembles credit card.
- Debit cards are directly linked to a cardholder's bank account.
- Whenever a card holder withdraws money from an ATM or uses the debit card for making payments, his/her account balance is automatically reduced.

Advantages

1. Debit card is much easier to get as compared to credit card.
2. One doesn’t have to carry cash or cheque book or traveller's cheques and carry only debit card.
3. Debit cards are more willingly accepted than cheque, it happens more so when people are travelling because with debit cards the person who is taking it does not have to worry about bounced cheques and hence it is preferred over cheques.
4. With debit cards one knows that for how much limit one can purchase unlike credit cards where chances of overspending are higher.

Disadvantages

1. One needs to have enough money in his or her bank account to cover for the amount of purchase done.
2. One has less protection if the debit card is lost or stolen as compare to credit card.
3. Since money is debited instantly at the time of purchase, one has less protection if something goes wrong with the purchase because bank won't put money back into account if purchased items are not delivered, or don't work.

Digital Money

Digital Money

- Digital money or digital cash is a replacement for credit cards or cash, for online purchases, where privacy and personal safety are important.
- It can provide a secure and efficient system of money, it may also lead to an increase in a variety of crimes, including money laundering and fraud.
- Digital cash can take two forms:

  online accounts or on smart card.
- An online account allows transactions on the Internet.
- A smart card can be thought of as an electronic purse people can carry with them.

Advantages

- Digital money is easy to use and secure
- The owner is the only person who can use the account
- People are addicted to a convenient technology
- Some kind of digital money will function like electronic checks
- Even paper checks are not going to be needed
- Once again, digital money is replacing wallets and purses full of credit cards
- Its main obstacle though to be successful is the number of people that are using it; not that much are considering it as an option yet
- While digital money is considered very convenient and easy to handle; paper money is becoming now very complicated to deal with it
- Being handicapped, naïve, or sophisticated person, you have the chance to use this card

Disadvantages

- When digital money is widely used; it could disturb the financial system.
- It can facilitate money laundering and fraud because some hackers might be able to steal the information and uses them for their benefits.
- Law enforcement suspects that it will be easy to trade drugs rather than smuggle them across borders.
- Consumers are not going to interact with their bank and its employees.
- Lack of relationship between the consumers and the business people

Digital wallet

Digital wallet

- A **digital wallet** refers to an electronic device that allows an individual to make E-C transactions.
- This can include purchasing items on-line with a computer or using a Smartphone to purchase something at a store.
- Increasingly, digital wallets are being made not just for basic financial transactions but to also authenticate the holder's credentials.
- For example, a digital-wallet could potentially verify the age of the buyer to the store while purchasing alcohol.
- It is useful to approach the term "digital wallet" not as a singular technology but as three major parts:

1. The system (the electronic infrastructure)
2. The application (the software that operates on top)
3. The device (the individual portion).

Advantages

- **Lower Costs:** Employing the use of digital wallets removes the need for intermediaries, in a variety of forms
- **Competitive Advantage:** Digital wallet applications provide a more convenient transaction processing method for customers, giving businesses that employ this technology a competitive edge in the market.
- **Modern:** This opens up an entirely new aspect to payment methods in large markets, introducing many business opportunities and greater potential revenue.
- **Convenience**: Users are able to get through a purchase in mere seconds with a simple tap or scan of their mobile device.

Disadvantages

- **Investment is high:** It requires the initial development of the software as well as the continual maintenance, updates and fixes associated with it.
- **Support Technology:** The devices created at the moment will support the processing of digital wallet payments; thus, it is very limited because the technology is still new.
- **System Outages:** Information for digital wallets are stored on the cloud of business servers; therefore, the risk of a system malfunction or shut down is always present.
- **Security:** Companies must ensure that their customers' information is encrypted and well protected.

E-Cash

- An anonymous electronic cash system; equivalent to "cash" or "printed bank notes" except that it is transferred through networks with bits of information, in essence it is just another representation of monetary value; anonymity is preserved through public key cryptography, digital signatures, and blind signatures.
- E-Cash is used over the Internet, email, or personal computer to other workstations in the form of secured payments of "cash" that is virtually untraceable to the user. It is backed by real currency from real banks.

Agile Wallet

- Developed by CyberCash
- Allows customers to enter credit card and identifying information once, stored on a central server
- Information pops up in supported merchants' payment pages, allowing one-click payment

eWallet

- Developed by Launchpad Technologies
- Free wallet software that stores credit card and personal information on users' computer, not on a central server; info is dragged into payment form from eWallet

- Information is encrypted and password protected – Works with Netscape and Internet Explorer Electronic Wallets

Microsoft Wallet

- Comes pre-installed in Internet Explorer 4.0, but not in Netscape
- All information is encrypted and password protected
- Microsoft Wallet Merchant directory shows merchants setup to accept Microsoft Wallet

Advantages and Disadvantages of Electronic Cash

- Advantages
  - More efficient, eventually meaning lower prices
  - Lower transaction costs
  - Anybody can use it, unlike credit cards, and does not require special authorization
- Disadvantages
  - Tax trail non-existent, like regular cash
  - Money laundering
  - Susceptible to forgery

- Secure Electronic Transaction
- (SET) protocol

accumulating balance,

- **Accumulated balance** digital **payment systems** enable users to make micropayments and purchases on the Web, **accumulating** a debit **balance** that they must **pay** periodically on their credit card or telephone bills. IPIN has been widely adopted by online music sites that sell music tracks for 99 cents

online stored value payment systems,

- **Stored value systems** are a form of **electronic payment** technology. They coexist with credit and debit technology and principally target the low **value** transactions. **Online stored value systems** have very low transaction cost

digital cheques

- An electronic check, or e-check, is a form of payment made via the Internet, or another data network, designed to perform the same function as a conventional paper check. Since the check is in an electronic format, it can be processed in fewer steps

E-BUSINESS MARKETING TECHNOLOGIES

UNIT 4 :

TOPICS

- E-Commerce and marketing B to B and B to C marketing and branding strategies.
- Web transaction logs,
- Cookies,
- Shopping cart database,
- DBMS,
- SQL,
- Data mining,
- CRM (customer relationship Management)
- System – permission marketing, affiliate marketing, viral marketing.

E-Commerce and marketing B to B and B to C marketing and branding strategies.

- **Marketing is** defined as the set of tools, processes, and strategies you use to actively promote your product, service, and company.
- **Branding is** the **marketing** practice of actively shaping your **brand**.
- **Branding is** about defining who you are as a company.

B to B marketing

- **What Are The Four Types Of B2B Markets?**
- Business buyers can be either profit or non-profit companies.
- To help you get a better idea of the different types of business customers in B2B markets, Below are four basic categories:
- Producers,
- Resellers,
- Governments
- Institutions.

- **Producers:**
- Producers are companies that purchase goods and services that are transformed into other products.
- They include both producers and service providers. Examples General Motors, McDonald's, Dell.
- All these companies must purchase certain products in order to produce the goods and services they create.
- Ex: General Motors needs steel and hundreds of thousands of other products for the production of cars.

- **Resellers:**
- Resellers are companies that sell goods and services produced by other companies without any material change.
- These include wholesalers, brokers and retailers.
- Walmart , Metro cash and Carry, Big bazar etc.
- Large wholesalers, brokers and retailers have a lot of market power.
- If you can get them to buy your products, your sales may increase exponentially.

- **Government:**
- The biggest purchaser of goods and services is the government .
- It buys everything you can imagine, from paper and fax machines to tanks and weapons, buildings, highway construction services and medical and security services.
- Governments and local governments are also buying huge quantities of products.
- They contract with companies that provide all kinds of services to citizens, from transport to garbage collection.
- Business-to – Government (B2G) markets are when companies sell to local, state , and federal governments, represent a major selling opportunity, even for smaller retailers.
- In fact, many government entities state that their agencies must award a certain amount of business to small businesses, minority and women-owned enterprises, and businesses owned by disabled veterans.

- **Institutions:**
- Institutional markets include non-profit organizations such as the Red Cross, Temples, hospitals, charities, private colleges, civic clubs, and so on.
- Like government and non-profit organizations, they buy a huge quantity of products and services.
- Keeping costs down is particularly important to them.
- The lower their costs, the more people they can provide their services.

B to B marketing strategies.

- **Absolutely fundamental B2B marketing strategies are**
- Research. ...
- Niche-driven **Strategy**. ...
- A High Performance Website. ...
- Search Engine Optimization (SEO) ...
- Social Media. ...
- Advertising. ...
- Referral **Marketing**.

- **Research**
- Research is the bedrock of any modern marketing effort. From marketplace research to brand research, detailed scientific studies will help you make more informed decisions.
- They'll give you an objective basis for your marketing and provide you valuable baselines for measuring your results.
- By conducting research, you'll know your clients better — which puts you in a position to serve them better.
- Market research also gives you insight into how your processes are performing.
- You'll know which aspects of your firm are performing most successfully and develop a better understanding of which services you should offer.
- The impact of research is clear. studies on the impact of research have shown that firms that conduct systematic research on their prospects and clients grow three to ten times faster and are up to two times more profitable than peers that don't pursue research.

- **Niche-driven Strategy**
- One of your most important business considerations period – is specialization and niche targeting.
- Research has repeatedly shown that the fastest-growing firms tend to be specialists in a carefully targeted niche.
- This should be an area of the industry that you understand *thoroughly*, a space in which you can become an undisputable expert and leader.
- Specialization makes all of your marketing efforts easier, because it tends to define exactly what you do and immediately distinguish you from the competition.
- A specialization is a differentiator that proves itself.

- **A High Performance Website**
- In today's professional services marketplace, your firm's website is one of your most crucial assets.
- It is much more than a digital billboard or brochure.
- A successful website is the hub of a firm's online presence and an information-rich projection of its expertise into the marketplace.
- Your website is a critical tool for building visibility.
- Potential clients search online to find service providers, and they need to be able to find your firm's website in order for you to have a chance at winning their business. Plus, your website enables you to demonstrate your firm's expertise and become well-known throughout the marketplace.

- Research paints a clear picture of the importance of a professional services firm's website.
- In fact, 80% of people look at website when checking out service providers the most commonly used information source by far.
- And as new visitors reach your site, robust educational content and carefully targeted offers can drive leads to closer and closer engagements, eventually bringing qualified leads straight to you.

- A second component of your website you need to consider is design. Web and graphic design can influence your audience's perceptions, aid recall, and swiftly and intuitively differentiate a business.
- The power of design to engage audiences is often under appreciated — which means it offers a tremendous opportunity to set firms apart and convey the credibility firms needs to thrive.
- Finally, another increasingly essential consideration for your website is its usability across a wide range of devices, including mobile. Responsive design, which allows your website to adapt to suit a user's device, has become a key feature as more people use mobile devices to do business.

- **Search Engine Optimization (SEO)**
- As we alluded to in the previous item, your target audience has to be able to find your site for it to be effective. That's where search engine optimization comes in.
- This is such a key piece of the online marketing puzzle that in our studies, high-growth firms list it as the most effective online marketing technique available to them.
- Though SEO is a complex and evolving discipline, it ultimately consists of two primary components.

- **On-site SEO** uses targeted keyword phrases to communicate the concepts on your site that matter to your audience. These keyword phrases typically focus on your services and expertise.

- The purpose of on-site SEO is to communicate to search engines what your website is about. This allows search engines to produce more relevant results to searchers. And when audiences search for insight on your area of specialty, they'll find you.

- **Off-site SEO** takes the form of links to your website, either through outside engagement or guest articles in other publications, for example. These efforts work to increase your site's authority as a widely recognized leader on your topic.
- As more high authority and relevant websites link to your website, search engines will begin to see your site as more credible – resulting in higher rankings.

- **Social Media**
- If you needed any more proof that social media is here to stay for professional services firms, we've got you covered.
- Research has found that over 60% of buyers check out new service providers on social media, making it a more commonly used source of information than formal referrals and recommendations.
- Even the *nature* of referrals has changed in the wake of social media.
- A recent study on referral marketing has found that 17% of expertise-based referrals are made on the basis of interactions on social media.
- Put simply, social media is an accelerator for the reach of your reputation, expertise, and content.
- It allows you to network and connect with valuable contacts and influencers, as well as monitor your brand by social listening.

- **Advertising**
- There are a number of platforms on which your firm can advertise effectively:
- Industry publications and websites
- Social media
- Search Engine Marketing (SEM) – Google Ads, as well as Bing and Yahoo
- Retargeting – A cookie-based technology that uses a simple JavaScript code to anonymously "follow" your audience across the Web and serve relevant ads
- Advertising doesn't just promote your services – it can also play an important role in driving content downloads, increasing both your expertise and visibility.

- It’s important, however, to use forms of advertising best-suited to professional services. LinkedIn, retargeting, and other industry-focused advertising tend to work best, because they allow you to most directly target appropriate industry audiences, which leads to more conversions, higher click-through rates, and lower cost per download.
- Search engine marketing (SEM), on the other hand, often can be more expensive and harder to target for professional services’ purposes. Similarly, Facebook ads tend to be less effective because the platform is used at a lower rate by professional services buyers than other social media networks..
- However, it’s important to remember there are many variations of each of these advertising types. Professional services firms might find them more or less successful depending on budget, ad purpose, targeting, and industry niche.

- **Referral Marketing**
- We mentioned that the nature of professional services referrals has changed – and this has major implications for your B2B marketing strategy. Our studies of referral marketing strategies in professional services have revealed an important new facet of the practice – over 81.5% of providers have received a referral from someone who wasn't a client.
- Where do these referrals come from? The vast majority are based on a firm's reputation for specific expertise.
- By using content marketing in conjunction with the rest of the tactics in this list, you can build a brand with a widespread reputation for specialty in your area – and an understanding of your expertise even among audiences that haven't worked with you directly. This brand recognition can lead to referrals and new business.

- **Marketing Automation, CRM, and Lead Nurturing**
- **Marketing Automation:** Marketing automation replaces high-touch, repetitive manual processes with automated ones – supported by technology solutions. It brings together all of your online marketing channels into one centralized system for creating, managing, and measuring programs and campaigns.
- As with any technological tool, it's essential to select the right marketing automation software for your firm. Make sure the size, complexity, and scalability of a prospective solution is a good match for your needs.

- **CRM:** Another essential software is a Customer Relationship Management System (CRM). Many firms use a CRM to track and organize opportunities and client information. In short, a CRM will help you stay organized and connected, no matter how sophisticated your operations grow.
- Your CRM serves as the database for all the information you collect about opportunities and clients, including specific interactions with them. The information can be entered, stored, and accessed by employees in different firm departments, synchronizing efforts across your firm.

- **Lead Nurturing:** But CRM isn't the end of the story. Remember the lead-nurturing content funnel? Your website is one critical piece of that puzzle – and email marketing is another. Targeted, analytics-driven email marketing campaigns allow you to deliver soft and hard offers for specific buyer roles, tailored to a buyer's particular place in the buying process.

- Similarly, drip email campaigns enable you to send more targeted offers to segments of your audience over a set period of time. This builds closer engagement (and educates further) through successive, relevant content and offers.

- **Testing and Optimization**
- We started with research, but we're not finished with our scientific approach. Testing and optimization allow you to iterate your marketing efforts and make ongoing decisions based on hard data rather than intuition.
- Just as research is the bedrock of your marketing, testing and optimization is your continuous guide. You should never stop testing your marketing campaigns and adjusting them accordingly. This includes:
- A/B testing of emails, landing pages– Using A/B testing tools (like Optimizely or Unbounce), learn which of two emails or landing pages converts users more successfully based in variances of language, design, or other elements.
- Email and landing page rendering– Use tools like Email on Acid to test how emails will render on different devices and platforms, ensuring that they look and function as they should.

- **Analytics and Reporting**
- Similarly, it is critical to analyze the right metrics in order to measure results effectively. You will need tools in place to collect accurate data on all your efforts, from your website to social media to SEO.
- Google Analytics is an essential tool for measuring and analyzing your site traffic. MOZ can help you study and improve your SEO results, while tools like Hootsuite provide detailed social media analytics.
- Analytics and testing help you truly understand what is working and what is not. Embrace them, use them. They will help you turn your marketing efforts from an art form into a science.

B to C marketing strategies.

- Business to customer **marketing**, commonly known as **B2C marketing**, is a set of **strategies**, practices, and **tactics** that a company uses to push its products or services to customers.
- **B2C** campaigns don't just focus on the benefit or value that a product offers, but also on invoking an emotional response from the customer.

- **B2C marketing strategies**
- Connect with prospects on a human level. Let's start with content marketing.
- Host creative and engaging contests.
- Add a free offer with every purchase.
- Prioritize searcher intent for SEO.
- Run retargeting programs.
- Create membership programs.
- Use social media.
- Build micro-influencer relationships.

- **1. Connect with prospects on a human level**
- Let’s start with content marketing. If you’re focused on building relationships with your prospects, you must treat them like human beings — not like potential ATMs who will dispense cash for your products.
- Whether you’re writing blog articles or posting on social media, create content that’s authentic to your voice and brand. Communicate with people on a human level, whether you’re sharing your own story or helping them understand their frustrations.
- The idea here is to present yourself and your business as a solution to whatever pain points your customers personally experience.

- •**Example**
- Let’s say that you create online courses to help people lose weight. Maybe you struggled with your own weight earlier in your life, so you know how it feels to struggle with yo-yo diets and New Year's’ Resolutions that never pan out.
- Use those experiences to connect with your audience. Post before and after photos, talk about weight-loss strategies that failed, and share your personal struggles. You can also talk about how you feel now that you’ve conquered your weight-loss struggles and triumphed over your former pain.
- People connect to stories like this. The message you’re sending is simple: “I figured out a way to beat this problem. Let me help you do the same.”

- **2. Host creative and engaging contests**
- Everyone loves a contest. The idea of winning something for free is almost too attractive to pass up — especially if an entry doesn't require much effort or time.
- You can host a contest on your blog, social media, or anywhere else that seems appropriate. Many entrepreneurs use webinars to hold contests. This way, you boost attendance for your webinar and gain exposure through the contest at the same time.
- The important thing is to make sure you're following the rules on whatever platform you choose. It's also essential to give away something that your target audience will view as valuable.
- You might be tempted to give away something expensive that doesn't relate to your business. Sure, lots of people would love a new flat-screen television, but if your online courses have nothing to do with TV, the contest won't have the desired result. Choose a giveaway that's related to what you do.

- **Example**
- Maybe you create online courses and other digital products on public speaking. You've created a mini-course and two full-length courses, so you decide to give away access to your mini-course in a contest.
- Let as many people know about your mini-course contest as possible. Describe what the course entails and how many people can win. Then, let potential participants know how they can enter the contest.
- You're an expert on public speaking, right? So maybe you could ask people to post photographs of themselves during public speaking engagements, or maybe you could ask them to record 15-second speeches. Whatever the rules, stick by them and choose a winner fairly. If you don't want to do a contest, host a giveaway instead.

- **3. Add a free offer with every purchase**
- Also known as a gift with purchase, a free offer with every purchase adds even more value to the product you sell. In other words, it lets people know that they're getting something extra without having to part with more money.
- That's a win for everyone involved. You get paid for your product, and the customer gets a bonus item in return.
- The free offer can be anything you want. Maybe it's a mini-course that's related to your main course. Or perhaps it's an e-book or workbook that will help your customers get better use out of your online course.

- **Example**
- Many of our Kajabi Heroes teach spirituality-based online courses.
- If you fall into that same niche, you could create a bonus offer for every purchase related to helping people find their own spirituality.
- Devotions, guided meditations, and similar products can prove extremely popular among your target audience. Alternatively, you could share a short e-book that complements your online course or create a video that shares your story.
- The important thing is to make sure your offer has true value. If you don’t want to create something as a bonus, you could offer a discount on another one of your products. For instance, everyone who buys your primary online course gets your mini-course for free.

- **4. Prioritize searcher intent for SEO**
- Many entrepreneurs fail to consider searcher intent when they optimize their content for SEO. We assume that all Google searches, for instance, are the same.
- They're not.
- Searcher intent refers to the reason behind a Google search. For example, if you want something to eat, you might search for "Chinese restaurants near me." If you're interested in cooking, you might search for "Chinese recipes for beginners."
- The type of search indicates its intent. Some consumers are just gathering information, others are comparing their options, and still more are ready to buy.
- Ideally, you'll create content for people in each phase. That way, they know you have all the answers.

- **Example**
- Let's say, for instance, that you're interested in getting in better shape.
- You might start by researching different types of physical activity:
- High-impact, Low-impact , Running , Cycling , Yoga ,Weight Training etc
- You're in the information-gathering phase at this point. You don't know how you want to get in better shape because you're not yet informed about the options that exist.
- You can target consumers in this phase by preparing comparison articles and charts. Help people understand their options so they can make an educated decision.

- But what if you already know what type of fitness interests you? For years, you've told yourself you'll start jogging every day, but now you're committed.
- In this phase, you're already aware. You're looking for the best product to help you become a consistent jogger.
- For this audience, you might create content on the benefits of jogging, jogging posture, daily guides, and more.
- You're demonstrating your expertise and presenting your product as a way to dive deeper into the subject.
- When you break down your audience by searcher intent, you can create content that's custom designed for each segment.
- You'd be surprised by how well this tactic works, especially if you're comfortable in your knowledge of your buyer personas.

- **5. Run retargeting programs**
- Retargeting sounds like a difficult concept, but it's actually pretty simple. It's all about reconnecting with consumers who have connected with your business in the past. It's particularly relevant for B2C marketing.
- As a form of paid advertising, retargeting can put a dent in your budget. However, if you use it correctly, the ROI can make the expense worth it.
- When a consumer makes contact with your business, a sequence gets triggered. The next time the customer visits Facebook, for example, he or she will see an ad for your business.
- That customer might not immediately click on the ad or buy from you. However, seeing the ad reinforces your brand image and helps the consumer remember your company in the future.

- **Example**
- Maybe you teach online courses related to web design. You help aspiring designers become better at their work and find paying jobs.
- You could remarket to potential customers who visit your website to read one of your blog posts or check out a landing page.
- If you have Facebook Ads set up, you can use a Facebook Pixel to retarget those customers.
- After visiting your site, the customer logs on to Facebook to check his or her wall. Right there in the feed is an advertisement for your web design course.

- **6. Create membership programs**
- Think of a membership program as a form of gamification.
- It encourages consumers to interact with your business so they can rise up the membership levels.
- Also called a loyalty program, a membership program combines competitiveness and rewards.
- As consumers move up the membership levels, they gain access to more rewards, which enhances their relationship with your business.

- **Example**
- You could create three membership levels for your business:
- **Bronze**: Customers at the bronze level receive free discounts on your digital products every quarter.
- **Silver**: Those who reach the silver level get a special downloadable asset twice a year in addition to the discounts.
- **Gold**: At the top level, consumers receive bronze and silver rewards as well as a free 15-minute phone consultation every year.
- Obviously, you could name the levels whatever you want and choose the rewards.
- You also decide how customers move up the levels.
- For instance, bottom-tier members might have spent between $1 and $100 in the preceding year, while silver members have to spend $300 and gold members have to spend $500.

