Lakshya School+ Revision Digest

12th Commerce Board Exam Master Guide
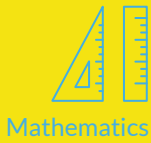
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ACCOUNTANCY

Chapter - 1

Accounting for Partnership: Basic Concepts

1 PARTNERSHIP

Two or more individuals may decide to oversee business operations and share its profits or loss.

2 PARTNERSHIP DEED

Written document containing the terms and conditions of partnership as agreed by the partners.

Rules applicable in the absence of Partnership Deed

a) Profit sharing Ratio	Shared Equally
b) Interest on capital	No Interest on capital is allowed to partners
c) Interest on drawings	No interest will be charged on the drawings made by the partners
d) Interest on loans and advances	Partners is entitled to get interest at 6% p.a. It should be paid even if there is loss
e) Salary or other remuneration	No one is entitled to get salary or commission

Note:
above points a), b), c), d), e) can be also used as some of the contents in partnership deeds.

3 MAINTENANCE OF CAPITAL ACCOUNTS OF PARTNERS

The capital accounts can be prepared in two methods Fixed Capital Method & Fluctuating Capital Method

• Difference Between Fixed Capital Method and Fluctuation Capital Method

Fixed Capital Method	Fluctuating Capital Method
Two accounts are prepared Capital account & Current account	Only one account is prepared called Capital account
The capitals of the partners shall remain fixed	Capital balance fluctuates from year to year
Adjustments like interest on capital, drawings, interest on drawings etc. are made in the current account	Adjustments are made in the capital account itself
Both capital account and current account appear in balance sheet	Only capital account appears in Balance sheet

4 PROFIT AND LOSS APPROPRIATION ACCOUNT

Preparing P&L Appropriation account to find final figure of profit and loss to be distributed among the partners with some adjustments like interest on capital, salary...etc

Particulars	Rs	Particulars	Rs
To Interest on Capital		By Profit & Loss A/c	xxx
A xxx		(Net profit)	
B xxx	xxx	By interest on Drawings	
To Partners Salary		A xxx	
A xxx		B xxx	xxx
B xxx	xxx		
To Partners Commission			
A xxx			
B xxx	xxx		
To Profit Transferred to			
A's Capital/Current			
A/c xxx			
B's Capital/Current			
A/c xxx	xxx		
	xxx		xxx

5 GUARANTEE OF PROFIT TO A PARTNER

Guarantee is an assurance given to the partner of the firm that at least a fixed amount shall be given to that partner irrespective of his actual share in profits of the firm.

If actual share in profits is **less than the guaranteed** amount in that case the deficit amount shall be borne either

BY THE FIRM

Distribute Guaranteed profit to that partner and Remaining profits are distributed among the remaining partners in their remaining ratio

BY ANY PARTNER OR PARTNERS - IMPORTAN

Calculate profit of all partners as per their ratio and deficiency shall be subtracted from partner or partners who are agreed and this amount shall be added to Guaranteed partner

All will be done through P&L Appropriation account

6 INTEREST ON CAPITAL

• **If there is no Additional Capital and Drawings :**

Interest is charged on the opening balance of the partner's capital account.

• **When additional capital is introduced and some capital is withdrawn permanently:**

The interest will be calculated on the amount of the capital used in the particular period. (Important)

> **Interest on Capital = Capital X Rate X Month/12**

(Month – Number of months which capital is used in business, this portion is only required when period is less than 1 year)

In case the opening balance of capital a/c is not given:

• Calculate Opening Capital and find interest on it
• Closing Capital = Opening Capital + Additional Capital +Profit – Drawings Hence,

> **Opening Capital = Closing Capital – Additional Capital – Profit + Drawings**

Then calculate Interest on Capital as normal

7 INTEREST ON DRAWINGS

Interest on drawings is to be charged from partners if it is specified in the deed. The interest is calculated by considering the time period involved.