- **7. Use social media**
- Many brands have achieved amazing success using social media.
- Some of them advertise on social, while others take the organic approach.
- If you don’t have any money in the budget for paid social, focus on building your following through strategic B2C marketing.
- There are lots of ways to get people more active on social when it comes to your brand.

- **Example**
- Let’s say you’ve just opened an Instagram account. You want to attract people who might be interested in your online courses, but you’re not sure where to start.
- Your strategy might look something like this:
- Follow 10 people per day who are interested in your niche or industry.
- Create a branded hashtag that you use on all of your posts.
- Use new hashtags every day that correspond to your subject or niche.
- Host contests that are exclusive to Instagram.
- Share inspirational or educational content that makes your followers feel like they’re part of a community.
- That’s a solid strategy. Plus, you can duplicate it for other platforms, from Facebook to Twitter.

- **8. Build micro-influencer relationships**

- When you say the word “influencer,” people often hear names like Kim Kardashian, Selena Gomez, and Beyonce. However, micro-influencers are often more engaging with their social content plus, they don’t cost millions of dollars.
- Micro-influencers are social media personalities in a very specific niche.
- They often have small but loyal and devoted followings of people who make buying decisions based on what the influencers say.
- And there’s your opportunity for B2C marketing greatness.
- Partnering with micro-influencers can be a boon to your business.
- You might send them free copies of your online courses, to get them interested.

- **Example**
  - Let's say that you're a Knowledge Commerce entrepreneur in the personal safety niche.
  - You've met a security expert on Instagram who has a pretty decent following.
  - You both want to teach people how to stay safe.
  - Approach that expert and ask him or her to take a look at your course.
  - If the influencer likes it, request that he or she promote it.
  - Some micro-influencers might charge money, but many don't.
  - If you start by building relationships, you'll spend less cash.

- **9. Invest in mobile-first marketing**
- The world is moving in a mobile-first direction.
- Many people don’t own laptop or desktop computers anymore.
- They do all of their computing via tablets, phones, and even watches.
- That’s why it’s critical for B2C marketers to adopt a mobile-first strategy.
- Figure out how your content will appeal to your audience best on mobile devices.
- It starts with a responsive website.
- If you build your website, you’ll automatically have a responsive layout that looks great across all devices.
- Plus, you won’t have to worry about managing two different sites: one for desktop and one for mobile.
- Additionally, you’ll want your posts to look great on mobile, from your blog to social media.
- Condense your images, use readable fonts, and make yourself accessible on mobile.

- **Example**
- If you're interested in starting a Knowledge Commerce business.
- You can begin building your business from the ground up without worrying about how people will reach you via mobile. It's ingrained in the platform.
- Make sure you're up-to-date on the best practices for marketing on mobile. Email marketing, SMS marketing, and social media marketing are all mobile friendly.
- You can also use gamification and other forms of engaging B2C marketing to get in touch with your target market on mobile.
- You don't have to forget about users on desktop completely, but consider the fact that your best customers might find you on their mobile devices.

- **The difference between B2C and B2B marketing**
- You might have noticed that every strategy we've listed deals specifically with B2C marketing.
- We're not addressing B2B marketing at all.
- There's a good reason for that.
- Some of the same tactics can work for B2B, but you have to adjust them for your audience.
- When you're marketing to businesses, for instance, you're targeting people who use different social media channels. Additionally, you have to target the right decision-maker at the business if you want to find success.

- Essentially, the difference between B2B and B2C marketing comes down to the end user.
- With B2C marketing, you only have to convince one person to buy.
- For B2B marketing, the opposite is often true.

- **Using B2C campaigns to grow your business**

- A well-rounded B2C marketing campaign can make a huge difference in your revenue. Regardless of which strategies you use, you can vastly improve your business's outlook and reach more consumers.
- What is B2C marketing?
- It's marketing campaigns directed at consumers or end users for personal purposes. It differs from B2B marketing, which targets other businesses as the buyers.
- B2C marketing works by helping you identify ways to communicate with your target audience and measure the results of each campaign.
- It allows you to persuade your target audience to choose your products over those of your competitors.
- You can try lots of B2C marketing strategies.

- Start by connecting with people on a human level. Talk to them like friends not potential customers.
- Host creative and engaging contests to further interest your target audience.
- Get them excited about your digital products and encourage them to spread the word.
- You can add a free offer with every purchase, optimize your SEO for user intent, run retargeting programs, and create membership programs.
- All of these strategies increase engagement during B2C marketing campaigns.
- Social media and micro-influencers are also beneficial for many B2C companies.
- Finally, don’t forget to invest in mobile-first marketing.
- Many of your target audience members use their mobile devices primarily or exclusively.
- You’re ready to start your next B2C marketing campaign. What strategy will you try first?

B to B branding strategies.

- The term **brand** refers to a business and marketing concept that helps people identify a particular company, product, or individual.
- **Brands** are intangible, which **means you** can't actually touch or see them. As such, **they** help shape people's perceptions of companies, their products, or individuals.

- **Brand strategy**, by definition, is a long term inter-departmental plan for a **brand** to achieve specific, pre-defined goals.
- A successful **brand strategy** must be well-designed and executed across all business functions, with the capacity to improve consumer experience, competitive advantage and financial performance.

- **5 Steps to Build Your B2B Brand**
- Outline **Your** Vision and Core Values.
- Define **Your** Target Market/Ideal Client.
- Determine Value Proposition.
- Create **Your B2B Brand** Narrative.
- Promote **Your Brand** Internally.

- **1. Outline Your Vision and Core Values**
- The first step in a B2B branding project is outlining your firm's vision, core values, and mission statement. These are the foundation of a brand and must be definitively outlined before creating logos, taglines, websites, copy, or any type of tangible collateral.
- The typical process for outlining vision, values, and a mission statement is a creative meeting of the C-level team or decision makers.
- Since these individuals are guiding the success of the company, they are the best group for determining the fundamental values of the organization.
- A mission statement should communicate the vision and values of the organization and how the company adds value.
- For example, Amazon.com's mission statement is "to be Earth's most customer-centric company, where customers can find and discover anything they might want to buy online, and endeavors to offer its customers the lowest possible prices." This mission statement shares the company's vision and communicates the value to its customers.

- **2. Define Your Target Market/Ideal Client**
- Next, determine who your target market is and what they “look” like.
- The simplest way to do this is to create a profile of an ideal client.
- The profile includes information about sex, occupation, age range, education level, geographical location, income, work environment, and job title.
- The profile creates a detailed snapshot of whom your company is trying to reach.
- Be sure to define their pain points and challenges as well, since that will help with your value proposition.

- **3. Determine Value Proposition**
- What compels clients to buy your products or services?
- Determine what unique offering or attribute your company provides that differentiates you from competitors and addresses a pain point or points for your clients.
- The value proposition focuses on the benefit of your product and service.
- A great value proposition answers the question, “Why should I be your client?” Stay away from listing features here since a client won’t care about features if your product or service doesn’t fulfill a need.

- **4. Create Your B2B Brand Narrative**
- At this point in the B2B branding project, it's time to create your brand narrative.
- This is essentially how you tell your "company's story."
- This is not the same as the company history. Storytelling, also referred to as messaging, is how you are going to communicate with your potential clients and educate them about why they need your product or service.
- By crafting an interesting and engaging brand narrative, you are educating your target market without them thinking they are being sold on a product or service.
- Your B2B brand narrative runs throughout your marketing strategy and is essential to keeping a consistent brand.

- **5. Promote Your Brand Internally**
- The final step in launching your new B2B brand includes getting company wide buy-in.
- It's counter-productive to launch a new brand if your internal staff doesn't understand it or even know about it.
- Sadly, many companies don't alert their employees about a new brand or a re-brand until it has launched and been communicated to the market.
- Every member of your organization is a brand ambassador in one way or another so make sure you share the elements of the brand with them prior to launch.
- Share the information with excitement to create internal buzz and show employees they have a stake in the company's success.
- Building a B2B Brand involves more than logo creation and a new email template.
- The branding process is an opportunity to define how your target market sees your company and views your products or services.

B to C branding strategies

- The **four brand strategies** are
- Line extension,
- B**rand** extension,
- New **brand strategy**,
- flanker/fight **brand strategy**

Line extension

- A product **line extension strategy** is an approach to developing new products for your existing customers or for prospects who do not currently buy from you.
- Extending a product **line** involves adding new features to existing products, rather than developing completely new products.

Brand extension

- A **brand extension** is when a company uses one of its established **brand** names on a new product or new product category.
- It's sometimes known as **brand** stretching.
- The **strategy** behind a **brand extension** is to use the company's already established **brand** equity to help launch its newest product

New brand strategy

- The **new brand strategy** is when a firm creates a **new brand** to go along with a **new** product.
- The **new brand strategy** is the most costly, since starting a **new brand** includes costs such as advertising, sales personnel, manufacturing costs and more

Flanker/fight **brand strategy**

- '**Flanker Brand**' essentially means a new **brand** that is introduced for an existing category of products which is intended to compete without harming an existing **brand's** reputation by targeting a different class or grade of consumers for these products

Web transaction logs

- Transaction logs, which are built into web server software, record user activity at a website.
- Log file analysis tools cull information from these files, which can contain tens to hundreds of entries for each user.
- Transaction log data becomes more useful when it is combined with registration form data and shopping cart data.
- Registration forms and shopping cart database are two other visitor generated data trails.

- Merchants
  use registration forms to gather personal data such as the name, address, phone number, zip code, e-mail address, and other optional information on the tastes and interests of the consumer.
- The shopping cart database captures all the item selection, purchase, and payment data.
- The data from transaction logs, registration forms , and the shopping cart database can also be combined with other information that users submit on product forms, contribute in chat rooms, or sub mit via e-mail messages to a firm to produce a veritable treasure trove of information for both individual merchant sites and for the industry as a whole

Cookies,

- Although the transaction log represents the foundation of online data collection, it is supplemented using cookies that are placed on a user's hard drive when he or she visits a site.
- Cookies allow a website to store data on a user's machine that can be retrieved later.
- Cookies provide marketers with a very quick means to identify each customer and to understand his or her prior behavior at the site

- Cookies can be used to determine how many people
- are visiting a site, how many are repeat visitors, and how often they have visited.
- They also make use of shopping cart and quick checkout possible by allowing a site to keep track of a user as he or she adds to the shopping cart.
- Cookies can be combined with web bugs to create cross-site profiles.
- Web beacons (sometimes called web bugs) are graphic files that are embedded in e-mails and on websites.
- When a user opens an HTML format e-mail with an embedded web beacon, a request is sent to the server for the graphic data.
- Web beacons are used to automatically transmit information about the user and the page being viewed to a monitoring server in order to collect personal browsing behavior and other personal information

Shopping cart database,

- A **shopping cart** on an online retailer's site is a piece of software that facilitates the purchase of a product or service.
- It accepts the customer's payment and organizes the distribution of that information to the merchant, payment processor and other parties.
- The **shopping cart database** stores information about the products and about the orders.
- It stores the catalog of products.
- It stores general information about the order, such as the customers' names and addresses, and the items selected for each order and when the order was submitted.

DBMS,

- A **Database Management System** (**DBMS**) is software designed to store, retrieve, **define**, and manage data in a database.

- it is general-purpose software that provides the users with the processes of defining, constructing and manipulating the database for various applications.
- Database systems are designed to manage large bodies of information.
- Management of data involves both defining structures for storage of information and providing mechanisms for the manipulation of information

- In addition, the database system must ensure the safety of the information stored, despite system crashes or attempts at unauthorized access.
- If data are to be shared among several users, the system must avoid possible anomalous results.
- A database management system (DBMS) is a collection of interrelated data and a set of programs to access those data.

- This is a collection of related data with an implicit meaning and hence is a database.
- The collection of data, usually referred to as the database, contains information relevant to an enterprise.
- The primary goal of a DBMS is to provide a way to store and retrieve database information that is both convenient and efficient.

- By data, we mean known facts that can be recorded and that have implicit meaning.
- For example, consider the names, telephone numbers, and addresses of the people you know.
- You may have recorded this data in an indexed address book, or you may have stored it on a diskette, using a personal computer and software such as DBASE IV or V, Microsoft ACCESS, or EXCEL.

SQL,

- **SQL** stands for Structured Query Language.
- **SQL** statements are used to perform tasks such as update data on a database, or retrieve data from a database.
- Some common relational database management systems that **use SQL** are: Oracle, Sybase, Microsoft **SQL** Server, Access, Ingres, etc.

- **SQL** has become a very **important** tool in a data scientist's toolbox since it is **critical** in accessing, updating, inserting, manipulating and modifying data.
- **SQL** is a special-**purpose** programming language designed to handle data in a relational database management system.
- A database server is a computer program that provides database services to other programs or computers, as defined by the client-server model.

Data mining,

- **Data mining** is the process of discovering actionable information from large sets of **data**.
- **Data mining** uses mathematical analysis to derive patterns and trends that exist in **data**.
- These patterns and trends can be collected and defined as a **data mining** model.
- **Data mining** is the process of understanding **data** through cleaning raw **data**, finding patterns, creating models, and testing those models. It includes statistics, machine learning and database systems

- Data mining is **used** in a variety of ways, such as database marketing, credit risk management, fraud detection, spam Email filtering, or even to discern the sentiment or opinion of users.
- The main purpose of **data mining** is extracting valuable information from available **data** that can be used to make predictions about future trends

CRM (customer relationship Management)

- It is an approach to managing a company's interaction with current and future customers.
- The CRM approach tries to analyze data about customers' history with a company, in order to better improve business relationships with customers, specifically focusing on retaining customers, in order to drive sales growth.
- One important aspect of the CRM approach is the systems of CRM that compile information from a range of different channels, including a company's website, telephone, email, live chat, marketing materials, social media, and more.

- The CRM approach and the systems used to facilitate CRM, businesses learn more about their target audiences and how to best cater to their needs.
- The adoption of the CRM approach may also occasionally lead to favouritism within an audience of consumers, leading to dissatisfaction among customers and defeating the purpose of CRM.

Types of CRM

- Operational CRM
- Analytical CRM
- Collaborative CRM

Operational CRM

- The primary goal of CRM systems is to integrate and automate sales, marketing, and customer support.
- These systems typically have a dashboard that gives an overall view of the three functions on a single page for each customer that a company may have.
- The dashboard may provide client information, past sales, previous marketing efforts, and more, summarizing all of the relationships between the customer and the firm.
- Operational CRM is made up of 3 main components:

1. Sales force automation
2. Marketing automation
3. Service automation.

Analytical CRM

- The role of analytical CRM systems is to analyze customer data collected through multiple sources, and present it so that business managers can make more informed decisions.
- Analytical CRM systems use techniques such as data mining, correlation, and pattern recognition to analyze the customer data.
- These analytics help improve customer service by finding small problems which can be solved, perhaps, by marketing to different parts of a consumer audience differently.

Collaborative CRM

- The third primary aim of CRM systems is to incorporate external stakeholders such as suppliers, vendors, and distributors, and share customer information across organizations.
- For example, feedback can be collected from technical support call, which could help provide direction for marketing products and services to that particular customer in the future.

Permission marketing,

- **Permission marketing** refers to a form of advertising where the intended audience is given the choice of opting in to receive promotional messages.
- **Permission marketing** is characterized as anticipated, personal, and relevant

Steps of Permission Marketing

- **Step** 1: Offer an Incentive. ...
- **Step** 2: Teach the Prospect Over Time.
- **Step** 3: Reinforce the Incentive. ...
- **Step** 4: Increase the Level of **Permission**. ...
- **Step** 5: Ask for the Sale.

- Facebook is a prime **example** – whether it is to post, share, or amplify, the marketer would have to send a friend request (or a **permission**) to the potential prospects.
- Opt-in email is an **example of permission marketing**, where Internet users request to receive information about a certain product or a service.

Affiliate marketing

- A marketing arrangement by which an online retailer pays commission to an external website for traffic or sales generated from its referrals
- **Affiliate marketing is the** process by which an **affiliate** earns a commission for **marketing** another person's or company's products.
- The **affiliate** simply searches for a product they enjoy, then promotes that product and earns a piece of the profit from each sale they make.

- Marketers promote their affiliate programs by offering bonuses to anyone who purchases the offer.
- For example, you could give a free ebook you wrote to any follower who makes a purchase.
- Promotions like this encourage customers to buy by sweetening the deal.
- Affiliate marketing is when an online retailer pays you a commission for traffic or sales generated from your referrals.
- Your followers purchase the product or service using your affiliate link.
- You get paid a commission for the sales made using your affiliate link

Viral marketing.

- **Viral marketing** refers to a technique in **marketing** a product or a service where users help in spreading the advertiser's message to other websites or the users create a scenario which can lead to multi-fold growth.

Introduction to Investment Management

Unit 1

Syllabus

- **Introduction Investment Management**
- Investment management, nature and scope, investment avenues, types of financial assets and real assets, Security return and risk – Systematic and unsystematic risk - sources of risk, Measurement of risk and return, sources of investment information, Fixed income – securities – bonds, preference shares – sources of risk, valuation, duration of bonds – theory of interest rates – yield curve, Bond innovations and their valuation.

Meaning of Investment

- Investment is the process of sacrificing something now for gaining something later.
- **Investment** is commitment of Funds made for a time period that will compensate the investor for-
- The time the funds are committed;
- The expected rate of inflation; and
- The uncertainty of future payments.

Meaning of Investment Management

- Investment management is the professional asset management of various assets & securities in order to meet the specified investment goals for the benefit of Investors.

Nature of Investment Management

- Employment of fund managers
- Research about individual assets & asset classes
- Scope for dealing, settlement, marketing…etc
- Scope for internal auditing, preparation of reports for clients
- Apart from marketing & investing, investment also requires compliance staff

Scope of Investment Management

- Identification of Investors requirement
- Formulation of Investment policy & strategy
- Execution of Strategy
- Monitoring of investment or portfolio

Investment Avenues

- **Fixed Principal Investment**
- Savings Bank a/c
- Savings Certificate
- Govt Bonds

- **Variable Principal Investment**
- Equity Shares
- Convertible Debentures
- Preference Shares

- **Non-security Investment**

- Real Estate
- Mortgages
- Commodities
- Business Ventures
- Art & Antiques
- Bullion

- **Indirect Investment Avenues**
- Pension Fund
- Provident Fund
- Insurance Companies

Types of financial assets and real assets

- Types of Financial Assets
- Equity Shares
- Preference Shares
- Debentures
- Savings Certificate
- Government Securities

Equity Shares

- Blue chip Shares
- Shares of well established & financially strong & companies which have good record of earning & paying regular dividends
- Growth Shares
- The shares of companies which have very good growth in their value of investment or shares
- Income Shares
- Cyclical Shares
- Defensive Shares
- Speculative Shares

- Debentures

- A debenture is a document under the companies seal which promises payment of interest & principal

Types of Real assets

- Tangible Assets
- Residential Property
- Commercial Property
- Agricultural lands
- Buildings
- Machines…etc

- Intangible Assets
- Goodwill
- Patent
- Trademark
- Copyright

Money Market Securities

- Treasury Bills

- They are short term instrument issued by government. Treasury bills are sold at a discount & redeemed at par. Treasury bills are bearer instruments.

- Certificate of Deposit
- These are marketable receipt for funds that have been deposited in their bank for a fixed period of time.

- Commercial Papers
- These are short term unsecured promissory note sold by large business firms to raise funds. These are sold at par or maturity

Security Risk & Return

- It is a condition in which there is a possibility of an adverse deviation from a desired outcome (profit) that is expected.

Causes or Sources of Risk

- Investing in wrong place
- Investing at wrong time
- Interest rate risk
- Wrong method of Investment
- Wrong quality of Investment
- Nature of Industry in which the company is operating
- Credit worthiness of the Issuer
- Length of the Investment
- Terms of Lending
- National & International factors
- Natural Calamities

Types of Risk

- Systematic Risk
- Unsystematic Risk
- Individual & Group Risk
- Financial & Non-financial Risk
- Pure & Speculative Risk
- Static & Dynamic Risk

Systematic Risk

- Systematic risks are the risks which are caused by factors that affect the whole system. This risk cannot be avoided. This risk occurs due to economic, social & political changes

Types of Systematic Risk

- Market Risk
- Interest rate Risk
- Purchasing Power Risk
- **Market Risk**
- Variations in prices due to changes in political & economic events are known as market risk.
- **Interest rate Risk**
- Generally process of securities move inversely with changes in rate of interest
- **Purchasing Power Risk**
- Uncertainty of purchasing power is referred to a risk due to inflation

Unsystematic Risk

- Unsystematic risk is that portion of risk which is caused due to factors related to that particular firm.
- Unsystematic risk can be diversified & can be controlled

Types of Unsystematic Risk

- Business Risk
- Financial Risk
- Credit risk or Default Risk
- **Business Risk**
- It can be internal as well as external. Internal risk occurs due to company or firms problems. External risks are those which occurs due to external factors (such as Competitors).

- **Financial Risk**
- Financial risk is associated with the capital structure of the company & how company manages its funds.

- **Credit risk or Default Risk**
- If the company supplies goods on credit & if it's not able to recover the money then it faces credit risk.

- **Individual & Group Risk**
- If a risk affects one particular group or type of companies, then it is called Group risk.
- If a risk affects only one particular company in a group it is called as Individual risk.
- **Financial & Non-financial Risk**
- **Pure & Speculative Risk**
- Pure risks are those situations where possibility of loss may or may not be there. If such risk is insured losses can be avoided.
- Speculative risks are those risks where there is possibility of profit or loss & this risk cannot be insured.

- **Static & Dynamic Risk**
- Static risks are more or less predictable.
- Dynamic risk is one which cannot be predicted.

INVESTMENT V/S SPECULATION

- Investment is the application of money for earning more money. Investment also means savings or savings made through delayed consumption. According to economics, investment is the utilization of resources in order to increase income or production output in the future. An amount deposited into a bank or machinery that is purchased in anticipation of earning income in the long run is both examples of investments

- **Speculation :** Speculation is the practice of engaging in risky financial transactions in an attempt to profit from short or medium term fluctuations in the market value of a tradable good such as a financial instrument, rather than attempting to profit from the underlying financial attributes embodied in the instrument such as capital gains, interest, or dividends. Many speculators pay little attention to the fundamental value of a security and instead focus purely on price movements. Speculation can in principle involve any tradable good or financial instrument. Speculators are particularly common in the markets for stocks, bonds, commodity futures, currencies, fine art, collectibles, real estate, and derivatives.

Difference between Investment and Speculation

- 1. Investment is all about value creation

  (e.g. manufacturing products and providing services) while speculation is concerned about price movement.

- In the Speculation, you profit purely from price differences. The price movement is mostly influenced by the psychology of the market.

- 2. Investment is has lower risk but need more capital to generate more value while speculation is challenging, has higher risk but requires less capital. This explains why most people are speculating because its entry requirement (capital) is lower.
- 3. Investment is about getting what market offers you while speculation is about trying to get more by doing more in believing that you can beat the market.
- 4. Investment is about doing least since you let the companies or industries work for you by owning a piece of their businesses while speculation is about doing the most (unconsciously) and it is more involving because you keep chasing the price movement. You need to keep buying and selling to generate profit.

- 5. Investment is over long term while speculation is of shorter term. For the former, the success rate is highest by maximizing the holding period of a position while for the latter; the success rate will peak if the position is kept open for the shortest time possible. This also explains why people like to speculate because it provides "shortcuts" to wealth.
- 6. Investment is about simplicity while speculation is about complexity (timing market, predicting market direction, stock picking…). That's why most people fail when speculating. It gives a false sense of simplicity.
- 7. Investment = growing system (like a living organic creature) while speculation = zero- sum game (one person's gain is another person's loss). The former will grow over time while the latter remains constant or shrinking over time.

Factors to be considered in investment decision or Investment attributes / Objectives or Characteristics of Investment:

- ***1.* Return:** Return refers to expected rate of return from an investment.
- Return is an important characteristic of investment.
- Return is the major factor which influences the pattern of investment that is made by the investor.
- Investor always prefers high rate of return for his investment.
- Returns could be in the form of dividend, interest, capital gain etc.
- Returns depend upon the factors such as nature of the investment, the maturity period, stability of earnings etc.

- **2. Risk:** If an investor is risk averse , he can invest in bank deposits, government securities, life insurance, provident fund, PPF, debentures etc. If an investor is a risk taker he can choose the equity shares, precious metals, real estate and mutual funds etc. Higher risk will lead to higher return. But in practice higher risk may always not guarantee higher return.
- **3. Safety:** Safety is another feature which an investor desires for his investments. Safety implies the certainty of return of capital without loss of money or time. Every investor expects to get back his capital on maturity without loss and without delay. In other words safety refers to the protection of investor's principal amount and expected rate of return.

- ***4.* Liquidity:** An investor which is easily saleable or marketable without loss of money without loss of time is said to be possess liquidity. Liquidity means that investment is easily realizable, saleable or marketable. When the liquidity is high, then the return may be low.
- ***5.* Marketability:** Marketability refers to buying and selling of securities in market. Marketability means transferability or sale ability of an asset. Securities are listed in a stock market which are more easily marketable than which are not listed. Public Limited Companies shares are more easily transferable than those of private limited companies.

- ***6.* Capital Growth:** Capital Growth refers to appreciation of investment. Capital growth has today become an important characteristic of investment. Growth of investment depends upon the industry growth.
- ***7.* Stability of Income:** It refers to constant return from an investment . Another major characteristic feature of the investment is the stability of income. Stability of income must look for different path just as security of principal. Every investor always considers stability of monetary income.
- ***8.* Tax shelter:** An investor can avail tax exemptions by investing in the government securities, PF, PPF, Indira Vikas Patras, Insurance and selected mutual funds.

INVESTMENT PROCESS

- Investment Policy
- Security Analysis
- Investment valuation
- Portfolio Construction
- Portfolio Evaluation

INVESTMENT PROCESS:

- 1. **Investment Policy:** Investment policy is the first stage of the investment process. The investor formulates the policy for systematic functioning.
- It determines the following aspects of the investor:
- a. Availability of funds i.e. savings or borrowings for investment
- b. Main objective of investment is to earn return, need for regular income and liquidity.
- c. Investor should have adequate knowledge of investment alternatives, avenues, risk associated, returns, operations of stock exchanges and brokers.

- **Security Analysis:** Security analysis is the second stage of the investment process. Once the investment policy is formulated, then the securities have to be scrutinized through:
- a. Economic analysis: GDP and inflation growth are reflected in stock prices. Stock prices fluctuate in short run, but move in trends in the long run
- b. Industry analysis: Industries contribute a lot of output as well as to the economic growth.
- c. Company analysis: It helps the investor make better decisions. Company's earnings, profitability, operating efficiency, capital structure and management must be screened.

- **3. Investment valuation:**

- Valuation of the securities is the third stage of the investment process. This stage involves
- a. Valuation of stocks
- b. Valuation of Debentures and Bonds
- c. Valuation of other assets

- Valuation helps the investor determine the return and risk expected from the investment. There are 2 values:
- i. Intrinsic value: It is measured through the book value of the share and P/E ratio.(ratio of a company's share price to EPS)
- ii. Future value: Future value of the securities could be estimated by using a statistical technique like trend analysis. The analysis of the historical behavior of the price enables the investor to predict future value.

- **Portfolio Construction:** Under portfolio construction stage, the investor has to allocate the wealth to different stocks. Investors need to appreciate that the risk of portfolio comes down if the portfolio is diversified. While including stocks in the portfolio, the investor has to watch its impact on the overall portfolio return and risk and also examine whether it is consistent with the initial investment objective.

- **Portfolio Evaluation:** The portfolio has to be managed efficiently. it consist of 2 steps:
- a. Appraisal: the return and risk performance of the security vary from time to time. The variability in returns of the securities is measured and compared. The developments in the economy, industry and relevant companies from which the stocks are bought have to be appraised.
- b. Revision: Revision depends on the result of the appraisal. The low yielding risky securities are replaced with high yielding less risk securities. To keep the return at a particular level necessitates the investor to revise the components of the portfolio periodically.

- **Concept of risk and return**
- Any rational investor, before investing his or her investable wealth in the stock, analysis the risk associated with the particular stock.
- The actual return he receives from a stock may vary from his expected return and is expressed in the variability of return.
- Risk The dictionary meaning of risk is the possibility of loss or injury; risk the possibility of not getting the expected return.
- The difference between expected return and actual return is called the risk in investment.
- Investment situation may be high risk, medium and low risk investment;

- 1.Buying government securities low risk
- 2.Buying shares of an existing
  Profit making company Medium risk
- 3. Buying shares of a new company High risk

- **Return**
- The major objective of an investment is to earn and maximize the return.
- Return on investment may be because of income, capital appreciation or a positive hedge against inflation.
- Income is either interest on bonds or debenture, dividend on equity, etc

- Rate of return: The rate of return on an investment for a period is calculated as follows:
- R = Forecasted dividend + Forecasted end of the period stock price ____ 1
  Initial Investment

or

$$R=(D/P_0)+(P_1-P_0)/P_0$$

Or

$$R=\sum (Xi)*P(Xi)$$

Question

- A share is currently selling at Rs120.An investor who is interested in the share anticipates that the company will pay a dividend of Rs.5 in the next year. Moreover, he expects to sell the share at Rs.175 after one year calculate the expected return from this investment.
- Solution
- R = Forecasted dividend + Forecasted end of the period stock price 1

  Initial Investment
- R= (5+175)/120 -1 = 0.5 or 50%

- A share is currently selling at Rs50. It is expected that a dividend of Rs 2 per share would be paid during the year and the share could be sold at Rs.54 at the end of the year. Calculate the expected return from the share.
- Ans : 12%

- R = Forecasted dividend + Forecasted end of the period stock price − 1
  Initial Investment
- $R=(D/P_0)+(P_1-P_0)/P_0$

Calculation of Risk

- Expected returns are insufficient for decision making.
- Risk aspect should also be considered.
- The popular measure of risk
- Variance or Standard deviation of the probability distribution of possible returns.
- Variance =
- $$\sigma^2 = \sum_{i=1}^{n} [(x_i - X)^2 p(X_i)]$$

- Standard deviation is the square root of the variance and is represented as σ
- $\sigma = \sqrt{\text{variance}}$

Sources of investment information

- Financial advisors
- Newspapers
- Business News channels
- Friends
- Banks
- Share Markets
- Financial companies

Unit 2

Securities Analysis

Syllabus

- Analysis of variable income securities,
- fundamental analysis – analysis of economy, industry analysis, company analysis – financial and non – financial, Equity valuation models,
- Options, futures, forwards, warrants, and their valuations,
- Technical analysis – Dow's theory, charts –Efficient market hypothesis and its implications, Tax aspects of investment,
- Securities Trading procedure.
- A Critical Survey of software packages for security analysis.

Analysis of variable income securities

- Active portfolio managers undertakes different types of analysis in order to attempt to select outperforming equities for the portfolios they manage.
- There are two types of analysis
- Fundamental analysis
- Technical analysis.

Fundamental analysis

- It is logical & systematic approach of estimating the future dividends and share price.
- It is a method of evaluating a security or asset by attempting to measure its intrinsic value by examining economic, financial & other quantitative and qualitative factors.

- Fundamental analysis is the examination of the underlying forces that affect the well being of the economy, industry groups, and companies. As with most analysis, the goal is to derive a forecast and profit from future price movements.

- At the national economy level, fundamental analysis might focus on economic data to assess the present and future growth of the economy.

- At the industry level, focus will be on examination of supply and demand forces for the products offered and other forces which affect the whole industry.

- At the company level, fundamental analysis involves examination of financial data, management, business concept and competition.

- To forecast future stock prices, fundamental analysis combines economic, industry, and company analysis to derive a stock's current fair value and forecast future value.

- If fair value is not equal to the current stock price, fundamental analysts believe that the stock is either over or under valued and the market price will ultimately gravitate towards fair value.

- Fundamentalists do not heed the advice of the random walkers and believe that markets are weak-form efficient.
- By believing that prices do not accurately reflect all available information, fundamental analysts look to capitalize on perceived price discrepancies.

Objectives of fundamental analysis

- To conduct a company's stock valuation & predict its probable price evolution.
- To make a projection on its business performance
- To evaluate its management & make internal business decisions.
- To calculate its risk

Uses/application of Fundamental analysis:

- It is used to evaluate a lot of information about the past performance and the expected future performance of company industry and the economy as a whole before taking investment decision.
- It is performed on historical and present data but with the goal of making financial forecasts.
- It attempts to study everything that can affect the security's value, including macroeconomic factors and individually specific factors.

- This approach is based on in-depth and all-around study of the underlying forces of the economy, conducted to provide data that can be used to forecast future prices and market development.
- Fundamental analysis can be composed of 3 layer analysis of economic, industry and company. A combination of the data is used to establish the true current value of the underlying assets, to determine whether they are over or under valued and to predict the future value of the underlying asset based on this information.
- It helps an investor obtain information about the overall state of market , attractiveness and state of a specific security as compared to other securities.

- Fundamental analysis consists of three layer analysis and they are.

- Economy Analysis
- Industry analysis
- Company Analysis

Economy Analysis

- The performance of a company depends much on the performance of the economy if the economy is in Boom, the industries and companies in general said to be prosperous.
- On the other hand, if the economy is in Recession, the performance of companies will be generally poor.
- The key economic variables are as follows that an investor must monitor as a part of the fundamental analysis.

- 1. GNP/GDP
- 2. Savings & Investment
- 3. Inflation
- 4. Agriculture
- 5. Interest Rates
- 6. Government Revenue, expenditure & deficits
- 7. Political stability
- 8. Infrastructure
- 9. Monsoon

Industry analysis

- An industry is a group of firms that have similar technological structure of production and produce similar products.
- Industry analysis refers to an evaluation of the relative strengths & weaknesses of particular industry.
- It is a market assessment tool designed to provide a business with an idea of the complexity of a particular industry.
- Porter's five force model is a framework for industry analysis to determine the competitive intensity.

- Following are the components of industry analysis:
- Competitive structure
- Permanence
- Phase of life cycle
- Vulnerability to external shocks
- Regulatory and Tax condition
- Labor condition
- Historical financial performance
- Financial & financing issues
- Industry stock price valuation

Company analysis

- It deals with return and risk of individual share and security.
- The analyst tries to forecast the future earning which has direct effect on share price.
- It involves a close investigative scrutiny of the company's financial aspects with a view to identifying its strength, weaknesses and future business prospects.

- The financial statement analysis is the study of a company's financial statement from various viewpoints.
- The statement gives the historical and current information about the company's operation.

- There are three steps of company analysis.
- Measuring earnings
- Forecasting earnings
- Applied valuations

- Financial Tools of company analysis:
- Balance sheet
- P&L account
- Comparative financial statements
- Trend analysis
- Common size statements
- Fund flow analysis
- Cash flow analysis
- Ratio analysis

Non-Financial analysis of company

- Company's market share
- Capacity utilization
- Modernization and expansion plans
- Order book position
- Good will of the company in market
- Reputation of company Directors
- Background of company owners

Equity Valuation Models

- Concept of present value : The present value concept is a fundamental concept used in share valuation procedure. An understanding of this concept is necessary for studying the share valuation process.
- Money has a “time value”. This implies that a rupee received now is worth more than a rupee to be received after one year.
- Time value of money suggests that money receivable now is more desirable than the money receivable later

- If an amount “P” is invested now for “n” years at “r” rate of interest, the future value of “F” to be received after “n” years can be calculated using the compound interest formula.
    - $P.V=P(1+r)^n$

- Example Problem
- If ₹.1,000/- is invested in a bank for three years at 10% interest , the amount to be received after the three year period can be calculated by using the above formula.

- $F=P(1+r)^n$
- $F=1000(1+0.1)^3$
- $F=1000(1.1)^3$
- $F=$ ₹.1331 /-

- We can calculate the future value of a present sum by using the above formula.

- Like calculating future value we can also calculate the present value of a sum to be received in future by a reverse process known as discounting.

- $P = \dfrac{F}{(1+k)^n}$

- If ₹500 would be received after two years and if the discount rate(interest rate) is 10% calculate the amount that has to be invested now.
- $P = \frac{F}{(1+k)^n}$
- $P = \frac{500}{(1+0.1)^2}$
- $P = \frac{500}{(1.1)^2}$
- P = ₹ 413.22

Share or equity valuation models

- One year holding period model
- Multiple year holding period model
- Constant growth model or Gordon's share valuation model
- Multiple growth model

One year holding model

- $S_o = \frac{D1}{(1+k)^1} + \frac{S1}{(1+k)^1}$

- D1 = Amount of dividend expected to be received at end of one year.
- S1 = Selling price expected to be realized on sale of the share at the end of one year
- K = Rate of return required by the investor.

Multiple year Holding year

$$S_o = \frac{D1}{(1+k)^1} + \frac{D2}{(1+k)^2} + \frac{D3}{(1+k)^3} + \frac{Dn+Sn}{(1+k)^n}$$

- D1,D2,D3…Dn = Annual dividends to be received each year.
- Sn = Sale price at the end of the holding price.
- K = Investors required rate of return.
- n = Holding period in years.

Constant Growth Model or Gordon's share valuation

- In this model it is assumed that dividends will grow at the same rate(g) into the indefinite future and that the discount rate(k) is greater than the dividend growth rate(g). By applying the growth rate (g) to the current dividend (Do), the dividend expected to be received after one year(D1) can be calculated as

- $D_1 = D_o (1+g)^1$

- The Dividend expected to be received after two years, three years etc can also be calculated from the current dividend as

- $D_2 = D_0 (1+g)^2$
- $D_3 = D_0 (1+g)^3$
- $D_n = D_0 (1+g)^n$

- The present value model for share valuation may now be written as

- $$S_0 = \frac{D_0(1+g)^1}{(1+k)^1} + \frac{D_0(1+g)^2}{(1+k)^2} + \ldots\ldots + \frac{D_0(1+g)^n}{(1+k)^n}$$

- When 'n' approaches infinity, this formula can be simplified as
- $$S_0 = \frac{D_1}{k-g} \quad \text{or} \quad \frac{D_0(1+g)}{k-g}$$

Multiple Growth Model or Two-stage growth model

- The constant growth assumption may not be realistic in many situations.
- The growth in dividends may be at varying rates.
- A typical situation for many companies may be that a period of extraordinary growth(either good or bad) will prevail for a certain numbers of years, after which growth will change to a level at which it is expected to continue indefinitely.

- This situation can be represented by a two-stage growth model.
- In this model, the future time period is viewed as divisible into two different growth segments, the initial extraordinary growth period and the subsequent constant growth period.
- During the initial period growth rates will be variable from year to year
- In subsequent years growth rate will be constant.
- The present value calculations will have to be spread over two phases

- Where one phase would last until time N and the other would begin after time N to infinity.
- The intrinsic value of the share is then the sum of the present values of two dividend flows
- a) The flow from period 1 to N which is represented as "V1"
- b) The flow from period N+1 to infinity is represented as "V2"
- Therefore $S_0 = V_1 + V_2$

Formula for Multiple Growth

- $V1$

- $$\frac{D_t}{(1+k)^t}$$

D = Dividend

k = Rate of return

t = time

$$V_2$$

$$\frac{D_N(1+g)}{(k-g)\,(1+k)^N}$$

$$V_1 + V_2$$

$$S_0 = \sum_{t=1}^{N} \frac{D_t}{(1+k)^t} + \frac{D_N(1+g)}{(k-g)\,(1+k)^N}$$

MEANING OF FUTURES

- An agreement traded on an organized exchange to buy or sell assets, especially commodities or shares, at a fixed price but to be delivered and paid for later.“ the existence of futures contracts allows sellers or buyers to hedge against risk“.

- A futures contract is a legal agreement to buy or sell a particular commodity or asset at a predetermined price at a specified time in the future. Futures contracts are standardized for quality and quantity to facilitate trading on a futures exchange .

- The buyer of a futures option contract has the right (but not the obligation) to assume a particular futures position at a specified price (the strike price) any time before the option expires.

- The futures option seller must assume the opposite futures position when the buyer exercises this right.

MEANING OF OPTIONS

- An **option** is a contract which gives the buyer (the owner or holder of the **option**) the right, but not the obligation, to buy or sell an underlying asset or instrument at a specified strike price on a specified date, depending on the form of the **option**.

- Options are a **contract** between two parties to exchange something.
- Options are contracts that have an expiration date.
- If the buyer of the option does not use (exercise) that option before the date, then it will be rendered null and void.

- A **call option** gives the buyer the right to purchase shares at a certain price, and it gives the seller the obligation to buy at a certain price.

- A **put option** gives the seller the right to sell shares at a certain price, and it gives the seller the obligation to sell at a certain price.

Meaning of Forwards

- A forward contract is a customized contract between two parties to purchase or sell an underlying asset in time and at a price agreed today (known as the forward price). The buyer of the contract is called the long. The buyer is betting that the price will go up. The seller of the contract is called the short.

- Investor A may make a contract with Farmer B in which A agrees to buy a certain number of Mango from B at Rs1500 per tonne. This contract must be honored whether the price of mango goes to Rs 1,000 or Rs2,000 per tonne.

Meaning of Warrants

- A stock warrant represents the right to purchase a company's stock at a specific price and at a specific future date.
- A stock warrant is issued directly by a company to an investor. Stock warrant are purchased when it is believed the price of a stock will go up or down.
- Stock warrants are typically traded between investors.

Bond Valuation

- Current Yield : The current market price of a bond in the secondary market may differ from its face value.
- A bond of face value Rs.100 may be selling at a discount, at say Rs.90, or it may be selling at a premium at Rs.115.
- The current yield relates the annual interest receivable on a bond to its current market price it can be expressed as follows

- Current Yield = $\frac{I_n}{P_0} \times 100$
- Problems.
- A bond of face value Rs.1000 and a coupon rate of 12% is currently selling for Rs800, find the current Yield of the bond.
- Current Yield = $\frac{I_n}{P_0} \times 100$
- Current Yield = $\frac{120}{800} \times 100 = 15\%$

- The Current yield would be higher than the coupon rate when the bond is selling at a discount.
- If the bond is selling at a premium than the current yield will be lesser the coupon rate

- Zero Coupon Bond or Deep discount bond : A Bond which does not pay annual interests. The return on this bond is in the form of a discount on issue of the bond.

Yield to Maturity (YTM)

- YTM is the compounded rate of return an investor is expected to receive from a bond purchased at the current market price and held to maturity.
- YTM is the real internal rate of return earned from holding a bond till maturity.

- $$YTM = \frac{I+[MV-C]/n}{[MV+C]/2}$$

- I = Amount of annual interest.
- MV = Maturity value at the end of the holding period.
- C = Cost or current market price of the bond.
- n= Holding period till maturity.

- Problems:
- A bond of face value of Rs 1,000/- and a coupon rate of 15%. The current market price of the bond is Rs900/-. 5 years remain to maturity and the bond is repaid at par. Calculate the YTM.

- Jaya ltd has issued 14% debenture of face value 100 which matures at par in 15 Years. Currently it sells at Rs 105. if the company buys back after 5 years at 114 calculate YTM.
- YTM = $\frac{I+[MV-C]/n}{[MV+C]/2}$
- $= \frac{14+[100-114]/5}{[100+114]/2}$
- $= \frac{14 + (-14)/5}{107} = \frac{14 + (-2.8)}{107} = 11.2/107 = 0.104$ or
- 10.46%

- YTM = $\dfrac{I+[MV-C]/n}{[MV+C]/2}$

- YTM= $\dfrac{150+(1000-900)/5}{(1000+900)2}$

- $= \dfrac{150+20}{950} = 0.1789 = 17.89\%$

- Jaya ltd has a 14% debenture with a face value of Rs.100 that matures at par in 15 Years. The debenture is callable in five years at Rs.114. It currently sells for Rs 105/- Calculate the following for the debeture
- Current Yield
- Yield to maturity.
- Solution :
- Current Yield = $\frac{I}{P_0} \times 100$
- $= \frac{14}{105} \times 100 = 13.33\ \%$

- Bond prices
- Present value of bond
- $$\sum_{t=1}^{N}$$
- $$P_o = \sum_{t=1}^{N} \frac{I_t}{(1+k)^t} + \frac{MV}{(1+k)^n}$$

- I = Annual interest payments.
- P_o = Current price.
- n = Number of years to maturity.
- k = Appropriate discount rate.
- MV = Maturity value of the bond.

- A bond of face value Rs.1000 was issued five years ago at a coupon rate of 10%. The bond had a maturity period of 10 years and as of today , therefore , five more years are left for final repayment at par. If the current market interest rate is 14% calculate the present value(p83).

- A person owns a Rs1000 face value bond with five years to maturity. The bond makes annual interest payments of Rs80. The bond is currently priced at Rs960.Given that the market interest rate is 10%, should the investor hold or sell the bond. (p93)

924.16

- A bond of face value Rs.1000 was issued five years ago at a coupon rate of 10%. The bond had a maturity period of 10 years and as of today , therefore , five more years are left for final repayment at par. If the current market interest rate is 14% calculate the present value(p83).

- Solution $\frac{100}{(1+0.14)1} + \frac{100}{(1+0.14)2} + \frac{1000}{(1+0.14)5}$
- 87.71 +76.94+67.49+59.20+51.93 + 519.36
- = 862.71

Technical analysis

- Technical analysis is a method of evaluating securities by analyzing the statistics generated by market activity, such as past prices and volume.