> **Interest on Drawings = Drawings amount X Rate X Month/12**

If fixed amount withdrawn at fixed intervals (Important)

> **Interest on drawings = Total Drawings X Rate X (Average Period)/12**

This will be equal to,

Particulars	Beginning	Middle	End
Withdrawn Every Month	6.5	6	5.5
Withdrawn Every Quarter	7.5	6	4.5
Withdrawn Every Half year	9	6	3

Chapter - 2

Reconstitution of a Partnership Firm Admission of a Partner

1 RECONSTITUTION OF A FIRM

A partnership is formed by an agreement and any change in the agreement or relations of the partners will result in the reconstitution of the partnership firm. Re-constitution will happen in following cases

- Admission of a partner.
- Retirement of a partner.
- Death of a partner.
- Change in profit sharing ratio.

2 ADMISSION OF A NEW PARTNER

The admission of a partner is the process of adding a new partner to an existing partnership business

(1) Capital of new partner

The new partner has brought in an agreed amount of capital, the journal entry is:

Cash/Assets a/c Dr
To Incoming Partner's Capital A/c

(2) New profit-sharing ratio and sacrificing ratio

New Profit-Sharing Ratio

On admission of a partner, there is a need to ascertain the New Profit-Sharing Ratio.

Computation of New profit-sharing ratio

Different Cases

Case (a) When a new partner's share is given, the question is silent about the sacrifice,

Here old partners will share the remaining share in their old ratio

Case (b) When new partners acquire his share from old partners in certain ratio.

Here, Share of existing partner's = Old share — Sacrificed to new partner

Share of new partner = Sum of sacrificed ratio by existing partners

Case (c) When old partners sacrifice a particular fraction of their share (Surrender method)

Here, Firstly we need to calculate sacrifice from their share from the given information and find out a new profit sharing ratio as case b.

Sacrificing Ratio

The ratio in which the old partners agreed to sacrifice their share of profit in favor of the incoming partners is called sacrificing ratio.

> **Sacrificing Ratio = Old Ratio – New ratio**

> **Note, if old partners sharing remaining share of profit in old ratio, the sacrificing ratio will be equal to old ratio (Case a)**

③ GOODWILL

Simply Goodwill is the reputation of a business and it is the result of hard work and the efforts made by the existing partners.

Factors Affecting the Value of Goodwill
- Location of Business - Nature of Business
- Efficiency of Management - Market situation

Need for Valuation of Goodwill (Same as modes of reconstitution)

Methods of Valuation of Goodwill

a) Average profit method b) Weighted average profit method

c) Super profit method d) Capitalisation method

ⓐ AVERAGE PROFIT METHOD

> **Goodwill = Average Profit x No. of Year Purchase**

$$\text{Average Profit} = \frac{\text{Total Profit}}{\text{No. Of Years}}$$

(b) WEIGHTED AVERAGE PROFIT METHOD

Here weights (Like Rank.1,2,3..) are assigned for each year's profit (Highest weight for latest profit), and multiplying each profit with this weight, Then we will get the Value of product.

Goodwill = Weighted average profit x agreed number of years

$$\text{Weighted average profit} = \frac{\text{Total of products}}{\text{Total of weights}}$$

(c) SUPER PROFIT METHOD (IMPORTANT)

Goodwill = Super Profit x Number of year's purchase

Super Profit = Actual Profit – Normal Profit.

Normal profit = Capital Employed x Normal Rate of Return/100

(Actual Profit means Average Profit)

(d) CAPITALISATION METHOD

(a) Capitalization of Average Profit

Goodwill = Capitalized value of average profit - Actual capital

$$\text{Capitalized value of Avg. Profit} = \text{Avg. Profit} \times \frac{100}{\text{Normal Rate of Return}}$$

e CAPITALIZATION OF SUPER PROFIT

$$\text{Goodwill} \frac{\text{Super Profit} \times 100}{\text{Normal Rate of Return}}$$

Treatment Of Goodwill

i) Premium brings to the business

Bank A/c
To Premium for Goodwill A/c / New Partner's Capital A/c
(Amount brought by new partner as premium)

ii) Premium distributing to sacrificing Partners

New Partner's Capital A/c / Premium of Goodwill Dr.
To Sacrificing Partner's Capital A/c
(Goodwill distributed in sacrificing ratio).

iii) If the sacrificing partners decided to withdraw their amounts, (in full or in part) the following additional entry will be passed:

Sacrificing partners Capital A/c Dr
To Cash/Bank A/c
(Being premium withdrawn by the sacrificing partners).