- Technical analysts do not attempt to measure a security's intrinsic value, but instead use charts and other tools to identify patterns that can suggest future activity.

- There are different types of technical traders. Some rely on chart patterns, others use technical indicators and oscillators, and most use some combination of the two.
- Technical analyst exclusive use historical price and volume data and this is what separates them from their fundamental analyst.
- Unlike fundamental analysts, technical analysts don't care whether a stock is undervalued - the only thing that matters is a security's past trading data and what information this data can provide about where the security might move in the future.

- The field of technical analysis is based on three assumptions:

- 1. The market discounts everything.

- 2. Price moves in trends.

- 3. History tends to repeat itself.

- The Market Discounts Everything:
- A major criticism of technical analysis is that it only considers price movement, ignoring the fundamental factors of the company. However, technical analysis assumes that, at any given time, a stock's price reflects everything that has or could affect the company - including fundamental factors.

- Technical analysts believe that the company's fundamentals, along with broader economic factors and market psychology, are all priced into the stock, removing the need to actually consider these factors separately. This only leaves the analysis of price movement, which technical theory views as a product of the supply and demand for a particular stock in the market.

- Price Moves in Trends: In technical analysis, price movements are believed to follow trends. This means that after a trend has been established, the future price movement is more likely to be in the same direction as the trend than to be against it. Most technical trading strategies are based on this assumption.

- History Tends To Repeat Itself : Another important idea in technical analysis is that history tends to repeat itself, mainly in terms of price movement. The repetitive nature of price movements is attributed to market psychology; in other words, market participants tend to provide a consistent reaction to similar market stimuli over time.

Dow's theory

- This theory was formulated by Charles.H.Dow a editor of wall street journal in USA.

- The basic assumptions of this theory are
- The market has three movements
  - Primary Movement
  - Secondary Movement
  - Minor Movement

- The "main movement", primary movement or major trend may last from less than a year to several years. It can be bullish or bearish.

- The "medium swing", secondary movement or intermediate reaction may last from ten days to three months and generally retraces from 33% to 66% of the primary price change since the previous medium swing or start of the main movement.

- The "short swing" or minor movement which are the day-to-day fluctuations in the market.

- The three movements have been compared to the tides, the waves and the ripples in the ocean.
- According to Dow theory, the price movements in the market can be identified by chart

- 2. Market trends have three phases Dow theory asserts that major market trends are composed of three phases:
- Accumulation phase,
- Public participation (or absorption) phase,
- Distribution phase.
- The accumulation phase (phase 1) is a period when investors "in the know" are actively buying (selling) stock against the general opinion of the market. During this phase, the stock price does not change much because these investors are in the minority demanding (absorbing) stock that the market at large is supplying (releasing).

- Eventually, the market catches on to these astute investors and a rapid price change occurs (phase 2). This occurs when trend followers and other technically oriented investors participate.
- This phase continues until rampant speculation occurs. At this point, the astute investors begin to distribute their holdings to the market (phase 3).

- 3. The stock market discounts all news Stock prices quickly incorporate new information as soon as it becomes available. Once news is released, stock prices will change to reflect this new information.

- 4. Stock market averages must confirm each other In Dow's time, the US was a growing industrial power. The US had population centers but factories were scattered throughout the country. Factories had to ship their goods to market, usually by rail.
- Dow's first stock averages were an index of industrial (manufacturing) companies and rail companies. To Dow, a bull market in industrials could not occur unless the railway average rallied as well, usually first.

- According to this logic, if manufacturers' profits are rising, it follows that they are producing more. If they produce more, then they have to ship more goods to consumers. Hence, if an investor is looking for signs of health in manufacturers, he or she should look at the performance of the companies that ship the output of them to market, the railroads. The two averages should be moving in the same direction.
- When the performances of the averages diverge, it is a warning that change is in the air. Both Barron's Magazine and the Wall Street Journal still publish the daily performance of the Dow Jones Transportation Average in chart form.
- The index contains major railroads, shipping companies, and air freight carriers in the US.
-

- Trends are confirmed by volume Dow believed that volume confirmed price trends. When prices move on low volume, there could be many different explanations. An overly aggressive seller could be present for example. But when price movements are accompanied by high volume, Dow believed this represented the "true" market view. If many participants are active in a particular security, and the price moves significantly in one direction, Dow maintained that this was the direction in which the market anticipated continued movement. To him, it was a signal that a trend is developing.
-

- 6. Trends exist until definitive signals prove that they have ended Dow believed that trends existed despite "market noise". Markets might temporarily move in the direction opposite to the trend, but they will soon resume the prior move. The trend should be given the benefit of the doubt during these reversals. Determining whether a reversal is the start of a new trend or a temporary movement in the current trend is not easy. Dow Theorists often disagree in this determination. Technical analysis tools attempt to clarify this but they can be interpreted differently by different investors.

Efficient market hypothesis and its implications,

- This hypothesis states that the capital market is efficient in processing information.
- An efficient capital market is one in which security prices is equal to their intrinsic values at all times and most securities are correctly priced.
- In efficient market hypothesis the security prices fully reflect all available information
- Efficient market model is actually concerned with the speed with which information is incorporated into security prices.

- The efficient market has internal and external efficiency there are 3 forms of efficient market hypothesis (EMH)
- 1. Weak form.
- 2. Semi strong form
- 3. Strong form
- **Weak Form** : Weak form deals with the information regarding the past sequence of security price movement. The weak form hypothesis tests whether all the information contained in historical prices of securities is fully reflected in current prices

- **Semi strong form** : This form tests whether publicly available information is fully reflected in current stock prices.

- **Strong form :** This form tests whether all the information both private or public information is fully reflected in security prices and any investor is able to earn excess returns

- Different types of test used by efficient market hypothesis are

- Serial correlation test
- Run test
- Filter test

Unit 3
Portfolio Management

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- Meaning of portfolio management, portfolio analysis, why portfolios? Portfolio objectives, portfolio management process, selection of securities.

- Portfolio theory, Markowitz Model, Sharpe's single index model. Efficient frontier with Lending and borrowing, optimal portfolio capital Asset pricing model, Arbitrage pricing theory two factor and multi factor models.

Meaning of portfolio management

- Investors invest in a group of securities rather than a single security in order to diversify the risk .
- The group of securities where investment is made by investor is known as Portfolio.
- To create portfolio best securities has to be selected out of many securities available in the market.
- After selecting best securities a portfolio is constructed and this constructed portfolio should be constantly observed and necessary changes has to be made by adding good securities and removing bad securities the process of adding and removing is known as Portfolio management.

Meaning of portfolio analysis

- The efficiency of each portfolio can be evaluated in terms of expected return and risk of the portfolio.

- Determining the expected return and risk of different portfolio is a primary step in portfolio management and this step is known as portfolio analysis.

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- Why portfolios?
- The reason for constructing portfolio is to diversify and reduced the risk associated with investment in the securities .

- What are Portfolio objectives
- To reduce the risk
- To get maximum return on investment at least risk
- To select best securities from available securities in the market
- To increase the value of investment of investor.

PORTFOLIO MANAGEMENT PROCESS

- Security analysis
- Portfolio analysis
- Portfolio selection
- Portfolio revision
- Portfolio evaluation

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- Security analysis
- There are over seven thousand companies listed in the stock exchange.
- There are variety of stock like convertible debenture, Deep discount bonds , zero coupon bonds, Flexi bonds , Floating rate bonds, GDR, euro-currency bonds etc..
- From the above a investor has to choose bonds to be included in his investment portfolio and this calls for detailed analysis of the available securities.
- Security analysis is the initial phase of the portfolio management process.
- Security analysis includes steps like risk-return examining of individual securities.

- A basic strategy in securities investment is to buy underpriced securities and sell over priced securities.
- The main problem is how to identify underpriced and over priced securities.
- The two approaches to security analysis is
- Fundamental analysis
- Technical analysis.
- Efficient market hypothesis

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- Portfolio analysis
- A portfolio is a group of securities held together as investment.
- Investors invest their funds in a portfolio of securities rather than in a single security because they are risk averse.
- By constructing a portfolio investors attempt to spread risk over many securities instead of single security.
- Security analysis provides the investor with a set of worth able securities.
- Portfolio analysis consists of identifying the range of possible portfolios that can be constituted from a given set of securities and calculating their return and risk for further analysis

- Portfolio Selection
- Portfolio analysis provides the basic information of possible securities to be included the next step is portfolio selection.
- Investor has to select a portfolio which provides the highest returns at a given level of risk.
- The inputs from portfolio analysis can be used to identify the set of efficient portfolios.
- From the set of efficient portfolios, the optimal portfolio has to be selected for investment.

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- Portfolio revision
- After constructing and selecting optimal portfolio , investor has to constantly monitor the portfolio to ensure portfolio gives expected return
- As the economy and financial markets are dynamic , changes take place almost daily because of this changes securities which were once attractive may cease to be so.
- New securities with promises of high returns and low risk may emerge.
- Investors have to revise his portfolio in the light of new developments in the market by removing unattractive shares and adding attractive shares from time to time.

- Portfolio Evaluation
- The objective of constructing and revising a portfolio is to earn maximum returns with minimum risk.
- Portfolio evaluation is the process which is concerned with assessing the performance of the portfolio over a selected period of time in terms of return and risk.
- Portfolio evaluation is a mechanism for identifying weakness in the investment process and to over come the weakness by taking appropriate measures
- Portfolio evaluation provides necessary feedback for designing a better portfolio next time.

SELECTION OF SECURITIES.

- Select securities based on return and risk.

Portfolio theory

- Markowitz Model

THEORIES OF PORTFOLIO CONSTRUCTION

- Markowitz Theory
- Sharpe's Single Index Model
- Capital Asset Pricing Model
- Arbitrage Pricing Theory

MARKOWITZ THEORY

- Dr. Harry Markowitz is credited with developing the first modern portfolio analysis model i.e., risk return optimization which is found in an article presented by Harry Markowitz in 1952 in journal of finance.
- Markowitz used mathematical programming and statistical analysis in order to arrange the optimum allocation of assets/securities within portfolio.
- He has provided a conceptual framework and analytical tool for the selection of an optimal portfolio.

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- Markowitz showed that the variance of the rate of return was a meaningful measure of portfolio risk under reasonable set of assumption, and he derived the formula for computing the variance of a portfolio.
- As the Harry Markowitz Model (HM Model) is based on the expected return (mean) and the standard deviation (variance) of different portfolios, it is called Mean-Variance Model.
- Through this model, the investor can find out the efficient set of portfolio by finding out the trade-off between risk return, between the limits of zero and infinity.

MARKOWITZ THEORY

Assumptions:

- Returns have a probability distribution.
- Risk is variability of returns.
- Investors have a utility curve (Utility is a function of expectation and risk perception of investors).
- Risk and return are key parameters.
- There is an efficient portfolio.
- Investors are risk-averse.
- Investors prefer larger returns.

MARKOWITZ THEORY

Propositions:

- Diversification is the key for reducing risk.
- Portfolio selection must be based on –
  - Minimum Risk (Concept of Correlation)
  - Efficient Frontier (Concept of Dominance)
  - Utility Analysis (Theory of Utility)

MARKOWITZ THEORY

Formulae:

- Stock Returns

  Historical (Ex-post)

  Single Period Return: $(D_1+P_1)/P_0$ Holding Period Return:

  Holding Period Yield: $[D_1 + (P1-P_0)]/P_0$

  Multi Period Return: A.M: $(r_1+r_2+\ldots\ldots\ldots r_n)$ / count on n

  G.M: $[(1+r_1)\ (1+r_2)\ldots\ldots(1+r_n)]^{1/n} - 1$

  Expected (Ex-ante)

  Rate of Return: $\Sigma x P(x)$

- Stock Risk

  $\sigma = \sqrt{(X-AM)^2 / n-1}$

  $\sigma = \sqrt{\Sigma[x-E(x)]^2 \text{ X } P(x)}$

MARKOWITZ THEORY

Formulae:

- Portfolio Returns

  $Rp = \Sigma WiRi$

- Portfolio Risk

  $\sigma^2 p = w_1^2\sigma_1^2 + w_2^2\sigma_2^2 + 2w_1w_2Cov_{12}$

  $\sigma^2 p = w_1^2\sigma_1^2 + w_2^2\sigma_2^2 + w_3^2\sigma_3^2 + 2w_1w_2Cov_{12} + 2w_1w_3Cov_{13} + 2w_2w_3Cov_{23}$

MARKOWITZ THEORY

Formulae for calculating Minimum Risk Portfolio of two stocks:

- *When there is Positive Correlation*:

  $W_x = (\sigma^2_y - Cov_{xy}) / \sigma^2_x + \sigma^2_y - 2cov_{xy}$

- *When the correlation is Zero*:

  $W_x = \sigma^2_y / \sigma^2_x + \sigma^2_y$

- *When there is perfect negative correlation*

  $W_x = \sigma_y / \sigma_x + \sigma_y$

MARKOWITZ THEORY

Limitations:

- Number of inputs required are huge [n X (n+3)] / 2
- Complexity of calculation

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- Process of portfolio selection
- On the basis of above assumptions, Markowitz has suggested that the process of portfolio selection may be approached by-
- □ Making probabilistic estimates of the future performance of securities i.e. identifying risk and return opportunity set.
- □ Analyzing those estimates to determine an efficient set of portfolio i.e. determining attainable efficient set.
- □ Selection from that set the portfolio best suited to the investor's preference i.e. selection of the optimal portfolio.
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- Identifying Risk and return opportunity set:
- The process of selection of optimum portfolio starts with the identification of the opportunity set of various portfolios in terms of risk and return. When an investors invests his funds in various securities, the effect of one security purchase over the effects of the other security purchase taken into consideration with 3 variables namely return, standard deviation, coefficient of correlation.

- Efficient set of portfolio:
- Markowitz has formulated the risk return relationship and developed the concept of efficient portfolio. An efficient portfolio is one which provides the maximum expected return for any particular degree of risk, or the lowest possible degree of risk for any given rate of interest. To understand the concept of efficient portfolios, compare various combinations of securities with the risk and expected return.

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- The selection of portfolios by the investor will be guided by three criteria:
- 1) Given two portfolio with the **same expected return**, the investor would prefer the one with the **lower risk**.
- 2) Given two portfolio with the **same risk**, the investor would prefer the one with the **higher expected return**.
- 3) Given portfolio with **higher expected return**, the investor would prefer the one with the **lower risk**.

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- **Sharpe's Single Index Model:**

- William F. Sharpe found this theory on the assumption that return index also changes like the market index.
- The basic notion underlying the single index model is that all stocks are affected by movement in stock market.
- It is because the casual observation of stock prices over a period of time reveals that most of the stock prices move with the market index.

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- **When market moves up i.e. when the market index increases prices of most of the shares tend to increase & vice-versa.**
- In other words correlation between the returns of securities can be obtained by relating the return of a stock to the return of the stock market index.
- This model has gained its popularity to a great extent in the arena of investment finance as compared to Markowitz model.

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- Sharpe tried to simplify the data inputs and data tabulation required for the Markowitz model of portfolio analysis, he suggested that a satisfactory simplification would be achieved by abandoning the calculation of covariance of each security with in the portfolio and substituting in its place the relationship of each security with a market index as measured by the single index model.

Additional Assumptions:

- Risk is the variance of expected portfolio returns.
- Risk can be broken into two components - diversifiable (Unsystematic) and non-diversifiable (systematic) risk.
- Proper diversification can reduce unsystematic risk.
- Beta is the relevant measure of risk for investors with diversified portfolios.
- Risk and return are linearly related by beta, i.e. risk and return are in equilibrium.

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- Stock's price vary because of the common movement in the stock market and there is no effects beyond the market that account the stock movements

- All investors have homogeneous expectations

- A uniform holding period is used in estimating risk and return for each security

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- The price movements of a security in relation to another do not depend primarily upon the nature of those two securities alone.
- They could reflect a greater influence that might have cropped up as a result of general business and economic conditions
- The relation between securities occurs only through their individual influence along with some indices of business and economic activities.
- The indices, to which the returns of each security are correlated, are likely to be some securities market proxy.
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- Formula to calculate return of an individual security may be expressed as

- $Rs = \alpha + Rm\ \beta s + e$
- Rs = expected return on security
- α = Alpha co-efficient or non market component of the return of security
- Rm = Rate of return on the market index.
- βs= Beta coefficient of security
- e= Error term or random residual error.

- The equation breaks the return on a stock into 2 components, one part due to market and other part independent of the market. The beta parameter in the equation measures sensitivity of stock return on the market index.
- It indicates how extensively the return of a security will vary with the changes in the market return.
- Example if beta is 2 of a security, then the return of the security is expected to increase by 20 % when market return increases by 10%.

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- The alpha parameter indicates what the return of the security would be when the market return is zero.
- Example a security with alpha 3 % would earn 3% return even when market return is zero.
- The final e is the unexpected return resulting from influences not identified by the model.
- It is referred to as the random or residual return.
- It may take on any value, but over a larger number of observations it will average out to zero.

- Total risk = Market related risk+ Specific risk

Formulae:

- *For calculating Stock Return:* $E(R) = \alpha + \beta_i R_m + e_i$
- *For Calculating Stock Risk* $Var\ (R) = \beta_i^2 \sigma_m^2 + \sigma_{ei}^2$
- *For calculating Portfolio Return:* $\Sigma x_i(\alpha_i + \beta_i R_m)$
- *For Calculating Portfolio Risk* $\sigma_p^2 = [(\Sigma x_i \beta_i)^2 \sigma_m^2] + [\Sigma x_i^2 \sigma_{ei}^2]$

CAPM

- The Capital Asset Pricing Model was developed by William E. Sharpe, the Nobel Laureate and many economists through the sixties.
- CAPM provides the link between return and non-diversifiable or systematic risk.
- Investors can use CAPM to assess the extent of additional return over risk free return for a given level of systematic risk of a risky investment.

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- The excess return earned over and above the risk free return is called the risk premium which is the reward for undertaking the risk. Thus, the basic theme of CAPM is that expected return of a security increases linearly with systematic risk, measured by beta.
- It uses the results of capital market theory to derive the relationship between expected return and systematic risk of individual securities portfolios.

- The CAPM can be expressed in the form of equation as follows:
- $R = Rf + \beta(Rm - Rf)$
- R= Expected rate of return from any individual security or portfolio of securities
- Rf= Risk free rate of return
- Rm= Expected rate of return on market portfolios
- B= The beta factor i.e market sensitivity index or measure of systematic risk of individual security or portfolio of securities.

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- For example, if the Future Capital Holdings has invested in equity shares of a blue chip company and its.
- Risk free return =9%
- Expected total return = 16%
- $\beta = 0.8$
- The expected rate of return as per CAPM will be
- $R = Rf + \beta(Rm-Rf)$
- $= 9 + 0.8 (16-9)$
- $= 9 + 0.8 \times 7$
- $= 9 + 5.6$
- $= 14.6\%$

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- CAPM explains the behavior of security prices and provides a mechanism whereby investors could assess the impact of a proposed security investment on the overall portfolio risk and return.
- It suggests that the prices of securities are determined in such a way that the risk premium or excess returns are proportional to systematic risk, which is indicated by the beta coefficient.
- The model is used for analyzing the risk – return implications of holding securities.

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- CAPM refers to the manner in which securities are valued in line with their anticipated risks and returns.
- A risk averse investor prefers to invest in risk free securities.
- For a small investor having few securities in his portfolio the risk is greater.
- To reduce the unsystematic risk, he must build up well diversified securities in his portfolio.

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- ASSUMPTIONS:
- The CAPM is based on several assumptions which are as follows:
- Market is Perfect: This means that all assets are marketable and that there are no transaction cost or taxes
- Risk – free Rate: There is a single risk free rate of return. Investors can freely borrow or invest at such risk free rate.
- Time period: Forecasts are for one time period only
- Diversification: Investors hold well diversified portfolios.

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- Homogenous Expectations: Investors have homogenous expectations about return. Return in turn is dependent on dividends and capital gains. Inflation and its effect on dividends and capital gains are ignored.
- Rational Investors: All investors are rational, that is , for a higher risk, they expect a higher return.
- Divisible: All stocks are infinitely divisible, and it will be possible for investors to invest in a fraction of a stock.

Assumptions of CAPM

- Investors make choices on the basis of risk and return. Investors choose only those portfolios with the highest rate of return for their preferred level of risk, or those with the lowest risk for their preferred rate of return.
- Investors have homogeneous expectations of risk and return.
- Investors have identical time horizon.
- Information is freely and simultaneously available to investors.

- There is a risk free asset, and investors can borrow and lend unlimited amounts at the risk free, rate.
- There are no taxes, transaction costs, restrictions on short rates, or other market imperfections.
- Total asset quantity is fixed and all assets are marketable and divisible. This assumption suggests that we can ignore liquidity and new issue of securities.
- Securities markets are efficient and a single investor can not affect the price.
- **All investors are efficiently diversified and have eliminated the unsystematic risk. Thus, only systematic risk is relevant in determining the estimated return.**

Limitations of CAPM

- The calculation of beta factor is very tedious as lot of data is required. The beta factor can be found by examining the security's historical returns relative to the return of the market portfolio. Further, the beta factor may or may not reflect the future variability of returns. The beta factor cannot be expected to be constant over time. It must be updated frequently.
- The assumptions of the CAPM are hypothetical and are impractical. For example, the assumption of borrowing and lending at the same rate is imaginary. In practice, the borrowing rates are higher than the lending rates.
- The required rate of return, Rs, specified by the model can be viewed only as a rough approximation of the required rate of return.

CAPITAL MARKET LINE

- The Capital Asset Pricing Model (CAPM) consists of two elements: the Capital Market Line and the Security Market Line(SML).
- The Capital Market Line (CML) defines the relationship between total risk and expected return for portfolios consisting of the risk- free asset and the market portfolio.
- If all the investors hold the same risky portfolio, then in equilibrium it must be the market portfolio.

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- CML generates a line on which efficient portfolios can lie.
- Those which are not efficient will however lie below the line.
- Portfolios having maximum return at each level of risk (standard deviation) are the efficient portfolios.
- Thus, the CML represents the equilibrium condition that prevails in the market for portfolios consisting of risk- free and risky investments.

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- All combinations of risky and risk free investments are bound by the CML and in equilibrium, all investors will end up with portfolio on the CML.
- It says that the expected return on the portfolio is equal to the risk- free rate plus a risk premium.
- The risk premium is equal to the market price of risky securities this quantifies the risk.
- The CML line also shows trade-off between Lending and borrowing of funds above the market portfolio

- CML shows the trade-off between the expected returns and risk for portfolios and the risk is measured by the standard deviation of the portfolio.
- The equation for CML is:
- $R_p = R_f + \frac{(R_m - R_f)}{\sigma_m} \sigma_e$
- R_p = Return on Portfolio
- R_f = Reward for waiting or Price of time.
- σ_e = Risk of a security
- σ_m = Risk of Market

- Expected return of portfolio can also be expressed in following according Capital Market Line.