4 ADJUSTMENT OF ACCUMULATED PROFITS AND LOSSES

(a) In Case of Accumulated Profit & Reserves

General Reserve A/C Dr
P & L A/C (Profit) Dr
To Old Partner's Capital A/C
(Individually distributed in old ratio)

(b) In case of Accumulated losses & Fictitious Assets

Old partner's Capital A/C Dr
To P & L Account (Loss)
(written off in old Ratio)

5 REVALUATION OF ASSETS AND LIABILITIES

Revaluation Account

Particulars	Rs	Particulars	Rs
To Decrease in value of Asset	xxx	By Increase in value of Asset	xxx
To Increase in value of liabilities	xxx	To decrease in value of liabilities	xxx
To unrecorded liabilities	xxx	To unrecorded Assets	xxx
To profit on revaluation transferred to **old partners** in old ratio.	xxx	To Loss on revaluation transferred to **old partners** in old ratio.	xxx
	xxx		xxx

There will be essay question to prepare Revaluation account, Partner's capital account and Balance sheet in public examination

Click For Video On
**Reconstitution Of A Partnership Firm
- Admission Of A Partner**

Chapter - 3

Reconstitution of a Partnership Firm – Retirement or Death of a Partner

Accounting Treatments

1 **NEW PROFIT-SHARING RATIO & GAINING RATIO**

New Profit-sharing Ratio

The ratio, in which the continuing partners decide to share the future profits and losses after the retirement or death of a partner, is known as new profit-sharing ratio

Computation of New Profit-Sharing Ratio

Case 1: Continuing partners acquire the share of retiring or deceased partners in their old profit-sharing ratio or question is silent about their gain.

(Here Old Ratio = New Ratio)

Case 2: Continuing partners may acquire the share in the profits of the retiring/deceased partner in a proportion other than their old ratio.

Here new profit sharing Ratio = Old share + Gain acquired

Gaining Ratio

The ratio in which the continuing partners acquire the outgoing partner's share is called the gaining ratio.

Gaining Ratio = New Share − Old Share

Note, If Continuing partners acquire the share of retiring or deceased partners in their old profit- sharing ratio, (case 1) Gaining Ratio = New profit- sharing Ratio

2 TREATMENT OF GOODWILL

Valuation and Treatment of Goodwill is same as in the case of admission of a new partner, only the difference is Sacrificing Partner is Outgoing partner and Gaining Partners is Remaining Partners

3 ADJUSTMENT OF RESERVES ACCUMULATED PROFITS AND LOSSES

Same as in the Admission of a Partner, Only the difference is the accumulated profit or losses will be adjusted with **All partners.**

4 REVALUATION OF ASSETS AND LIABILITIES

Same as in the Admission of a Partner, Only the difference is Revaluation profit or loss is distributed to **All Partners.**

5 PARTNER RETIRED / DIED IN THE MIDDLE OF THE YEAR

a) On the basis of last year's profit

$$= \text{Last year profit} \times \text{his share of profit} \times \frac{\text{Month}}{12}$$

b) On the basis of the average profit of a certain number of year's (Important)

$$= \text{Average profit} \times \text{his share of profit} \times \frac{\text{Month}}{12}$$

c) On the Basis of Sales

$$= \frac{\text{Last year profit}}{\text{Last year Sale}} \times \text{Sale up to Date of retirement or death}$$

Month = Number of months up to retirement or death of a partner

Note:
the profit will be transferred to outgoing partner's capital account by using P & L Suspense Account

6 AMOUNT PAYABLE TO RETIRED / EXECUTOR OF DECEASED PARTNER (IMPORTANT)

- Credit balance of her capital A/c and Current A/c
- Her share of goodwill.
- Her share of accumulated profits.
- Her share in the gain of revaluation of assets and liabilities
- Share of profits up to the date of retirement.
- Interest on his capital, if involved, up to the date of retirement/death.
- Salary/commission, if any, due to him up to the date of retirement/death.

Questions will be asked for both theory and problems
(Outgoing Partner's Capital A/c to find total amount payable to him) from here.