- ER = Price of Time + (Price of risk)(Amount of risk)

- CML Provides a risk return relationship and a measure of risk for efficient portfolios.
- The appropriate measure of risk for an efficient portfolio is the standard deviation of return of the portfolio.
- There is a linear relationship between the risk as measured by the standard deviation and the expected return for these efficient portfolios.

Arbitrage Pricing Theory

- Arbitrage pricing theory (APT) is a well-known method of estimating the price of an asset.
- The theory assumes an asset's return is dependent on various macroeconomic market and security-specific factors.
- Finance arbitrage pricing theory (APT) is a general theory of asset pricing that tells the expected return of a financial asset can be modeled as a linear function of various macro-economic factors or theoretical market indices, where sensitivity to changes in each factor is represented by a factor-specific beta coefficient.

- The model-derived rate of return will then be used to price the asset correctly - the asset price should equal the expected end of period price discounted at the rate implied by the model. If the price diverges, arbitrage should bring it back into line. The arbitrage refers to buying in the low priced market and selling in the high priced one to gain from price differences for bringing about equilibrium in the market price of a security. The buying and selling activities of the arbitrageur reduces and eliminates the profit margin, and thus, bringing the market price to the equilibrium level.

- Assumptions
- The investors have homogenous expectations.
- The investors are risk averse and utility maxi misers.
- A perfect competition prevails in the market and there is no transaction cost.
- The security returns are generated according to factor model.
- Risk return analysis is not the basis.

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- The APT Model
- Returns of the security are influenced by a number of macroeconomic factors which explains the risk/ risk premium relationship of a particular security.
- The objective of security analysis is to identify these factors in the economy and the sensitiveness of security return to movements in these factors.
- The APT which was developed by Stephen Ross has given a four factor model which explains the risk/ risk premium relationship of a particular security.

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- Factors effecting APT
- In APT Model, the basic question is what are these factors? They are the underlying economic forces that have primary influences on the stock market. Following are some of the factors:
- Changes in level of industrial production in the economy.
- Changes in the real interest rate.
- Changes in the inflation rate.
- The level of personal consumption.
- The level of money consumption. Etc

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- Limitations of APT:
- 1. Undefined factors: In APT model. The factor are not well defined, Hence the investor find it difficult to establish equilibrium relationship. The well-defined market portfolio is a significant advantage of the CAPM leading to the wide usage of model in the stock market.

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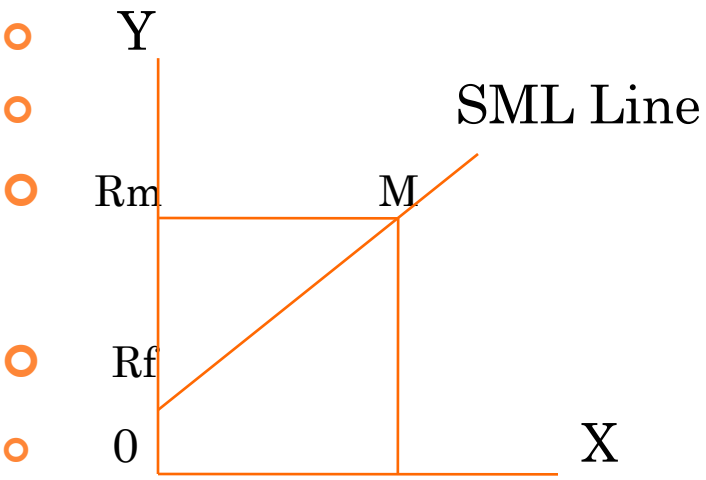
- 2. Lack of Consistency: The factor that have impact on the one group of security may not effect another group of security. There is a lack of consistency in the measurement of the APT model.
- 3. Lack of independence: Further the influence of the factor is not independent of each other .it may be difficult to identify the influence that corresponds exactly to each factor. Apart from this, not all variable that exert influence on a factor are measurable.

Security Market Line (SML)

- SML gives an explanation about the relationship between the required rate of return and its beta factor.
- Unsystematic risk tends to become zero by a well diversified portfolio and the remaining risk is systematic risk measured by beta.
- The correct measure of a security's risk is beta.
- The expected return of a security or a portfolio should be related to the risk of that security or portfolio as measured by β(beta).

- ß is a measure of security's sensitivity to change in a market return.
- Beta greater than 1 indicates higher sensitivity to market changes.
- Beta lesser than 1 indicates lower sensitivity to market changes.
- Beta equal to 1 indicates that the security moves at the same rate and in same direction as the market. Thus, the beta of the market may be taken as one.
- The relationship between expected return and beta of a security can be determined graphically.



- In the above XY graph expected returns are plotted on the Y axis and beta coefficients are plotted on X axis.
- A risk free asset has an expected return equivalent to Rf and beta coeficient of zero.
- The market portfolio M has b beta coefficient of one and expected return equivalent to Rm.
- The straight line joining these two points is known as SML.

- The SML provides the relationship between the expected return and beta of a security or portfolio.
- The relationship can be expressed in the form of the following equation
- E(R) on security = R(f) + (ß x risk premium of market)

PRODUCTION AND OPERATIONS MANAGEMENT

SYLLABUS

- **UNIT I:**
- **INTRODUCTION TO PRODUCTION AND OPERATIONS MANAGEMENT .**

- Introduction - Meaning and Definition; Classification - Objectives and Scope of Production and Operation Management; Automation: Introduction, Meaning and Definition, Needs, Types, Advantages and Disadvantages.

CHAPTER I

- **INTRODUCTION TO PRODUCTION AND OPERATIONS MANAGEMENT.**

- **Meaning of Production Management:**

- Production Management refers to the application of management principles to the production function in a factory. In other words, production management involves application of planning, organizing, directing and controlling the production process.

.student activity

- Production Management refers to the application of
- Management Principles

- Production Management deals with decision-making related to production process. So that the resulting goods and services are produced in accordance with the quantitative specifications and demand schedule with minimum cost.

Student activity

- Production Management deals with ---------- ------ related to production process. So that the resulting goods and services are produced in accordance with the quantitative specifications and --------- ---------- with ----------.

Definition:

- Production / Operations Management is defined as the process which transforms the inputs/resources of an organization into final goods (or services) through a set of defined, controlled and repeatable policies.

Objectives of production management

- 1. Right Quality
- 2. Right Quantity
- 3. Manufacturing Cost
- 4. Pre established cost (Manufacturing cost)

Right Quality

- The quality of the product is established based upon the customers' needs. Customer's needs are translated in to product specifications by the design or engineering department. The manufacturing department then translates these specifications in to measurable objectives.
- Thus the cost quality trade off decides the final quality of the product. Thus a proper balance must be obtained such that the product quality offered to the customer should be within the pre-established manufacturing cost.

Right Quantity

- The manufacturing organization should produce the products at the right number.
- If the products are produced in quantity excess of demand the capital will block up in the form of inventory and if it is produced in quantity short of demand, there will be shortages of products. Thus a decision is to be taken regarding how much to produce. (Right quantity)

Manufacturing Cost

- Manufacturing costs are established before the product is actually manufactured. The manufacturing department has to manufacture the products at the pre-established cost. In any case, any variation between the actual costs and the standard (pre established) should be kept at minimum.

Manufacturing Schedule

- Timeliness of delivery (schedule) is one of the important parameter to judge the effectiveness of production department. There are many reasons like non-availability of materials at right time, absenteeism, machine break down etc. Which affect the timely completion of the products. So the manufacturing department should organize its activities in such a way that the products will be manufactured as per schedule.

The main objectives may be one or more of the following:

- ***a. Efficiency:***
- Increased output for a given input.
- ***b. Productivity:***
- Increased production using given resources.
- ***c. Economy:***
- Production is more economical (done at reduced cost).
- ***d. Quality:***
- Good quality products at reduced cost.
- ***e. Reduced processing time:***
- Increased production within a given amount of time.

Types of Production

- Some of the most important types of production are:
- Job Production
- Batch production
- Mass or flow production

Job Production

- Under this method peculiar, special or non-standardized products are produced in accordance with the orders received from the customers. As each product is non- standardized varying in size and nature, it requires separate job for production. The machines and equipment's are adjusted in such a manner so as to suit the requirements of a particular job.
- Job production involves intermittent process as the work is carried as and when the order is received. It consists of bringing together of material, parts and components in order to assemble and commission a single piece of equipment or product.
- Ship building, dam construction, bridge building, book printing are some of the examples of job production.

Characteristics of job production

- A large number of general purpose machines are required.
- A large number of workers conversant with different jobs will have to be employed.
- There can be some variations in production.
- Some flexibility in financing is required because of variations in work load.

- A large inventory of materials, parts and tools will be required.
- The machines and equipment setting will have to be adjusted and readjusted to the manufacturing requirements.
- The movement of materials through the process is intermittent.

Limitations of Job production

- The economies of large scale production may not be attained because production is done in short-runs.
- The demand is irregular for some products.
- The use of labour and equipment may be inefficient.
- The scientific assessment of costs is difficult.

Batch production

- Batch production pertains to repetitive production. It refers to the production of goods, the quantity of which is known in advance. It is that form of production where identical products are produced in batches on the basis of demand of customers' or of expected demand for products.
- Under batch system of production the work is divided into operations and one operation is done at a time. After completing the work on one operation it is passed on to the second operation and so on till the product is completed.

Batch production method characteristics:

- The work is of repetitive nature.
- There is a functional layout of various manufacturing processes.
- One operation is carried out on whole batch and then is passed on to the next operation and so on.
- Same type of machines is arranged at one place.
- It is generally chosen where trade is seasonal or there is a need to produce great variety of goods.

Mass or flow production:

- This method involves a continuous production of standardized products on a large scale. Under this method, production remains continuous in anticipation of future demand. Standardization is the basis of mass production. Standardized products are produced under this method by using standardized materials and equipment. There is a continuous or uninterrupted flow of production obtained by arranging the machines in a proper sequence of operations. Process layout is best suited method for mass production units.

Characteristics:

- The units flow from one operation point to another throughout the whole process.
- There will be one type of machine for each process.
- The products, tools, materials and methods are standardized.
- Production is done in anticipation of demand.
- Production volume is usually high.
- Machine set ups remain unchanged for a considerable long period.
- Any fault in flow of production is immediately corrected otherwise it will stop the whole production process.

Suitability of Mass Production

- There must be continuity in demand for the product.
- The products, materials and equipments must be standardized because the flow of line is inflexible.
- The operations should be well defined.
- It should be possible to maintain certain quality standards.
- It should be possible to find time taken at each operation so that flow of work is standardized.
- The process of stages of production should be continuous.

Advantages of mass production:

- The product is standardized and any deviation in quality etc. is detected at the spot.
- There will be accuracy in product design and quality.
- It will help in reducing direct labour cost.
- There will be no need of work-in-progress because products will automatically pass on from operation to operation.
- Since flow of work is simplified there will be lesser need for control.
- A weakness in any operation comes to the notice immediately.
- There may not be any need of keeping work-in-progress, hence storage cost is reduced.

Functions or Components of Production Management

The **components** or functions of production management are as follows

- Selection of Product and Design,
- Selection of Production Process,
- Selecting Right Production Capacity,
- Production Planning,
- Production Control,
- Quality and Cost Control,
- Inventory Control, and
- Maintenance and Replacement of Machines

Selection of Product and Design,

- Production management first selects the right product for production. Then it selects the right design for the product. Care must be taken while selecting the product and design because the survival and success of the company depend on it. The product must be selected only after detailed evaluation of all the other alternative products. After selecting the right product, the right design must be selected. The design must be according to the customers' requirements. It must give the customers maximum value at the lowest cost. So, production management must use techniques such as value engineering and value analysis.

Selection of Production Process

- Production management must select the right production process. They must decide about the type of technology, machines, material handling system, etc.

- Selecting Right Production Capacity

- Production management must select the right production capacity to match the demand for the product. This is because more or less capacity will create problems. The production manager must plan the capacity for both short and long term's production. He must use break-even analysis for capacity planning.

4. Production Planning

- Production management includes production planning. Here, the production manager decides about the routing and scheduling.
- **Routing** means deciding the path of work and the sequence of operations. The main objective of routing is to find out the best and most economical sequence of operations to be followed in the manufacturing process. Routing ensures a smooth flow of work.
- **Scheduling** means to decide when to start and when to complete a particular production activity.

Production Control

- Production management also includes production control. The manager has to monitor and control the production. He has to find out whether the actual production is done as per plans or not. He has to compare actual production with the plans and finds out the deviations. He should then takes necessary steps to correct these deviations.

Quality and Cost Control

- Production management also includes quality and cost control. Quality and Cost Control are given a lot of importance in today's competitive world. Customers all over the world want good-quality products at cheapest prices. To satisfy this demand of consumers, the production manager must continuously improve the quality of his products. Along with this, he must also take essential steps to reduce the cost of his products.

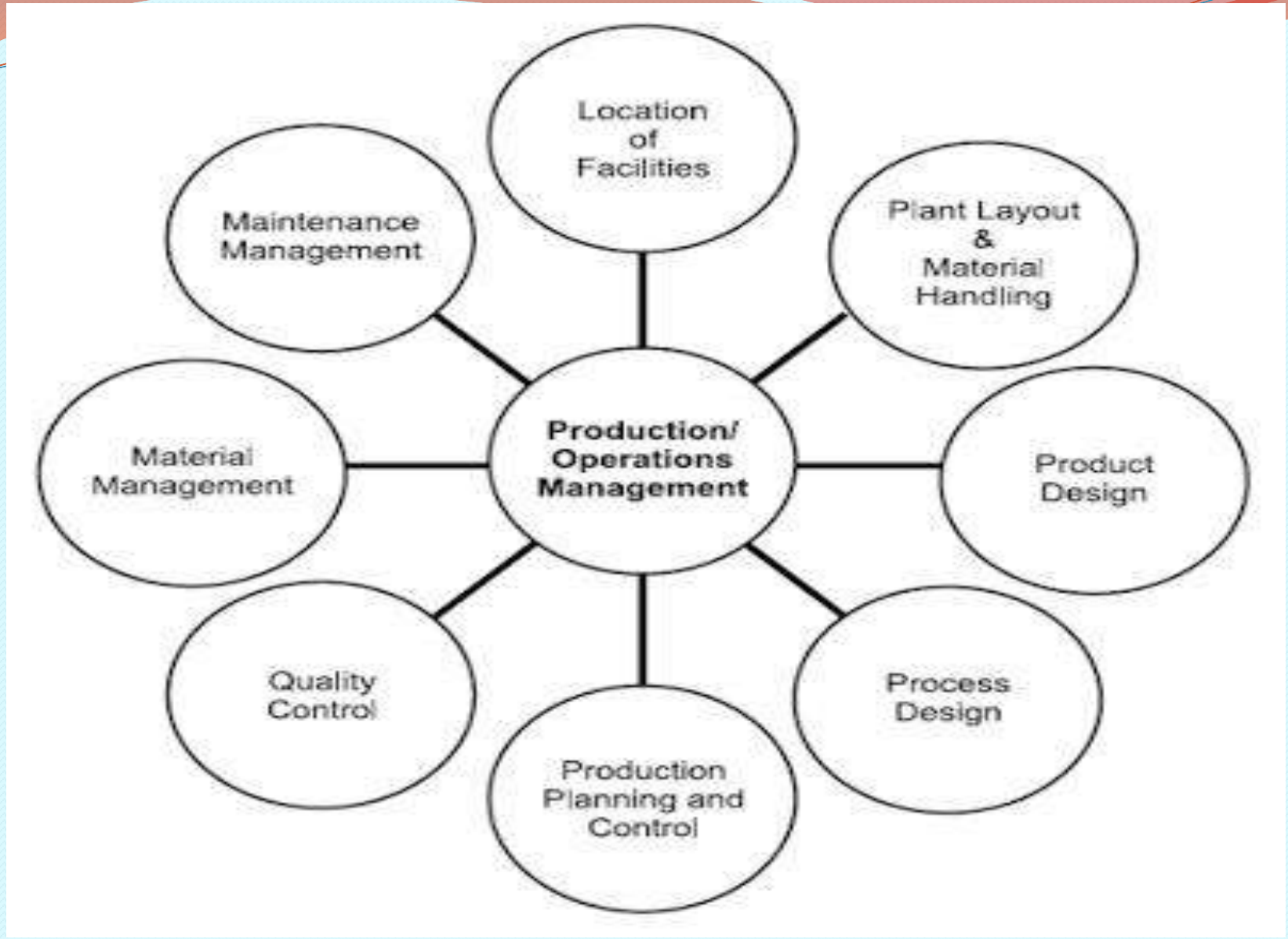
Inventory Control

- Production management also includes inventory control. The production manager must monitor the level of inventories. There must be neither over stocking nor under stocking of inventories.
- If there is an **overstocking**, then the working capital will be blocked, and the materials may be spoiled, wasted or misused.
- If there is an **under stocking**, then production will not take place as per schedule, and deliveries will be affected.

- Maintenance and Replacement of Machines
- Production management ensures proper maintenance and replacement of machines and equipments. The production manager must have an efficient system for continuous inspection (routine checks), cleaning, oiling, maintenance and replacement of machines, equipments, spare parts, etc. This prevents breakdown of machines and avoids production halts.

Scope of production and operations management

- Due to the dynamic change in the business environment, the scope of production and operation management has increased. Following are the activities which are included under production and operations management functions:


Location of Facilities
Maintenance Management
Plant Layout & Material Handling
Material Management
Production/ Operations Management
Product Design
Quality Control
Production Planning and Control
Process Design

- **Facility Location** - Selecting appropriate location for the production
- **Plant layouts and material handling -** Deciding upon the machines, equipment and necessary devices which could lead to effectual and desired production in the most economic way. Preparation of plan layout for the establishment of machines in the required sequence. Storage of material and handling it in most effective way to avoid the wastage and delivery at the work centers as and when required.
- **Product design -** Designing the product and conceive the idea about its production.
- **Process design -** Determination of the production process which is most relevant and efficient in the given state of affairs.

- **Production and planning control** - Planning the production and its various aspects how, when and where producing a particular product or its assembly will be done.
- **Quality control -** Controlling the production and ensuring the quality by setting the check points and taking the periodic measurements of the current performance.
- **Materials management** - Managing the inventories of raw material, semi-finished and finished goods in a way that neither excessive money may block in this non-productive operation nor the required material.
- **Maintenance management -** Analysis of deviations and formulating the corrective measures to stay in track with planned quality, time-schedule and predetermined cost schedules

Meaning of Automation

- The technique, method or system of operating or controlling a process by highly automatic means like electronic , mechanical , hydraulic , pneumatic electrical & computers which reduces human intervention to a minimum.

Automation

- One of the most important application areas for automation technology is manufacturing.

- There are three types of automation in the production
- Fixed automation
- Programmable automation and
- Flexible automation .

- Fixed automation stands for the automated production facility in which the sequence of processing operations is fixed by the equipment configuration , It is known as hard automation , the programmed commands are contained in the machines in the form of the cams , the gears , wiring & the other hardware that is not easily changed over from one product style to another .

- Fixed automation has high production rates & high initial investment, it is suitable for the products that are made in large volumes,
- Examples of fixed automation contain machining transfer lines found in the automotive industry, the automatic assembly machines & certain chemical processes.

- Programmable automation - The computers carry out the sequential control & feedback control , a single computer will do both in the industrial application, Programmable logic controllers (PLCs) are a type of special purpose microprocessor that replaced many hardware components such as the timers & sequencers used in relay logic type systems .

- The general purpose process control computers have replaced stand alone controllers, with a single computer able to perform the operations of hundreds of controllers;
- Process control computers can process data from a network of PLCs.

- Flexible automation - Flexible Automation is the ability for a robot or system to be quickly and easily re-tasked to change product design for both low and high mix manufacturing. When properly utilized, a Flexible Automation cell can evolve with your process and demand, reduce and fix production costs, improve quality, and eliminate health and safety issues.

- Automation are carried out by many means such as mechanical , hydraulic , pneumatic , electrical , electronic devices & computers.
- In modern factories like airplane & ship building use combined Automation such as mechanical , hydraulic , pneumatic , electrical , electronic devices & the computers.

Needs and Importance

- The need for automation is felt because of the following reasons.

- These reasons emphasize on importance of automation. The reasons are:
- Automation facilitates efficient and detailed information through the use of mechanical aids like computers.
- It ensures speedy recording, processing and presenting of information.
- Increased volume of work, scarcity of time and the slow manual processes necessitate the introduction of automation.

- It facilitates better quality work by reducing errors which are created on manual work.

- Revolution in office has been brought by automation because increased volume of work is handled in a better manner with greater accuracy and speed because of automation. This process results in increased output.

- Automation increases the goodwill and reputation of the firm because it adds to the prestige and status symbol of the enterprise

Automation Advantages

- **Reduction in production time** – having a machine that is automated definitely speeds up the production time since no thinking is needed by the machine, there is better repeatability, and less human error.
- **Increase in accuracy and repeatability** – when an automated machine is programmed to perform a task over and over again, the accuracy and repeatability compared to an employee is far greater.
- **Less human error** – no one is perfect, and we are all prone to making mistakes. Which is why a machine that performs repeated tasks is less likely to make mistakes than an employee.

- **Less employee costs** –

  Adding automated machines to an operation, means less employees are needed to get the job done.

- It also indicates less safety issues, which leads to financial savings. With having less employees, there are numerous costs that are diminished or reduced such as payroll, benefits, sick days etc.

- **Increased safety** – having automated machines means having less employees who perform tasks that can be dangerous and prone to injury, which can be avoided by automation which make the work environment safer.

- **Higher volume production** – investing in automated equipment creates a valuable resource for large production volumes, which in turn, will increase profitability.

Automation Disadvantages

- **Less versatility** – by having a machine that can perform a certain task limits to the flexibility and variety of tasks that an employee could do.

- **More pollution** – different types of machines operate using motor which may require gases or chemicals in order to operate. This can cause an increase in pollution in the workplace.

- **Large initial investment** – automated machines can be one of the most costly operating costs for a company. With automated machines running anywhere between thousands and millions of dollars depending on the type and degree of automation.

- **Increase in unemployment** – by increasing the amount of automation, there are less employees required causing high unemployment rates.

- **Unpredictable costs** – there can be several unpredictable costs that may exceed the actual cost saved by the automation itself. Some of these costs could include research and development costs of automating a process, preventative maintenance costs, and the cost of training employees to operate automated machines.

UNIT 2

PLANT LOCATION AND LAYOUT

Syllabus

- Introduction – Meaning and Definition, Factors affecting location, theory and practices, cost factor in location- Plant layout principles, space requirement, Different types of facilities; Organization of physical facilities – building, sanitation, lighting, air conditioning and safety.