7 DISPOSAL OF AMOUNT DUE TO RETIRING OR DECEASED PARTNER (SETTLEMENT) - IMPORTANT

Amount payable to outgoing partner may be settled immediately by cash payment or transferred to Outgoing partner Partner's loan account and is paid in installments together with interest.

On death, the amount due to the deceased partner is transferred to his Executor's Account.

Click For Detailed Video On
**Reconstitution Of A Partnership Firm
– Retirement Or Death Of A Firm**

PLUS TWO
ACCOUNTANCY
RECONSTITUTION:
RETIREMENT OR DEATH OF A
PARTNER (FULL CHAPTER)

Chapter - 4
Dissolution of Partnership Firm

1 DISSOLUTION OF PARTNERSHIP

Simply Dissolution of partnership equal to reconstitution of partnership (Change the relationship between partners)

The dissolution of partnership may take place in any of the following ways

Same as modes of reconstitution

2 DISSOLUTION OF A FIRM

Dissolution of Firm means complete closure of the business, also known as winding up of a firm, At the time of dissolution of firms, all assets of the firm are sold, cash realized and with that cash liabilities are to be paid off. If there is any cash balance left, it will be distributed among the partners as per their ratio.

Difference between Dissolution of Partnership & Dissolution of Firm

Basis	Dissolution of Partnership	Dissolution of Firm
Meaning	Changes the existing relationship between partners	Partnership between all the partners comes to an end
Termination of business	The Business is not Terminated	The business of the firm is closed
Settlement of Assets & Liabilities	Assets and Liabilities are Revalued	Assets are realized and liabilities are paid off
Preparation of Balance Sheet	Assets & liabilities are revalued & new balance sheet prepared	There is no scope for balance sheet.

Modes of Dissolution of a Firm

Dissolution of a firm takes place in the following ways,

(1) **Dissolution by Agreement**

(2) **Compulsory Dissolution**
(When business become illegal, All partner's or except one become insolvent or retired or died..etc)

(3) **On the happening of certain contingencies**
(Completion of period or venture..etc)

(4) **Dissolution by notice**

(5) **Dissolution by court**
(Partner's become unsound mind, loss of business...etc)

3 SETTLEMENT OF ACCOUNTS

The mode-settling accounts will be mentioned in the partnership deed.
In the absence of an agreement between the partners, the following rules are applicable

a Paying the realization expenses

b Paying the debts from third parties-creditors, loans, bills payable, bank overdraft, loan from partners' relatives etc.

c Repayment of loans from partners.

d Repayment of capital contributed by partners.

e Surplus, if any, is distributed among the partners in their profit-sharing ratio.

> **Liabilities shall be paid first out of profit, next out of capital and lastly, if needed, by the partners individually in their profit-sharing ratio.**

4 ACCOUNTING TREATMENT

- On dissolution of a firm, the firm ceases (stop) to conduct business and has to settle its accounts.

- So, at the time of dissolution of a firm, books of accounts are to be closed, assets realized, liabilities are to be paid off and balance if any, distributed among partners according to their ratio.

- **In this process the following accounts are prepared:**

  (1) Realisation Account

  (2) Partners Capital Account

  (3) Bank/Cash Account

- **These three accounts will be asked for an essay question in public examination**

(1) Realisation Account

Performa of Realisation A/c

DR		Realisation A/c		Cr
Particulars	**Rs**	**Particulars**	**Rs**
To Sundry Assets (All the assets except Cash / Bank & fictitious Assets)	xxx	**By Sundry Liabilities** (Only Outsiders)	xxx
To Cash or bank (Payment of Liabilities)	xxx	**By Cash or bank** (Sale of Asset)	xxx
To Partners Capital A/c (liabilty taken by partner)	xxx	**By Partners Capital A/c** (Asset taken by partner)	xxx
To Cash Or Bank (Realisation expenses)	xxx	**By Cash / Bank** (Unrecorded Assets)	xxx
To Cash Or Bank (Unrecorded Liability)	xxx	**By Partners Capital A/c** (Loss transfer to partners if any)	xxx
To Partners Capital A/c (profit Transfer to partners)	xxx		
	xxx		xxx

Journal entries are also remembered,

Think about the revaluation account, which accounts are debited or credited to revaluation account, then we can make journal entries based on that

Eg: Revaluation Ac/ Dr
To Assets A/c (Individually)

(Assets from balance sheet transferred to Realisation Account)

Differences Between Revaluation A/c and Realisation A/c

Basis	Revaluation Account	Realisation Account
Meaning	Revaluation of Assets and Re-assessment of Liabilities	Realize the asset to the pay the liabilities
Time	It is prepared at the time of reconstitution	It is prepared at the time Dissolution of firm
Result	Profit or loss distributed to old partners only	Profit or loss distributed to all partners
Valuation	Assets are valued at current market price	Shows the actual amount received from the sale of asset
Expenses	No such expenses	Realisation expenses are shown in Account

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Dissolution Of Partnership Firm

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BUSINESS STUDIES

Chapter - 1

Nature And Significance of Management

1 DEFINITION

▸ Management is the art of getting things done through other people -Mary Parker.

2 CHARACTERISTICS OF MANAGEMENT (FEATURES)

▸ Goal-oriented,Pervasive,Multi-dimensional,Continuous process ,Group activity, Dynamic function ,Intangible force

3 OBJECTIVES OF MANAGEMENT

▸ Organizational objectives : Survival, Profit.Growth

▸ Social Objectives

▸ Personal objectives

4 NATURE OF MANAGEMENT

▸ Management as an **Art**

▸ Management as a **Science**

▸ Management as a **Profession**

5 LEVELS OF MANAGEMENT

▸ Top Management

▸ Middle management

▸ Lower Management (Supervisory Mgt or Operative Mgt)

2 LEVELS OF MANAGEMENT

▸ Planning, Organizing, Staffing, Directing, Controlling

2 CO-ORDINATION

▸ Co-ordination is regarded as the essence of Mgt and not as a separate function

Click For Video On
Nature And Significance Of Management

Chapter - 2

Principles of Management

MANAGEMENT PRINCIPLES-DEFINITION

▸ Principles of management are the guiding rules or laws for managerial action"...H.G. Hicks

TAYLOR'S SCIENTIFIC MANAGEMENT

▸ Scientific Management means knowing exactly what you want men to do and seeing that they do it in the best and cheapest way

PRINCIPLES OF SCIENTIFIC MANAGEMENT

▸ F.W. Taylor (Known as the Father of Scientific Management) developed certain principles of scientific Mgt .They are

- ▸ **Science not rule of thumb**
- ▸ **Harmony not discord**
- ▸ **Co-operation, not individualism**
- ▸ **Development of each and every person to His greatest efficiency**

TECHNIQUES OF SCIENTIFIC MANAGEMENT

- ▸ **Functional foremanship**
- ▸ **Standardization and simplification of work**
- ▸ **Method study**
- ▸ **Motion study**
- ▸ **Time study**
- ▸ **Fatigue study**
- ▸ **Differential piece wage system**

HENRY FAYOL'S PRINCIPLES OF MANAGEMENT

▸ Henry Fayol is known as the Father of Modern or General Management.
The 14 principles explained by Fayol are as follows

1. **Division of work**
2. **Parity between authority and responsibility**
3. **Discipline**
4. **Unity of command**
5. **Unity of direction**
6. **Subordination of individual interest to general interest**
7. **Remuneration of employees**
8. **Centralization and decentralization**
9. **Scalar chain**
10. **Order**
11. **Equity**
12. **Stability of personnel**
13. **Initiative**
14. **Esprit De-Corps (Union is strength)**

Click For Video On
Principles Of Management

Chapter - 3

Business Environment

1 MEANING

▸ Business environment means the sum total of individuals, institutions and other forces that are outside the control of a business but that may affect its performance.