Meaning of Plant Location

- Plant location refers to the choice of the region where men, materials, money, machinery and equipment are brought together for setting up a business or factory. A plant is a place where the cost of the product is kept to low in order to maximize gains.

Factors affecting the plant location

- Decisions regarding selecting a location need a balance of several factors.
- These are factors divided into
- Primary factors
- Secondary factors
- here both the factors can influence the business in the long run.

Primary factors

- Availability of raw materials
- Nearness to the market
- Availability of labor
- Transport facilities
- Availability of fuel and power
- Availability of water

- **Availability of raw materials**
- Availability of raw materials is the most important factor in plant location decisions. Usually, manufacturing units where there is conversion of raw materials into finished goods is the main task then such organizations should be located in a place where the raw materials availability is maximum and cheap.

- **Nearness to the market**
- Nearness of market for the finished goods not only reduces the transportation costs, but it can render quick services to the customers. If the plant is located far away from the markets then the chances of spoiling and breakage become high during transport. If the industry is nearer to the market then it can grasp the market share by offering quick services.

- **Availability of labor**
- Another most important factor which influences the plant location decisions is the availability of labor. The combination of the adequate number of labor with suitable skills and reasonable labor wages can highly benefit the firm. However, labor-intensive firms should select the plant location which is nearer to the source of manpower.

- **Transport facilities**
- In order to bring the raw materials to the firm or to carrying the finished goods to the market, transport facilities are very important. Depending on the size of the finished goods or raw materials a suitable transportation is necessary such as roads, water, rail, and air. Here the transportation costs highly increase the cost of production, such organizations can not compete with the rival firms. Here the point considered is transportation costs must be kept low.

- **Availability of fuel and power**
- Unavailability of fuel and power is the major drawback in selecting a location for firms. Fuel and power are necessary for all most all the manufacturing units, so locating firms nearer to the coal beds and power industries can highly reduce the wastage of efforts, money and time due to the unavailability of fuel and power.

- **Availability of water**
- Depending on the nature of the plant firms should give importance to the locations where water is available. For example, power plants where use water to produce power should be located near the water bodies.

Secondary factors

- Suitability of climate
- Government policies
- Availability of finance
- Competition between states
- Availability of facilities
- Disposal of waste

- **Suitability of climate**
- Climate is really an influencing factor for industries such as agriculture, leather, and textile, etc. For such industries extreme humid or dry conditions are not suitable for plant location. Climate can affect the labor efficiency and productivity.

- **Government policies**
- While selecting a location for the plant, it is very important to know the local existed Government policies such as licensing policies, institutional finance, Government subsidies, Government benefits associated with establishing a unit in the urban areas or rural areas, etc.

- **Availability of finance**
- Finance is the most important factor for the smooth running of any business; it should not be far away from the plant location. However, in the case of decisions regarding plant location, it is the secondary important factor because financial needs can be fulfilled easily if the firm is running smoothly. But it should be located nearer to the areas to get the working capital and other financial needs easily.

- **Competition between states**
- In order to attract the investment and large scale industries various states offer subsidies, benefits, and sales tax exemptions to the new units. However, the incentives may not be big but it can help the firms during its startup stages.

- **Availability of facilities**
- Availability of basic facilities such as schools, hospitals, housing and recreation clubs, etc can motivate the workers to stick to the jobs. On the other hand, these facilities must be provided by the organization, but here most of the employees give preference to work in the locations where all these benefits/facilities are available outside also. So while selecting plant location, organizations must give preference to the location where it is suitable for providing other facilities also.

- **Disposal of waste**
- Disposal of waste is a major problem particularly for industries such as chemical, sugar, and leather, etc. So that the selected plant location should have provision for the disposal of waste.

Cost Factors in location

- **Factors of Considerations for Plant Layout**
- Maximum use of the available space.
- Compatibility with the production technology and product mix.
- Minimum movement of materials as well as men.
- Provision of proper space for maintenance.
- Arrangement of proper in-transit storage and stacking space.

- Promotes effective supervision.
- Proper lighting and ventilation.
- Provision of maximum flexibility.
- Safety of operators and other staff.
- Minimum handling of materials.
- Provision for future expansion.
- Security against fire , theft , detoriation etc.

- Maximum flexibility to accommodate changes in production volume and product mix.

- Should meet the specific requirement of the production process viz., air conditioning, air cooling, dust control, humidity control and may be required.

Principles of Plant Layout:

- **While designing the plant layout, the following principles must be kept in view:**

- **(i) Principle of Minimum Movement:**
- Materials and labour should be moved over minimum distances; saving cost and time of transportation and material handling.

- **(ii) Principle of Space Utilization:**
- All available cubic space should be effectively utilized – both horizontally and vertically.

- **(iii) Principle of Flexibility:**
- Layout should be flexible enough to be adaptable to changes required by expansion or technological development.

- **(iv) Principle of Interdependence:**
- Interdependent operations and processes should be located in close proximity to each other; to minimize product travel.
- **(v) Principle of Overall Integration:**
- All the plant facilities and services should be fully integrated into a single operating unit; to minimize cost of production.
- **(vi) Principle of Safety:**
- There should be in-built provision in the design of layout, to provide for comfort and safety of workers.

- **(vii) Principle of Smooth Flow:**
- The layout should be so designed as to reduce work bottlenecks and facilitate uninterrupted flow of work throughout the plant.

- **(viii) Principle of Economy:**
- The layout should aim at effecting economy in terms of investment in fixed assets.

- **(ix) Principle of Supervision:**
- A good layout should facilitate effective supervision over workers.

- **(x) Principle of Satisfaction:**
- A good layout should boost up employee morale, by providing them with maximum work satisfaction.

Types Of Layout

- As discussed so far the plant layout facilitates the arrangement of machines, equipment and other physical facilities in a planned manner within the factory premises.
- An entrepreneur must possess expertise to lay down a proper layout for new or existing plants.
- It differs from plant to plant, from location to location and from industry to industry.
- But the basic principles governing plant layout are more or less same.

- As far as small business is concerned, it requires a smaller area of space and can be located in any kind of building as long as the space is available and it is convenient.
- Plant layout for Small Scale business is closely linked with the factory building and built up area.
- From the point of view of plant layout, we can classify small business or unit into three categories:

- I. Manufacturing units
- II. Traders
- III.Service Establishments

Manufacturing units

- In case of manufacturing unit, plant layout may be of four types:

- (a) Product or line layout
- (b) Process or functional layout
- (c) Fixed position or location layout
- (d) Combined or group layout

- **Product or Line Layout:**
- Under this, machines and equipments are arranged in one line depending upon the sequence of operations required for the product.
- The materials move from one workstation to another sequentially without any backtracking or deviation.
- Under this, machines are grouped in one sequence. Therefore materials are fed into the first machine and finished goods travel automatically from machine to machine, the output of one machine becoming input of the next.
- e.g. in a paper mill, bamboos are fed into the machine at one end and paper comes out at the other end.
- The raw material moves very fast from one workstation to other stations with a minimum work in progress storage and material handling.

- The grouping of machines should be done keeping in mind the following general principles.
- All the machine tools or other items of equipments must be placed at the point demanded by the sequence of operations.
- There should be no points where one line cross another line.
- Materials may be fed where they are required for assembly but not necessarily at one point.
- All the operations including assembly, testing packing must be included in the line.

- **Advantages**
- Product or line layout provides the following benefits:

- Low cost of material handling, due to straight and short route and absence of backtracking.
- Smooth and uninterrupted operations.
- Continuous flow of work.
- Lesser investment in inventory and work in progress.
- Optimum use of floor space.
- Shorter processing time or quicker output.
- Less congestion of work in the process.
- Simple and effective inspection of work and simplified production control.
- Lower cost of manufacturing per unit

- **Disadvantages**
- Product layout suffers from following drawbacks:

- High initial capital investment in special purpose machine.
- Heavy overhead charges.
- Breakdown of one machine will hamper the whole production process.
- Lesser flexibility as machines are specially laid out for particular product.

Suitability: Product layout is useful under following conditions:

- Mass production of standardized products.
- Simple and repetitive manufacturing process.
- Operation time for different process is more or less equal.
- Reasonably stable demand for the product.
- Continuous supply of materials.

- Therefore, the manufacturing units involving continuous manufacturing process, producing few standardized products continuously on the firm's own specifications and in anticipation of sales would prefer product layout
- e.g. chemicals, sugar, paper, rubber, refineries, cement, automobiles, food processing and electronics etc.

- **Process Layout:**

- In this type of layout machines of a similar process and type are arranged together at one place.
- E.g. machines performing drilling operations are arranged in the drilling department,
- machines performing casting operations are grouped in the casting department.
- Therefore the machines are installed in the plants, which does a particular process.

- Hence, such layouts typically have drilling departments, milling department, welding department, heating department and painting department etc.

- The process or functional layout is followed from historical period.

- It evolved from the handicraft method of production.

- The work has to be allocated to each department in such a way that no machines are chosen to do as many different job as possible i.e. the emphasis is on general purpose machine.

- The work, which has to be done, is allocated to the machines according to loading schedules with the object of ensuring that each machine is fully loaded.

- The grouping of machines according to the process has to be done keeping in mind the following principles.

- The distance between departments should be as short as possible for avoiding long distance movement of material.
- The departments should be in sequence of operations
- The arrangement should be convenient for inspection and supervision.

- **Advantages:**
- Process layout provides the following benefits:

- Lower initial capital investment in machines and equipments.
- There is high degree of machine utilization, as a machine is not blocked for a single product.
- The overhead costs are relatively low.
- Change in output design and volume can be more easily adapted to the output of variety of products.
- Breakdown of one machine does not result in complete work stoppage.
- Supervision can be more effective and specialized.
- There is a greater flexibility of scope for expansion.

- **Disadvantages:** Process layout suffers from following drawbacks:

- Material handling costs are high due to backtracking.
- More skilled labour is required resulting in higher cost.
- Time gap or lag in production is higher.
- Work in progress inventory is high needing greater storage space.
- More frequent inspection is needed which results in costly supervision.

- **Suitability:** Process layout is adopted when

- When products are not standardized.
- Quantity produced is small.
- When there are frequent changes in design and style of product.
- Job shop type of work is done.
- Machines are very expensive.

- Thus, process layout or functional layout is suitable for job order production involving non-repetitive processes and customer specifications and non-standardized products.
- e.g. tailoring, light and heavy engineering products, made to order furniture industries, jewelry.

- **Fixed Position or Location Layout:**

- In this type of layout, the major product being produced is fixed at one location.
- Equipment labour and components are moved to that location.
- All facilities are brought and arranged around one work center.
- This type of layout is not relevant for small scale entrepreneur.

- **Advantages:** Fixed position layout provides the following benefits:

- It saves time and cost involved on the movement of work from one workstation to another.
- The layout is flexible as change in job design and operation sequence can be easily incorporated.
- It is more economical when several orders in different stages of progress are being executed simultaneously.
- Adjustments can be made to meet shortage of materials and absence of workers by changing the sequence of operations

- **Disadvantages:**
- Fixed position layout has the following drawbacks:

- Production period being very long, capital investment is very heavy.

- Very large space is required for storage of material and equipment near the product.

- As several operations are often carried out simultaneously, there is possibility of confusion and conflicts among different workgroups.

- **Suitability:**
- The fixed position layout is followed in following conditions:

- Manufacture of bulky and heavy products such as locomotives, ships, boilers, generators, wagon building, aircraft manufacturing, etc.

- Construction of building, flyovers, dams.

Combined Layout:

- Certain manufacturing units may require all three processes namely intermittent process (job shops), the continuous process (mass production shops) and the representative process combined process [i.e. miscellaneous shops].

- In most of industries, only a product layout or process layout or fixed location layout does not exist. Thus, in manufacturing concerns where several products are produced in repeated numbers with no likelihood of continuous production, combined layout is followed.

- Generally, a combination of the product and process layout or other combination are found, in practice.
- e.g. for industries involving the fabrication of parts and assembly, fabrication tends to employ the process layout, while the assembly areas often employ the product layout.

- In soap manufacturing plant, the machinery manufacturing soap is arranged on the product line principle, but ancillary services such as heating, manufacturing of glycerin, the power house, the water treatment plant etc. are arranged on a functional basis.

Organization of Physical facilities

- The following are the most important physical facilities to be organized in Plant Layout

- **FACTORY BUILDING**

- Factory building is a factor which is the most important consideration for every industrial enterprise.
- A modern factory building is required to provide protection for men, machines, materials, products or even the company's secrets.

- It has to serve as a part of the production facilities and as a factor to maximize economy and efficiency in plant operations.
- It should offer a pleasant and comfortable working environment and project the management's image and prestige.
- Factory building is like skin and bones of a living body for an organization.
- It is for these reasons that the factory building acquires great importance.

Following factors are considered for an Industrial Building:

- Types of buildings.
- Design of the Building

- The Factory building should be designed in manner it should provide a number of facilities — such as lunch rooms, cafeteria, locker rooms, crèches, libraries, first-aid and ambulance rooms, materials handling facilities, heating, ventilation, air-conditioning, etc.

Following factors are considered in the designing of a factory building:

- Flexibility
- Product and equipment
- Expansibility

- **Flexibility**

- Flexibility is one of the important considerations because the building is likely to become obsolete and provides greater operating efficiency even when processes and technology change.
- Flexibility is necessary because it is not always feasible and economical to build a new plant, every time a new firm is organized or the layout is changed.
- With minor alternations, the building should be able to accommodate different types of operations.

- **Product and equipment**

- The type of product that is to be manufactured, determines column-spacing, type of floor, ceiling, heating and air-conditioning.
- A product of a temporary nature may call for a less expensive building and that would be a product of a more permanent nature.
- Similarly, a heavy product demands a far more different building than a product which is light in weight.

- **Expansibility**

- Growth and expansion are natural to any manufacturing enterprises.
- They are the indicators of the prosperity of a business.
- The following factors should be borne in mind if the future expansion of the concern is to be provided for:

- The area of the land which is to be acquired should be large enough to provide for the future expansion needs of the firm and accommodate current needs.
- The design of the building should be in a rectangular shape. Rectangular shapes facilitate expansion on any side.
- If vertical expansion is expected, strong foundations, supporters and columns must be provided.
- If horizontal expansion is expected, the side walls must be made non-load-bearing to provide for easy removal.

Types of Factory Buildings

- Industrial buildings may be grouped under three types:
- **Single-storey buildings**
- **Multi-storey buildings**
- **High Bay and Monitor Type Buildings**
- The decision on choosing a suitable type for a particular firm depends on the manufacturing process and the area of land and the cost of construction.

Single-storey buildings

- Most of the industrial buildings of manufacturing industries are now designed and constructed are single storied, particularly where lands are available at reasonable rates.
- Single-storey buildings offer several operating advantages.
- A single-storey construction is preferable when materials handling is difficult because the product is big or heavy, natural lighting is desired, heavy floor loads are required and frequent changes in layout are anticipated.

- **Advantages**
- Advantages of single-storey building are:

- There is a greater flexibility in layout and production routing.
- The maintenance cost resulting from the vibration of machinery is reduced considerably because of the housing of the machinery on the ground.
- Expansion is easily ensured by the removal of walls.

- The cost of transportation of materials is reduced because of the absence of materials handling equipment between floors.
- All the equipment is on the same level, making for an easier and more effective layout supervision and control.
- Greater floor load-bearing capacity for heavy equipment is ensured.
- The danger of fire hazards is reduced because of the lateral spread of the building.

- **Limitations**
  Single-storey buildings suffer from some limitations. These are:
- High cost of land, particularly in the city.
- High cost of heating, ventilating and cleaning of windows.
- High cost of transportation for moving men and materials to the factory which is generally located far from the city.

MULTI STOREY BUILDINGS

- Schools, colleges, shopping complexes, and residences, and for service industries like Software, BPO etc. multi-storey structures are generally popular, particularly in cities.
- Multi-storey buildings are useful in manufacture of light products, when the acquisition of land becomes difficult and expensive and when the floor load is less.

- **Advantages**
  When constructed for industrial use, multi-storey buildings offer the following advantages:
- Maximum operating floor space (per sq. ft. of land). This is best suited in areas where land is very costly.
- Lower cost of heating and ventilation.
- Reduced cost of materials handling because the advantage of the use of gravity for the flow of materials.

- **Limitations**
  Following are the disadvantages of multi-storey building:

  - Materials handling becomes very complicated. A lot of time is wasted in moving them between floors.

  - A lot of floor space is wasted on elevators, stairways and fire escapes.

- Floor load-bearing capacity is limited, unless special construction is used, which is very expensive.
- Natural lighting is poor in the centers of the shop, particularly when the width of the building is somewhat great.
- Layout changes cannot be effected easily and quickly. Generally speaking, textile mills, food industries, detergent plants, chemical industries and software industry use these types of buildings.

High Bay and Monitor Type Buildings:

- They are basically single storey buildings. For a given floor space, they provide maximum overhead space.
- Large overhead space can be utilized for operating cranes.
- Natural ventilation and natural illumination are the main advantages for these types of factory buildings.
- Foundry and steel mill buildings are generally of monitor or high bay type.

- **LIGHTING**
  It is estimated that 80 per cent of the information required in doing job is perceived visually.
- Good visibility of the equipment, the product and the data involved in the work process is an essential factor in accelerating production, reducing the number of defective products, cutting down waste and preventing visual fatigue and headaches among the workers.
- It may also be added that both inadequate visibility and glare frequently causes accidents.

- In principle, lighting should be adapted to the type of work. However, the level of illumination, measured in should be increased not only in relation to the degree of precision or miniaturization of the work but also in relation to the worker's age.
- The accumulation of dust and wear and tear of the light sources cut down the level of illumination by 10–50 per cent of the original level.
- This gradual drop in the level should therefore be compensated for when designing the lighting system.
- Regular cleaning of lighting fixture is obviously essential.

- Excessive contrasts in lighting levels between the worker's task and the general surroundings should also be avoided.
- The use of natural light should be encouraged.
- This can be achieved by installing windows that are open.
- which are recommended to have an area equal to the time of day, the distance of workstations from the windows and the presence or absence of blinds. For this reason it is essential to have artificial lighting, will enable people to maintain proper vision and will ensure that the lighting intensity ratios between the task, the surrounding objects and the general environment are maintained.

Significance of Good lighting

- Clear Vision
- Reduced eye stress and strain
- Refined Quality of Work
- Multiplied Output
- Reduced accident rates
- Good Plant Up- Keep
- Improved Employee Morale
- Improved Supervision
- Meeting Legal Implications

Sources of Light

- Natural Light
- Artificial Light

Natural light

- Natural light or day light is one which is received from the sun and obtained through factory roofs , doors, window openings.

Advantages of Natural lighting

- It is plentiful especially in tropical regions of the earth
- With all the advantages of good lighting, it is available free of cost.
- It needs no maintenance as there is no problem of installation.
- There is no problem of load-shedding and power failure
- It is most suited for general lighting purpose.

Limitations of Natural Light

- It is variable and light variability can be season to season , day to day and hour to hour in a day and available only during day time.
- Its intensity can not be changed or controlled to meet the unique individual situations.
- Uniformity, brightness and the spectrum all depend on the size and position of windows and roof openings or sly lights
- One can not totally depend on natural lighting alone

Ventilation

- Ventilation means removal of stale air and letting in fresh air in the factory building

- As per W.C.F Hemeon
- Factory ventilation is on which is conserved largely with engineering techniques of controlling the air currents within the plant and for introducing outdoor air in a pattern and on a scale that is just adequate to maintain satisfactory air purity.

Air Conditioning

- Air conditioning is a deliberate attempt to condition the air by heating or cooling as required.

- Air conditioning is regulating fully the incoming air or conditioning the inflow of air from outside the factory.

Essentials of a sound air-conditioning system

- Air Filters
- Heating
- Cooling
- Humidification
- Dehumidification
- Air Distribution

- Air filters : a component or a device which is used for purifying the incoming air that comprises of harmful ingredients such as dust, chemicals, bacteria and other micro-organisms , odours and oxide particles. There are variety of filters used in creating and controlling the environment.

- Heating : During winter season it becomes essential to supply heated air into the factory building. This heating of an air is carried out by means of warm air furnaces or coils around which steam is surrounded. The incoming air is allowed to pass over the furnaces or coils. Air gets heated as soon it comes in contact with heated coils or furnace.

- Cooling : During hot days of summer, it is but essential to cool down the air temperature of the comfortable level. Cooling of air is possible through alternative methods such as surface-cooling, spray cooling and evaporative cooling.

- Humidification : Humidification is the process of adding moisture in the air. It is moisturizing the dry air. In winter season, the estimated air has normally low humidity as the temperature is low. Therefore, there is need for adding the moisture content to the expected level. It is possible through three possible ways namely, wet-cloth strips, allowing a direct spray of water in the room or a combination of both the processes.

- Dehumidification : It is the process whereby excess moisture or moisture content in the air is removed. During summer season the external air has higher degree of humidity because of high temperature such moisture content is dehumidified before it is allowed to enter the rooms

- Air Distribution : Once the air is conditioned there is need for proper distribution of air regularly and adequately in the rooms or departments of the factory building. A minimum of 0.21 cubic meter per minute per person fresh air is needed in factories. The air distributing devices are air-pumps, air-delivery systems and air distribution system.

Industrial Sanitation

- Industrial sanitation means maintenance of cleanliness which is free from all the possible filth and dust causing diseases and protecting employees health in the factory and providing environmental health services to workers.

Importance or significance of Industrial sanitation

- Improve quality and quantity of labour output
- Improve employee efficiency.
- Improve employer and employee relation.
- To provide health education and training to employees
- To improve employee hygiene and provide health programmes

Elements of Industrial Sanitation

- Water supply
- Waste disposal
- Personal service rooms
- Supply of balanced and fresh food
- Sanitation
- Noise control
- Good house-keeping
- Adequate and quality supply of tools and equipments etc..

Industrial safety/security

- Industrial safety or industrial security means all those measures to safe guard and protect the property and personnel of a factory against the possible theft, sabotage and other losses may be monetary or non-monetary.

Importance and significance of industrial safety.

- Prevention of personal injuries and deaths.
- Reduction in costs
- Building up of employee morale
- Improvement in efficiency
- Promote public safety

Safety provisions in the factories act,1948.

- Fencing of Machinery: Every moving part of a dangerous machinery should be properly fenced.
- Working on or Near Machinery in motion : Examination of any part of the machinery in motion should be carried out only by a specially trained male worker with tight fitting clothes.

  No women or young person shall be allowed to clean, lubricate machinery when it is in motion.

- Casing the Machinery : All machines parts which do not require frequent adjustment should be properly encased.

UNIT 3

MATERIALS MANAGEMENT

SYALLABUS

- Introduction – Meaning and Definition - Purchasing, Selection of Suppliers, Inventory Management, Material Handling Principles and Practices, Economic Consideration, Criteria for Selection of Materials Handling Equipment, Standardization, Codification, Simplification, Inventory Control, Techniques of inventory Control (Concept only).

Introduction

- Material management is a scientific technique, concerned with Planning, Organizing &Control of flow of materials, from their initial purchase to destination.

- Material management is an approach for planning, organizing, and controlling all those activities principally concerned with the flow of materials into an organization.

Fundamental objectives of Materials management or 5 R's

- The fundamental objectives of the Materials Management function, often called the famous 5 Rs of Materials Management are acquisition of materials and services:
- of the right quality
- in the right quantity
- at the right time
- from the right source
- at the right price

Meaning and definition of Purchasing

- The purchasing management department ensures that all goods, supplies and inventory needed to operate the business are ordered and kept in stock.

- It is also responsible for controlling the cost of the goods ordered, controlling inventory levels and building strong relationships with suppliers.

- Purchasing is the function of buying Goods & Services from External Source to an Organization

- Purchase department buys Raw Materials, Spare parts, services etc. as Required by the company or Organization.

- Purchase management is One of the most Crucial Area of the Entire Organization. Thus, Needs Intensive management.
- Purchase is the Main Activity in Area of Material management.
- Purchasing management is a department in an organization responsible for purchasing activities.
- Purchase is Most Important Function in any Organization.

- Purchase is the first element which affects the product cost.
- Purchase management decides profitability of the Company.
- Purchasing management also covers the areas of outsourcing and in sourcing.
- Purchasing management is the management of purchasing process, and related aspects in an organization.

Objectives of Purchasing Management

- To purchase the required material at minimum possible price by following the company policies.
- To keep department expenses low.
- Development of good & new vendors (suppliers).
- Development of good relation with the existing suppliers.

- Training & development of personal employees in department.
- To maintain proper & up to date records of all transactions.
- Participating in development of new material and products.
- To contribute in product improvement.

- To take Economic "MAKE OR BUY" decisions.
- To avoid Stock- out situations.
- To develop policies & procedure.
- To maintain of ROL
- To help the Practiosioner

Supplier

- A supplier is an entity that supplies goods and services to another organization. This entity (Supplier)is part of the supply chain of a business;

Common supplier selection criteria

- Cost.
- Quality & Safety.
- Delivery.
- Service.
- Social Responsibility.
- Convenience/Simplicity.
- Risk.

- **WHAT YOU SHOULD LOOK FOR IN A SUPPLIER**
- Reliability
- Remember - if they let you down, you may let your customer down.
- Quality

- The quality of your supplies needs to be consistent your customers associate poor quality with you, not your suppliers.

- Value for money

- The lowest price is not always the best value for money. If you want reliability and quality from your suppliers, you'll have to decide how much you're willing to pay for your supplies and the balance you want to strike between cost, reliability, quality and service.

- Strong service and clear communication

- You need your suppliers to deliver on time, or to be honest and give you plenty of warning if they can't. The best suppliers will want to talk with you regularly to find out what needs you have and how they can serve you better.

- Financial security

- It's always worth making sure your supplier has sufficiently strong cash flow to deliver what you want, when you need it. A credit check will help reassure you that they won't go out of business when you need them most.

- A partnership approach

- A strong relationship will benefit both sides. You want your suppliers to acknowledge how important your business is to them, so they make every effort to provide the best service possible. And you're more likely to create this response by showing your supplier how important they are to your business.

Inventory management

- Inventory management is a discipline primarily about specifying the shape and placement of stocked goods. It is required at different locations within a facility or within many locations of a supply network to precede the regular and planned course of production and stock of materials.

Top 10 Benefits of Great Inventory Management

- **Inventory Balance.** Good inventory management helps you figure out exactly how much inventory you need. This makes it easier to prevent product shortages and keep just enough inventory on hand without having too much.

- **Inventory Turnover.** You need to keep a high inventory turnover ratio to ensure your products aren't spoiling, becoming obsolete or sucking up your working capital. Calculate how many times your inventory sells in a year and see where you can make better use of your resources.

- **Repeat Customers.** Good inventory management leads to what every business owner wants – repeat customers. You want your hard-earned customers to keep coming back to your business to meet their needs. One way to do this is to make sure you have what they're looking for every time they come.

- **Accurate Planning.** Using smart inventory management, you can stay ahead of the demand curve, keep the right amount of products on hand and plan ahead for seasonal changes. This goes back to keeping your customers happy all year long.

- **Warehouse Organization.** If you know which products are your top sellers and what combinations of products your customers often order together, you can optimize your warehouse setup by putting those products close together and in easily accessible places. This speeds up the picking, packing and shipping processes.

- **Employee Efficiency.** You can empower your employees to help you manage inventory. Training employees to use barcode scanners, inventory management software and other tools helps them make better use of their time, and it helps your business make better use of its resources, both human and technological.

- **Inventory Orders.** If you've done a good job keeping track of how much inventory you have on hand, you can make smarter decisions about when and what to order. Inventory management software lets you speed up the ordering process. You can simply scan a product barcode and type in some information to place an order and generate an invoice.

- **Inventory Tracking.** If you have multiple locations, then inventory management becomes even more important because you need to coordinate your supplies at each location depending on differences in demand and other factors.

- **Time Saving.** Inventory management is a great time-saving tool. By keeping track of all the products you have on hand and on order, you can save yourself the hassle of doing inventory recounts to make sure your records are accurate. This once again requires inventory management software.

- **Cost Cutting.** When your inventory is humming along efficiently through your facilities, you can bet you'll save a lot of money. Inventory management helps you avoid wasting money on slow-moving products so you can put it to better use in other areas of your business.

Principles of Materials Handling

- Planning Principle
- Systems Principle
- Simplification Principle
- Material Flow Principle
- Gravity Principle
- Unit Size Principle
- Space Utilization Principle
- Safety Principle
- Mechanization Principle

Planning Principle

- Material should be placed on pallet or any other support and not on the floor directly.
- One container should be used throughout and avoid frequent changes.
- Utilize truss capacities and ceiling heights.
- Provide sufficient storage space at the work-place.
- Each operator must be instructed/trained to follow correct method.
- Plan for scrap removal means.
- Efforts are made to combine operations like inspection during productive operation.
- Minimize movement of men and material.

Systems Principle

- Handling activities should be integrated and co-ordinated.
- Handling activities are receiving, storage, in-process handling, inspection, packaging, warehousing, shipping and transportation.
- Consider all the handling activities while giving a detailed consideration to a particular activity.
- Material flow between work areas must be planned.
- Integrate activities into the handling system.

Simplification Principle

- Reduce, combine or eliminate unnecessary movements and/or equipment.
- Motion Economy principles must be applied.
- Reduce or eliminate, long and complicated movements.
- Deliver the material at correct spot in first instance.
- Eliminate re-handling.
- Reduce variety of equipment.

Material Flow Principle

- Material flow pattern must be determined by operation sequence and pattern of equipment arrangement.
- Avoid overcrowding.
- Eliminate obstacles in the flow.
- Move in a direct path and avoid back tracking.
- Move greatest weight and/or bulk for least distance.
- Minimize movements between floors and buildings.
- Plan proper locations of sub-assemblies.
- Plan related work areas close together.
- Avoid traffic jams and take necessary pre-cautions for cross traffic.

- Gravity Principle:
- Utilize gravity wherever possible.,
- Use slides, chutes, hoppers etc. where ever possible to move materials.

- Unit Size Principle:
- Increase size, quantity, weight of the load handled. Since larger the load, lesser will be the cost per unit handled.
- (i) Handle unit loads.
- (ii) Use containers.
- (iii) Containers should be standardised.
- (iv) Use standardized pallets.
- (v) Optimise unit loads.

- Space Utilisation Principle:
- Optimum utilisation of building space. As space means money.
- Equipment and work area may be kept in reasonably close position.
- Inventory at temporary stores must not be kept too much.
- Utilise height of building and use rack to permit higher stocking.
- Use concept of economic order quantities and economic lot sizes.
- Dispose obsolete or scrap items in time.
- Use handling equipment requiring minimum aisles.
- Use mobile or overhead equipment.
- Use collapsible containers to save space required by empty ones.

- Safety Principle:
- Safe handling methods and equipment for better working conditions and to avoid unsafe conditions.,
- Provide adequate guards and other safety devices.
- Handling equipment should be kept in good operating conditions.
- Highlight handling hazards, moving vehicles or danger areas.
- Make arrangement for removal of undesirable fire, dust, smoke etc.
- Emergency switches or controls should be provided.
- Provide proper instructions and training for safe operation to the operators.
- Keep floor clean.
- Provide good housekeeping.
- Keep aisles clear.
- Do not overload handling equipment or devices.

- Mechanisation Principle:
- For increasing efficiency use mechanised handling equipment but to the desired extent only.
- Mechanisation is useful for large quantities, long, frequent, high effort or hazardous moves.
- Replace excess manual handling to avoid large numbers of persons engaged in handling jobs.
- Mechanise moving of heavy containers.
- Design containers suitable for mechanical handling.
- Use mechanised communication where required.

- Flexibility Principle:
- Use equipments capable of handling variety of tasks.
- Buy versatile and flexible equipment.
- Buy adjustable racks.
- Utilise flexible accessories and attachments.

- Equipment Selection Principle:
- Select equipment very carefully considering all aspects of materials, movements, and the method.
- Select versatile equipment.
- Cost per unit to be handled should be compared.
- Consider standardization aspects.
- Equipment should be economical on long term basis.

- Standardisation Principle:
- Use standardise equipment as well as methods.
- Standardise the equipment, containers and pallets.
- Train employees on using standardised equipment and methods.

- Light Weight Principle:
- Reduce weight of equipment.
- Equipment should have less dead weight to pay load ratio.
- Use light weight pallets, skids and containers.

- Motion Principle:
- The handling equipment should be kept in motion before usage i.e., minimum period for loading, unloading or other idleness.
- Reduce loading/unloading time.
- Use mechanical means or other means for quick loading and unloading.
- Use tractor trailers, so that tractor can be used for other work while the trailer is being loaded/unloaded.
- Minimise downtime.

- Idle-time Principle:
- Reduce idle and unproductive time.
- To avoid idle manpower, deliver material at a desired rate.
- Do not use productive labour for handling.
- In order to utilise manpower fully, more than one machine can also be allotted to one man.
- Equipment should be fully utilised.

- Obsolescence Principle:
- Obsolete methods and equipment be replaced by efficient methods and equipment.
- Obsolete equipment must be identified and replaced by new equipment.
- Beware of new technological developments and remain in constant touch through books, journals, attending, conferences etc.

- Maintenance Principle:
- Preventive maintenance practices should be adopted for handling equipment.
- Preventive maintenance is carried out to avoid breakdowns.
- Carry out schedule maintenance and daily inspections and take remedial measures.
- Set up regular maintenance schedule.
- Train operators for proper operation and maintenance.
- Maintain adequate spare supplies.

Principles Related to Operation:

- Control Principle:
- Control production and inventory through materials handling equipment.
- Provide direct mechanical paths for materials movement.
- Materials should be moved in lots, batches and containers of a predetermine quantity or size must be used.
- Materials handling system should have built in features of controlling production, inventory and accounting.
- Material should be moved as per schedule.

- Capacity Principle:
- Production capacity should be fully achieved.
- Ensure uniform desired rate of flow.
- Equipment is operated at optimum rate.
- Plan to utilise forward as well as return runs of the equipment.
- Vehicles, conveyors, containers etc. should be loaded to full capacity.
- Utilise overhead space.
- Aisles should be obstacle free and wide enough for speedy movement.
- Store items not affected by weather.

- Performance Principle:
- Performance of handling is measured in terms of cost per unit handled, safe working condition and increase in production rate or reduced manpower for handling.
- This is the effect of all preceding activities.

Materials Selection Criteria

- Availability
- Design Flexibility
- Cost per Unit
- Regulatory Compliance
- Manufacturing Efficiency
- Sterilization and Cleaning
- Sustainability

- **Availability :**
- One of the baseline requirements for any material is consistently reliable availability.

- If quantities sufficient for current and future needs are not readily available marketing and sales potential could be negatively impacted.

- Supplies should be produced as soon as possible to the manufacturing site to avoid high shipping costs.

- Design Flexibility
- Materials are instrumental to the design Products that drive device innovation.
- Plastics alone, for example, can be molded into complex shapes or consolidated to foam multiple parts to enable simpler, more elegant designs.
- Over molding a thermoplastic elastomeric onto a rigid plastic substance can provide better grip or a more comfortable feel.

- Cost per Unit
- Material costs are a critical aspect of any Product.
- But companies need to look beyond the price of raw-material but also assess the true lifecycle costs.
- Different materials can raise or reduce costs by affecting life cycle of a product

- Amount required per device is influenced by material density, thickness and part consolidation

- Cost of unit is influenced by ease and speed of manufacturing due to required secondary operations or a material's suitability for high-volume production
- Cost of unit transport costs for shipping depends on weight and distance etc.

- **Regulatory Compliance**

  Although regulatory bodies certify the safety and efficacy of finished devices rather than their component materials, a detailed master access file for a certain material can often help smooth the road to device approval.

- **Manufacturing Efficiency**
  The manufacturing process offers significant opportunities for cost savings and productivity gains – if the right materials are chosen.
- The ability to use high-volume and integrated processes, such as two-shot injection molding, can lower system costs and enable rapid scale-up.
- Another key opportunity involves minimizing secondary operations, such as assembly, curing, polishing and painting

- **6. Sterilization and Cleaning**
  To reduce the prevalence of infection, hospitals and industries use aggressive disinfectants – such as alcohol, bleach and peroxide – as well as sterilization methods including autoclaving, gas plasma and Ethylene oxide (EtO). Repeated exposure can cause many plastic medical devices to craze or crack, lose critical properties or change color. As an alternative, metal offers excellent resistance to harsh cleaners and various sterilization techniques, but has a number of other drawbacks, including increased weight and design restrictions.

- **Sustainability**
  The sustainability of devices comes into play primarily during design, manufacture and disposal.
- Material selection affects all these stages of the lifecycle.
- In the design phase, sustainability considerations include strategies such as the use of lower-density materials, reduced need for fillers, broader part consolidation and down-gauging.

- **Standardization**

- Standardization means producing maximum variety of products from the minimum variety of materials, parts, tools and processes.
- It is the process of establishing standards or units of measure by which extent, quality, quantity, value, performance etc., may be compared and measured.

- **Advantages of Standardization**
- Well proven design and methods improve planning and control.
- Accurate delivery promises.
- Fewer delays arise from waiting for materials, tools, etc.
- Follow-up of small batches consumes less time
- Lower unit cost.
- Better quality products
- Better methods and tooling.
- Increased interchangeability of parts.
- Better utilization of manpower and equipment.

- **Codification**
- Codification is used to properly classify equipment's, raw materials, components and spares to suit the particular needs of any organization. Codification is helpful to prevent duplication and multiplicity of stores and the mistakes which are caused by the normal practice of describing the material.

- **Advantages of codification are**:
- Duplicate stocks under different descriptions for the same item are avoided.
- Accurate identification of items by all consumer departments and customers / users is made possible.
- Posting of receipts, issues, accounting records etc. in a systematic manner is now possible.
- Accuracy in posting of receipts, issues, accounting records etc. is possible.
- Codification is the fundamental requirement for computerization of materials management activities.
- It helps in standardization and variety reductions.

- **Simplification**
- The concept of simplification is closely related to standardization. Simplification is the process of reducing the variety of products manufactured. Simplification is concerned with the reduction of product range, assemblies, parts, materials and design.

- **Advantages of Simplification**
  Following are the advantages of simplification:
- Simplification involves fewer, parts, varieties and changes in products; this reduces manufacturing operations and risk of obsolescence.
- Simplification reduces variety; volume of remaining products may be increased.
- Simplification provides quick delivery and better after-sales services.
- Simplification reduces inventory and thus results in better inventory control.
- Simplification lowers the production costs.
- Simplification reduces price of a product.
- Simplification improves product quality.

PRODUCTION PLANNING AND QUALITY CONTROL

UNIT 4

SYALLABUS

- Objectives and Concepts, capacity planning, corresponding production planning, controlling, scheduling, routing – Quality Control Production Planning/operations planning and control-role of production planning and control in operation management-scope of production planning and control-main functions of PPC- Level of Production Planning-Production planning functions-production control functions-benefits of production planning and control-productions planning and control in different productions and system. Meaning of ISO and TQM.

Production planning.

- Production planning involves management decisions on the resources that the firm will require for its manufacturing operations and the selection of these resources to produce the desired goods at the appropriate time and at the least possible cost.

- **Production planning** is the planning of production and manufacturing modules in a company or industry. It deals with resource allocation for activities of employees, materials and production in order to serve different customers.

- Different types of production methods, such as single item manufacturing, batch production, mass production, continuous production etc. have their own type of production planning.
- Production planning can be combined with production control into production planning and control, or it can be combined and/or integrated into enterprise resource planning.

- **Production Control**
- Production control looks to utilize different type of control techniques to achieve optimum performance out of the production system to achieve overall production planning targets.
- Therefore, objectives of production control are as follows:
- Regulate inventory management
- Organize the production schedules
- Optimum utilization of resources and production process

- The advantages of robust production control are as follows:
- Ensure a smooth flow of all production processes
- Ensure production cost savings thereby improving the bottom line
- Control wastage of resources
- It maintains standard of quality through the production life cycle.

- Production control cannot be same across all the organization.
- Production control is dependent upon the following factors:
- Nature of production(job oriented, service oriented, etc.)
- Nature of operation
- Size of operation

Objectives of Production Planning & Control

- To ensure safe and economical production process
- To effectively utilize plant to maximize productivity
- To maximize efficiency by proper coordination in production process
- To ensure proper delivery of goods
- To place the right man for the right job, at right time for right wages.
- To minimize labor turnover
- To reduce the waiting time

Main elements of Production Planning & Control

- The following are main elements of Production Planning and Control.
- Routing
- Loading
- Scheduling
- Dispatching
- Follow up
- Inspection
- Corrective

- **Routing**:
- It is about selection of path or route through which raw materials pass in order to make it into a finished product.
- The points to be noted while routing process are – full capacity of machines, economical and short route and availability of alternate routing.
- Setting up time for the process for each stage of route is to be fixed.
- Once overall sequence are fixed, then the standard time of operations are noted using work measurement technique.

- **Loading and scheduling**:
- Loading and Scheduling are concerned with preparation of workloads and fixing of starting and completing date of each operation.
- On the basis of the performance of each machine, loading and scheduling tasks are completed

- **Dispatching or Implementing**:
- Dispatching is the routine of setting productive activities in motion through the release of orders and instructions, in accordance with previously planned time and sequence, embodied in route sheet and schedule charts. It is here the orders are released.

- **Expediting / Follow-up**:
- It is follow-up action undertaken to check and find out whether plans are actually being executed.
- It is a control tool which brings an idea on breaking up, delay, rectifying error etc., during the progress of work.

- **Inspection**: Inspection is to find out the quality of executed work process and take measures to motivate if the work done is correct or take corrective measures if work done is not as per plan.
- **Corrective**: At evaluation process, a thorough analysis is done and corrective measures are taken in the weaker spots.

- **Stages of Production Planning & Control**
- Production Planning & Control is done in three stages namely,
- Pre-planning
- Planning
- Control.

- **Stage 1: Pre-Planning**
- Under this phase of production planning, basic ground work on the product design, layout design and work flow are prepared. The operations relating to the availability scope and capacity of men, money materials, machines, time are estimated.

- **Stage 2: Planning**
- This is a phase where a complete analysis on routing, estimating and scheduling is done. It also tries to find out the areas of concern for short time and long time so that prominent planning can be prepared.

- **Stage 3: Control**
- Under this phase, the functions included are dispatching, follow up, inspection and evaluation. It tries to analyze the expedition of work in progress. This is one of the important phases of the Production Planning and Control

- **Types of production systems**
- **Continuous production**
- It is also known as continuous process or continuous flow process. It refers to the production of standardized products with a standard set of process. Under this, the materials are processed continuously in motion, chemical reactions, heating treatment etc., it operates 24/7 with infrequent shutdowns. Ex: Oil refining, Power stations, Casting of steel, Metal smelting, Fertilizers etc.,
- **Job or Unit production**
- It involves production as per customer's specification. Each batch or orders includes identical products and are different from other batches. It includes smaller investment and equipment. It is flexible and adapted to changes in product design and order size. Ex: Garments Industry
- **Intermittent production**
- Under this, the goods are produced partly for inventory and partly for customer's orders. Ex: Automobiles, printing presses, electrical goods etc.,

- **Objectives of Production Control**
- Minimize production cost.
- Procurement of raw material, equipment and labour.
- Adjusting with demand forecast.
- Co-ordination with different departments/divisions.
- Avoid delay in production by regular and timely supply of raw materials.
- Performance review of semi-finished and finished products and quality system.

- **Benefits of Production Control**
- **Better service to customer** – Production flows as per the scheduled time and promised delivered dates are kept. It leads to the increase of confidence among the group of salesman.
- **Less overtime work** – As flow of production is matched with the promised delivery dates or expected demand periods, there will be few rush firms in the same industry without adequate production and planning and control system.
- **Need for smaller inventories of WIP and finished goods** – As the production process in planned and maintained well it leads to the minimum storage of WIP and finished goods.
- **More effective purchasing** –Due to the better materials management leading to the effective inventory control, purchasing is more scientific.

- **Less loss of time** – As there is a proper flow of materials to workers on time, the workers need not have to waste their time in the work place for materials.
- **Cost saving** – A proper designed and introduced system of production planning and control frequently results in major cost-savings.
- **Less work stoppage** – Work stoppages are avoided or minimized in terms of time duration. Therefore delays in dispatch of goods to customers are very infrequent.
- **Maintain industrial harmony** – Effective production control helps in establishing harmonious industrial relations.

- **Factors affecting the complexity of production control procedures are:**
- Number of ultimate parts in the end product.
- Number of different operations on each part.
- Extent to which processes are dependent on the completion of previous operations.
- Variations in production rates of machines used in the process.
- Number of discrete parts and sub-assemblies.
- Degree to which customers orders with specific delivery dates occur.
- Receipt of many small lot orders.

- **Production Planning and Control**
- **Meaning** It refers to the decisions on the acquisition, utilization and allocation of production resources to satisfy customer requirement.
- **Definition**
- According to Alford and Beatty, “PPC comprise the planning, routing, scheduling, dispatch and follow up functions in the production process so organized that the movements of material, performance of machines and operations of labours sub-divided are directed and coordinated as to quantity, time and place.”

- **Importance of PPC**
- Facilitates and coordinates activities concerned with amount, location, movement and timing etc.,
- Minimizes the working capital requirement
- Creates better control of material and efficient buying
- Optimum combination of resources and methods to bring down the production cost.
- Orderly flow of production to avoid rush orders and minimizing overtime.
- Right product with right quantity and right quality and at the right time.