2 IMPORTANCE OF BUSINESS ENVIRONMENT

▸ **First mover advantage**

▸ **Identifying threats and warning signals**

▸ **Helps in coping with rapid changes,**

▸ **Assisting in planning and policy formulation**

▸ **Helps in improving performance**

3 **DIMENSIONS OF BUSINESS ENVIRONMENT**

Economic Environment	Social Environment	Technological Environment	Political Environment	Legal Environment

Click for Video on
Business Environment

Chapter - 4

Planning

1 **MEANING**

▶ It is the process of thinking before doing

2 **IMPORTANCE / BENEFIT**

(a) **Provides directions**

(b) **Reduces the risk of uncertainty**

(c) **Reduces overlapping and wasteful activities**

(d) **Promotes innovative ideas**

(e) **Facilitates decision making**

(f) **Establishes standards for controlling**

3 **PLANNING PROCESS / STEPS**

(a) **Setting objectives**

(b) **Developing premises**

(c) **Identifying alternatives**

(d) **Evaluating alternatives**

(e) **Selecting an alternative**

(f) **Implementing the plan**

Click For Video On: **Planning**

Chapter - 5

Organizing

1 DEFINITION

▶ The Haimman defines organizing as "the process of defining and grouping the activities of the enterprise and establishing authority relationships among them".

2 STEPS IN THE PROCESS OF ORGANIZING

(a) **Identification and division of work**

(b) **Departmentalisation**

(c) **Assignment of duties**

(d) **Establishing reporting relationship**

3 IMPORTANCE OF ORGANIZING

(a) **Benefits of specialization**

(b) **Clarity in working relationships**

(c) **Optimum utilization of resources**

(d) **Adaptation to change**

(e) **Effective administration**

(f) **Development of personnel**

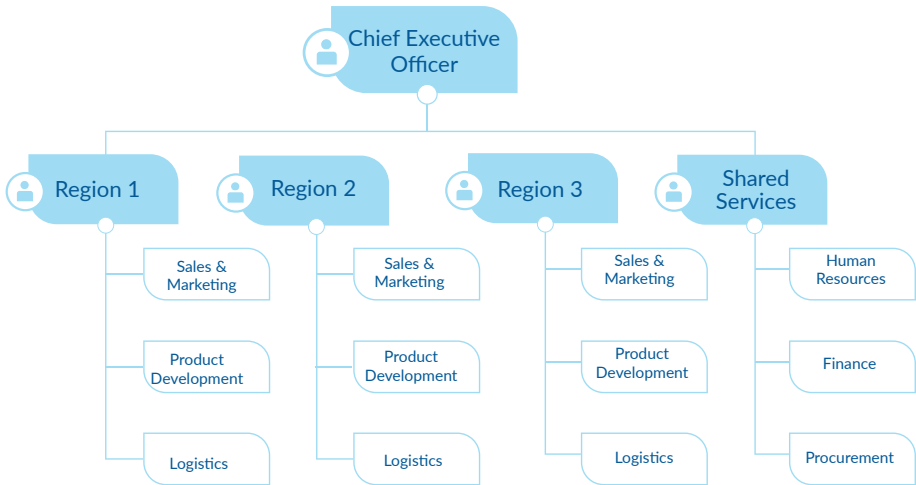## 4 SPAN OF MANAGEMENT (SPAN OF CONTROL)

▶ It refers to the number of subordinates that can be effectively managed by a superior

5 ORGANIZATION STRUCTURE

FUNCTIONAL STRUCTURE

DIVISIONAL STRUCTURE

6 FORMAL AND INFORMAL ORGANIZATION

(a) FORMAL ORGANIZATION

It refers to the organization structure which is deliberately planned and created by the Management to achieve organizational goals.

(b) INFORMAL ORGANIZATION

It is a network of personal and social relations not established by the formal organization but arising spontaneously as people associate with one another.

7 DELEGATION

Delegation refers to the downward transfer of authority from a superior to a subordinate.

▶ **Elements of Delegation:** Authority, Responsibility, Accountability

8 CENTRALIZATION AND DECENTRALIZATION

▶ **Centralization:** When decision making authority is retained by higher Mgt level, it is centralisation.

▶ **Decentralization:** When decision making authority is delegated to the lowest levels, it is decentralization

Click For Video On **Organizing**

Staffing

1 DEFINITION

▶ According to French Wendell "Staffing is the recruitment, selection, development, utilization, compensation and motivation of human resources of the organization"

2 STAFFING PROCESS

▶ **Estimating manpower requirements**

▶ **Recruitment**

▶ **Selection**

▶ **Placement and orientation**

▶ **Training and Development**

▶ **Performance appraisal**

▶ **Promotion**

▶ **Compensation**

3 RECRUITMENT

▶ It refers to the process of finding possible candidates for a job.