- **Advantages of PPC**
- **Avoiding of rush orders** – Production is well planned and its time aspects are well controlled. Therefore, the production controls reduces the number of risk orders and over time.
- **Avoidance of bottle necks**– There shall not be any incomplete work to get accumulated as the production flow happens according to the plan.
- **Cost reduction** – The production control programs minimizes the idleness of men and machines which leads to better control of raw materials, inventories etc.,

- **Effective utilization of resources**–It reduces the loss of time by workers waiting for the materials and makes most effective use of equipments.
- **Co-ordination** – It serves to coordinate the activities of plant and results in a concerted effort by workmen
- **Benefits to workers** – Adequate wages, stable employment, job security, improved working conditions, increased personal satisfaction etc.,
- **Efficient service to customers** –It ensures better service to the customers by enabling production to be conducted in accordance with time schedules and deliveries are made on promised dates.

- **.Limitations of PPC**
- **Lack of accuracy** – As planning is related to future, future is always uncertain and so prediction about future is also difficult.
- **Costs** – Plans formulated require too much cost and time as well. If the costs cross beyond a limit it will be a burden to the institution.
- **Advance effect on decisions**– Some plans are rigid and managers faces difficulty while making the changes due to the external factors and fluctuations in the existing environment.
- **Delay in actions** – Planning requires time to think, analyze and design the final plan by which it may lose the existing opportunity available in the market.
- **Psychological barrier** – Managers in organization have to work strictly according to the plan where as they may be able to give better performance but some managers do not think beside the plan and perform their activities like a machine.

- **Limited flexibility** – There may be some changes in planning only up to certain limit and this changes will further attract the changes in supporting plans and as such the whole system is disturbed.
- **Human elements** – Planning is the result of the thinking of human beings. Information on the basis of which plan is formulated may not be free from bias or there may be some other errors.
- **Limited practical value** – Planning too much theoretical may have less practical use to suit the environment due to unsuitability of environment business to take various quick steps/ decision times.
- **Time consuming and costly process** – This may delay action if certain cases but it is also true that if sufficient time is not given to the planning process, the plans produced may be unrealistic.
- **Capacity planning -** It is the process of determining the production capacity required by an organization to meet the changing demands for its products.

- **Strategy of capacity planning**
- **Lead strategy** – It is adding the capacity in anticipating an increase in demand.
- **Lag strategy** – It is adding the capacity only after the organization is running at full capacity or beyond due to increase in demand. It reduces the risk of waste.
- **Match strategy** –It is adding capacity in small amounts in response to changing demand in the market.

- **Routine**
- It is the prescribed, detailed course of action to be followed regularly in a standard procedure. It is mechanically performed procedures or activities. It is the selection of path which each part of the product will follow while being transformed from raw materials to finished products.

- **Techniques of Routine**
- Route card
- Work sheet
- Route sheet
- Move order

- **Scheduling**
- It is the process of converting an outline plan for a project into a time-based graphic presentation given information on available resources and time.

- **Objectives of Scheduling**
- To maximize output
- To be predictable
- To minimize overhead
- To use optimum resources
- To reduce postponing
- To implement priorities
- To degrade heavy loads

- **Types of Scheduling**
- **Forward scheduling** – It is based on assigning the start and finish time of the task based on the priority. It is used when customers places an order. It assigns the earliest time available to finish the task and determines the work centre.
- **Backward scheduling** – It determines the start and end time of the waiting jobs by assigning them to latest available time slot to complete the jobs when it is due.
- **Dispatching -** It is concerned with the starting and the processing of production. It is based on the route sheets and schedule sheets. It provides the authority to start the routed and schedule work.

- **Functions of dispatching**
- To ensure right products are moved from stores
- To instruct department to issue the right tools, accessories and fixtures.
- To inform the follow up section for production planning
- To direct inspection at various stages of production for inspection report.
- To maintain proper report of the various subsidiary orders issued with each production

- **Techniques of Production Planning and Control**
- A simple graph
- A control chart
- Control boards Communication system
- Linear programming
- **Program Evaluation and Review technique (PERT)**
- **Meaning** It is a model for project management designed to analyze and represent the tasks involved in completing a given project.
- **Various activities in PERT**
- Optimistic time i.e., minimum time required to complete the task.
- Pessimistic time i.e., maximum possible time required to accomplish task.
- Most likely time i.e., best estimation of the time required to accomplish a task.
- Time expected i.e., it assumes that everything proceeds as normal.

- **Advantages of PERT**
- Identifies critical paths. Facilities early start, late start and lack of time.
- It provides the potentiality to reduce the project duration due to the better understanding of dependencies.
- **Disadvantages of PERT**
- It considers too many obstacles and dependencies.
- Time consuming.
- May not be applicable to all the projects.
- **Critical Path Method(CPM)**
- It is a mathematical based algorithms for scheduling a set of project activities. It may use the basics technique of Expansion and Flexibility.

Difference between PERT and CPM

BASIS FOR COMPARISON	PERT	CPM
Meaning	It is a project management	It is a statistical technique
Technique	Used to manage uncertain activities of a project.	Used to manage well defined activities of a project.
What is it	A technique of planning	A method to control cost
Orientation	Event-oriented	Activity-oriented
Project Model	Probabilistic Model	Deterministic Model

- **Quality** It refers to the sum of the attributes or properties that describes a product. These includes length, width, color, specific gravity etc.,
- **Factors affecting quality**
- **Market**–It is the role of companies to identify the needs and then meet it with existing technologies or by developing new technologies.
- **Money** – The increased competition worldwide demands the industry to opt for new and sophisticated technology which requires huge investments.
- **Management** – The structure of the business organization, the quality related responsibilities lie with persons at different levels in the organizations.

- **Men** – The growth in technology leads to the improvised technical skills in the man power with different specializations.
- **Motivation** –Based on the responsibility allotted to the employees, each individual in the organization requires having proper motivation techniques to producing the designed quality products.
- **Materials** – Selection of proper materials to meet the desired tolerance limit also is an important consideration.
- **Machines and mechanization** – To have quality products which will lead to the higher productivity of any organization, we need to use advanced machines and mechanize various operations.

- **Modern information methods** –It helps in storing and retrieving needed data for manufacturing, marketing and servicing.
- **Quality control**
- It is a process by which entities review the quality of all the factors involved in production. It includes functions like acceptance function, preventive function and assurance functions etc.,
- **Quality assurance**
- It is the systematic measurement, comparison with a standard monitoring of processes and an associated feedback that confers error prevention. It includes of material quality, assemblies, products and components, services etc.,
- **Quality creation**
- It refers to the process of making customer delight of by identifying and meeting the unexpected requirements with new or additional products or services. It uses quality as an element to attract the customers.

- **Statistical Quality Control (SQC)**
- It refers to the use of statistical methods in monitoring and maintaining of the quality of products and services. It considers the other variables and samples to control product.
- It uses tools like
- Descriptive statistics
- Statistical process control (SPC)
- Acceptance sampling

- **Quality Management**
- It is the act of managing all the activities and tasks related to maintain a desired level of excellence. It includes creating and implementing quality planning and assurance and quality control and quality improvement.
- **Importance of Quality management**
- It reduces cost of repairs, instruction, scrap, rework and product warranties Helps in sustaining the revenue.
- It uses QSP concept i.e., Quality, Service and Price.
- Product gets influenced by perception of quality which can be influenced by advertising and promotional efforts. It influences area like Engineering, purchased material quality, manufacturing quality etc.,

- **Control charts**
- They are the charts which are used to know the variations and to control the same. They uses the graphs which shows the standard and also control limit.
- **Operating Characteristic (OC) curve**
- The operating characteristic (OC) curve depicts the discriminatory power of an acceptance sampling plan.
- The OC curve plots the probabilities of accepting a lot versus the fraction defective. When the OC curve is plotted, the sampling risks are obvious.
- We should always examine the OC curve before using a sampling plan.

- **Acceptance sampling**
- **Acceptance sampling** uses statistical **sampling** to determine whether to **accept** or reject a production lot of material.
- It has been a common quality control **technique** used in industry. It is usually done as products leaves the factory, or in some cases even within the factory.
- **Quality circles**
- It is the group of employees whose job is to identify problems, formulate solutions and present their results too management with suggestion for implementation.

- **Zero defects**
- It refers to the zero break downs, zero inventories, zero delays etc., this concept is based on doing the right thing first time and eliminating defects. It works on the following principles:
- Quality is given priority.
- Defect prevention.
- Zero defect is quality standard.
- Quality is measured in monetary terms.

- **International Standard Organization (ISO) 9000 series**
- ISO 9000 is a set of international standards on quality management and quality assurance developed to help companies effectively document the quality system elements to be implemented to maintain an efficient quality system.
- They are not specific to any one industry and can be applied to organizations of any size.
- ISO 9000 can help a company satisfy its customers, meet regulatory requirements and achieve continual improvement. However, it should be considered to be a first step, the base level of a quality system, not a complete guarantee of quality.

- **ISO 9000 principles of quality management**
- Customer focus
- Leadership
- Engagement of people
- Process approach
- Improvement
- Evidence based decision making
- Relationship management

- **ISO 14000 series**
- It helps in identifying the organizations to manage the environment effects of their business practices.
- **Some of the standards in ISO series are**
- ISO 14001 –Specification of environment management system
- ISO 14004 – Guideline standard
- ISO 14010 through ISO 14015 – Environmental Auditing and related activities
- ISO 14020 through ISO 14024 – Environment labeling
- ISO 14031 through ISO 14032 – Environment performance evaluation
- ISO 14040 through ISO 14043 – Life Cycle Assessment

- **Total quality management**
- It refers to an active approach encompassing a company to operate according to the philosophy and system for continuous improvement of quality.
- **Principles of TQM**
- Quality oriented management
- Focus on customer
- Involving the work force
- Continuous improvement
- Supplier partnership
- Measuring performance

- **Cost reduction** – TQM helps in reducing the cost which is spent for quality control measures. By having a proper control over the products it reduces the excessive cost.
- **Customer requirement** – The quality of the products are manufactured based on the customer requirement and expectations.
- **Defect reduction** – AS TQM focuses on the quality of the product, it reduces the human error and tries to focus on the zero defects products manufacturing.
- **Morale** – IT improves the employee morale by giving priority to the incentives and reducing the industrial accidents.

- **Disadvantages of TQM**
- **Risky jobs** –It becomes difficult to check all the products individually to control over the quality.
- **Lack of skilled workers** – Not all the employees are technically sounded to understand the concept of TQM
- **No benefits for many years** – Though there are many industries which is following TQM from a long time the benefits they have got are not very big.
- **Job insecurity** – Although the employees are technically sounded are not the job security is not assured to them.

- **Productivity**
- It refers to an economic measure of output per unit of input. Output includes revenues and business inventories and input includes labour and capital.
- **Types of Productivity**
- **Labour Productivity** – it is the amount of goods and services that a worker produces in a given amount of time.
- **Capital Productivity** – It is the efficiency with which fixed capital stock is used.
- **Direct cost productivity** –It includes all the items of direct cost associated with resources used are aggregated on a monetary value basis

- **Total cost productivity** – It is the productivity of all factors involved as a whole in a production activity.
- **Energy productivity** – It is the ratio of output divided by energy consumption.
- **Raw material productivity** – It expresses the amount of economic value generated by a unit of material input or material consumption.
- **Partial productivity** –It is the ratio of output to one class of input.
- **Total factor productivity** –It is the ratio of net output to the sum of associated labour and capital inputs.
- **Total productivity** –It is the ratio of total output to the sum of all input factors.

- **Factors influencing productivity**
- **Man Power:**
- Selection i.e. selection of right man for a specific job
- Applying well known saying division of labour.
- Training i.e. consideration of training requirements whether to be imparted training in the plant itself or to be sent for training outside the unit to other plants within the country or abroad or training institutes.
- **Equipment and Machines:**
- The number of machine tools, their capacity and accessories required, replacement policy of the organization and maintenance schedules etc.

- **3. Input Materials:**
- i. Appropriate quality of materials
- ii. Material requirement planning (M.R.P.)
- iii. Substitute of materials being used
- iv. Inspection of input materials at various points
- v. Cost of materials procurement and handling up to stores.
- **4. Time:**
- **Time is significant for the following reasons:**
- i. Inspection of input materials i.e. raw material and semi finished or finished items required for assembly.
- ii. Time for inspection of finished products.
- iii. Production time (total time of manufacturing).
- iv. Time for repair and maintenance of machines and equipment.

- **5. Floor Area or Space:**
- i. Total area covered by the administrative block, production shop and inspection & quality control departments etc.
- ii. Location of different departments and shops etc.
- iii. Other space covered by plant layout.

- **6. Power or Energy:**
- i. Maintenance of equipment for saving energy
- ii. Use of renewable energy devices
- iii. Use of biogas, photovoltaic cells, solar energy and other non conventional techniques.

- **7. Finance:**
- Finance is required to maintain all the above requirements. The management should be for minimum rather optimum finance.
- **8. Movement of Man and Materials:**
- i. The required motion of manpower within the plant
- ii. The motion of raw material semi finished and finished products/items within the plant.

- **Standard time**
- It is the time required by an average skilled operator, working at a normal pace, to perform a specific task using a prescribed method. It also includes appropriate allowances to look after the workers.

- **Usage of standard time**
- **Staffing or workforce planning** –The number of workers required cannot accurately be determined unless the time required to process the existing work in known.
- **Line balancing or production leveling** – The correct number of workstations for optimum work flow depends on processing time, standard time at each workstations.
- **Materials requirements planning** – MRP systems cannot operate properly without accurate work standards.

- **System simulation** – Simulation models cannot accurately simulate operation unless times for all operations are known.
- **Wage payment**– Comparing expected performance with actual performance requires the use of work standards.
- **Cost accounting** – Works standards are necessary for determining not only the labour component of costs but also the correct allocation of production costs to specific products.
- **Employee evaluation** –In order to access whether individual employees are performing as well as they should, a performance standards is necessary against which the level of performance is measured.

- **Techniques to establish standard time**
- Time study
- Predetermined motion time systems
- Standard data system
- Work sampling

- **Method study**
- It is the systematic recording and critical examination of existing and proposed ways to doing work. It is a means of developing and applying easier and more effective methods and reducing costs.
- **Objectives**
- Develop work method and procedures
- Establish the best sequence of doing work
- Reduce monotony in the work
- Improve plant and material utilization
- Examine the facts critically
- Eliminate waste and unproductive operations

- **Steps involved in method study**
- **Select** – Work selected for method study may be an identical problem area or an identified opportunity. It may be identified through a systematic review of a available data.
- **Record** – The record stage of method study involves gathering the sufficient data to act as the basis of evaluation and examination. A wide range of techniques are available for recording, the choice depends on the nature of investigation.
- **Examine** – The recorded data are subjected to examination and analysis, formalized versions of this process are critical examination and system analysis.

- **Develop** – The examine stage merges into the develop stage of the investigation as more thorough analysis leads to automatically to identity areas of change.
- **Install** – the success of any method study project is realized when actual change is made on the ground change that meets the originally specific terms of reference for the project.
- **Maintain** – Sometime after introduction of new working methods it is necessary to check that the new method is working that it is being properly followed.

- **Time and motion study**
- It is an efficiency technique which combines the time study and motion study.
- **Time study** is concerned with the determination of the amount of time required to perform a unit of work. It consists of observing and recording the time required to perform each element of task.
- **Motion study** it is a qualitative analysis of a work station leading to design or improvement of an operation or activity.

- **Time study procedure**
- Define the objective of the study – this involves statement of the use of the result, the precision desired and the required level of confidences in estimated time standards.
- Verify the standard method and conditions exist for operation and the operator properly trained.
- Select operator to be studied if there are more than one operator doing the same task.
- Record information about the standard method, operation, operator, product, equipment and condition on the time study observation sheet.

- Divide the operation into reasonably small elements and record them on the time study observation sheet.
- Time the operator for each of the element. Record the data for a few minutes of cycles on time study observation sheet.
- Collect and record the data required number of cycles by timing and rating the operator
- Calculate the representative watch time for each element of operation.
- Determine the allowances for fatigue and various delays
- Determine the standard time of operation.

- **Meaning of motion study**
- It is a qualitative analysis of work station leading to the design or improvement of an activity. It is a part of method study where analysis of the motion of an operator or work will be studied.
- **Benefits of motion study**
- It grows the ability of workers
- Life of machine can be increased
- Reduces the exhaustion of workers
- Decreases the labour cost due to less wastage of factory or plant
- Helps in improve the methods or procedures adopted in performance of various jobs
- Assists to improve the layout of th e facility
- Improve utilization of resources

- **Work Study**
- Work study is the investigation, by means of a consistent system of the work done in an organization in order to attain the best utilization of resources
- i.e. Materials, Machines, Men and Money.
- All the technologies and management systems are related with productivity.

- **Flow chart**
- A flowchart is a type of diagram that represents an algorithm, workflow or process.
- The flowchart shows the steps as boxes of various kinds, and their order by connecting the boxes with arrows.
- This diagrammatic representation illustrates a solution model to a given problem.
- Flowcharts are used in analyzing, designing, documenting or managing a process or program in various fields.

- **Flow Chart Defined**
- A flow chart is a graphical or symbolic representation of a process. Each step in the process is represented by a different symbol and contains a short description of the process step. The flow chart symbols are linked together with arrows showing the process flow direction.
- **Common Flowchart Symbols**
- **Terminator**: An oval flow chart shape indicating the start or end of the process.
- **Process**: A rectangular flow chart shape indicating a normal process flow step.
- **Decision**: A diamond flow chart shape indication a branch in the process flow
- **Connector**: A small, labeled, circular flow chart shape used to indicate a jump in the process flow
- **Data**: A parallelogram that indicates data input or output (I/O) for a process.
- **Document**: Used to indicate a document or report

- **Flow diagram** is a collective term for a diagram representing a flow or set of dynamic relationships in a system.
- The term flow diagram is also used as a synonym for flowchart and sometimes as a counterpart of the flowchart.
  Flow diagram is a graphic representation of the physical route or flow of people, materials, paper works, vehicles, or communication associated with a process, procedure

- **Types of Diagram used in work study**

- **Outline process Chart**
- An outline process chart is a process chart which gives an overall view of a process by recording only the main operations and sequences in proper sequence.

- **Operation process chart**
- An operation process chart provides a compact over all view of the whole system of operations involved in the production of a product.
- In this chart only the main activities (i.e. operations and inspections) carried out to complete a job are recorded in the sequence of their occurrence but irrespective of where they are performed and who performs them.

- **Flow process chart**
- The Flow process Chart is a simple half-text, half-picture method of showing the steps in a process, using symbols to indicate the type of action being taken and text to give details of the action.
- The chart can selectively be used to show what happens to selected people, materials or equipment.

- **Two handed process chart**
- Two handed process chart is also known as Left and Right Hand process chart. As the name suggests, activities of a worker's hand are recorded with respect to each other. This usually comes into picture when the work involves repetitive and short operations.
- **Multiple activities chart**
- Multiple activity charts are the process charts using a time scale. It usually comes in picture when work study man wants to record the activities of one subject with respect to other on a single chart. Subject may be the worker, machine or equipment

- **Man Machine chart**
- A man-machine chart graphically represents the relationship between the manual work performed by one or more operators and one or more machines involved in a manufacturing process.

- **Process Flow diagram**
- A process flow diagram (PFD) is a diagram commonly used in chemical and process engineering to indicate the general flow of plant processes and equipment.
- The PFD displays the relationship between major equipment of a plant facility and does not show minor details such as piping details and designation.

- **String diagram**
- String diagram is one of the useful and simplest techniques of method study.
- It can be defined as a scale model on which a thread is used to trace the path or movements of man and materials during a specified sequence of events.
- It can also be stated that string diagram in a special form of flow diagram.

- **Work Measurements**
- **Meaning** Work measurement is concerned with the determination of the amount of time required to perform a unit of work. Work measurement is very important for promoting productivity of an organization. It enables management to compare alternate methods and also to do initial staffing. Work measurement provides basis for proper planning.
- **Definition**
- Work measurement has been defined by British Standard Institution as**,** “The application of techniques designed to establish the time for a qualified worker to carry out a specified job at a defined level of performance”**.**

- **Objectives of Work Measurement**
- To compare the times of performance by alternative methods.
- To enable realistic schedule of work to be prepared.
- To arrive at a realistic and fair incentive scheme.
- To analyze the activities for doing a job with the view to reduce or eliminate unnecessary jobs.
- To minimize the human effort.
- To assist in the organization of labor by daily comparing the actual time with that of target time.

- **Uses of Work Measurement**
- Wok measurement is used in planning work and in drawing out schedules.
- Wok measurement is used to determine standard costs.
- Wok measurement is used as an aid in preparing budgets.
- It is used in balancing production lines for new products.
- Work measurement is used in determining machine effectiveness.
- To determine time standards to be used as a basis for labour cost control.

- **Techniques of Work Measurement**
- **Time study:** A work measurement technique for recording the times and rates of working for the elements of a specified job carried out under specified conditions and for analyzing the data so as to determine the time necessary for carrying out the job at the defined level of performance. In other words measuring the time through stop watch is called time study.

- **Synthetic data:** A work measurement technique for building up the time for a job or pans of the job at a defined level of performance by totaling element times obtained previously from time studies on other jobs containing the elements concerned or from synthetic data.

- **3. Work sampling:** A technique in which a large number of observations are made over a period of time of one or group of machines, processes or workers. Each observation records what is happening at that instant and the percentage of observations recorded for a particular activity, or delay, is a measure of the percentage of time during which that activities delay occurs.

- **4. Predetermined motion time study (PMTS):** A work measurement technique whereby times established for basic human motions (classified according to the nature of the motion and conditions under which it is made) are used to build up the time for a job at the defined level of performance. The most commonly used PMTS is known as Methods Time Measurement (MTM).

- **5. Analytical estimating:** A work measurement technique, being a development of estimating, whereby the time required to carry out elements of a job at a defined level of performance is estimated partly from knowledge and practical experience of the elements concerned and partly from synthetic data.

- **Review Questions**
- **SECTION - A (2 marks)**
- 1. What do you mean by production planning and control?
- 2. What is quality circle?
- 3. What is time and motion study?
- 4. What is material requirement planning?
- 5. What is capacity planning?
- 6. What is routing?
- 7. What is scheduling?
- 8. Mention the types of scheduling.
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- **SECTION - B (6 marks)** 1. What are the objective of production planning and control?
- 1. State the objectives of scheduling?
- 2. Mention the benefits of Motion study?
- 3. Explain the techniques of routing.
- 4. Discuss the advantages of production planning and control.
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- **SECTION - C (14 marks)**
- 1. Discuss the functions of Production Planning & Control.
- 2. Discuss the types of production system.
- 3. Discuss the principles of scheduling.
- 4. Write a note on
- a. Quality circle.
- b. ISO.
-
- 4. Explain the techniques of work measurement study?
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