▶ **Internal sources:** It refers to the recruitment for jobs from within the organization

▶ **External sources:** They refer to the recruitment for jobs from outside the organization

4 SELECTION

▶ Selection is the process of identifying and choosing the best person out of a number of prospective candidates for a job

Process of selection

▶ **Preliminary scrutiny**

▶ **Selection tests**

▶ **Employment Interview**

▶ **Reference and Background checks**

▶ **Selection decision**

▶ **Medical examination**

▶ **Job offer**

▶ **Contract of employment**

- **Training:** Training is an organized activity of increasing the knowledge and skills of employees for performing a particular task.

- **Development:** it enables the overall growth of an employee thereby increasing his capabilities for accepting higher positions in future.

Click for video on: **Staffing**

Chapter - 7

Directing

▸ **Directing:**

Refers to the process of Instructing,Guiding,Counseling, Motivating and Leading people in an organization to achieve its objectives.

Elements of directing

Supervision
Refers to the direct and immediate guidance and control of subordinates in performance of their task

Motivation
Means a process of stimulating people to action to accomplish desired goals.

Leadership
Refers to the process of influencing the behavior of people by making them to strive voluntarily towards achievement of organizational goals
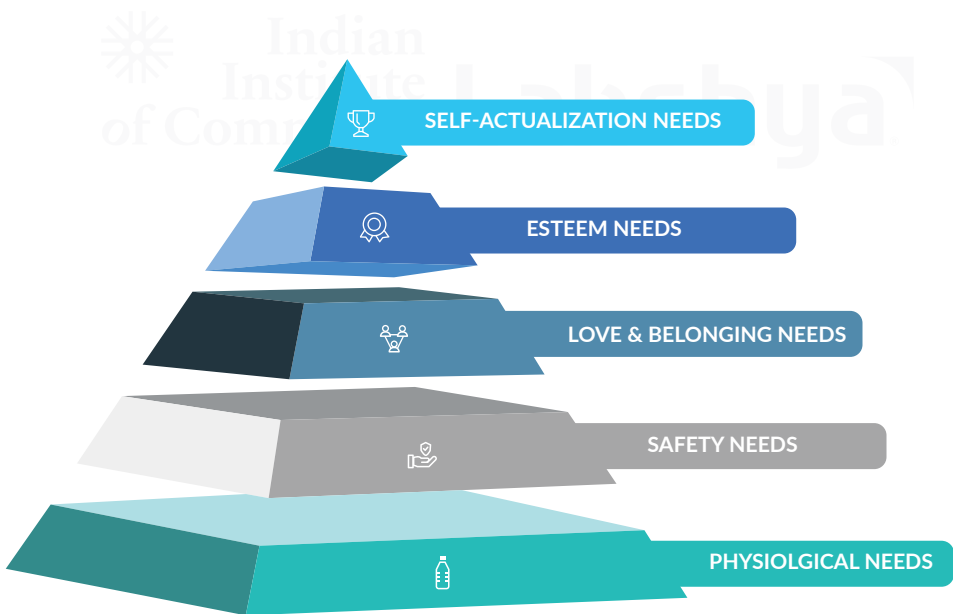
Communication
Two or more persons sharing their ideas, experience,knowledge,Feelings with each other is called Communication.

IMPORTANCE /ROLE/ FUNCTIONS OF SUPERVISION/SUPERVISOR

▶ **Maintains day-to day contact**

▶ **Act as a link between workers and the Management**

▶ **Maintains group unity**

▶ **Ensures performance of work**

▶ **Provides on-the-job training**

▶ **Influences workers**

▶ **Provides feed back**

MASLOW'S NEED HIERARCHY THEORY OF MOTIVATION

▶ Abraham Maslow, an eminent U.S. psychologist developed a theory of human motivation based on the Hierarchy of needs.

SELF-ACTUALIZATION NEEDS

ESTEEM NEEDS

LOVE & BELONGING NEEDS

SAFETY NEEDS

PHYSIOLGICAL NEEDS

INCENTIVES

FINANCIAL INCENTIVES	NON FINANCIAL INCENTIVES
1) Pay and allowances	1) Status
2) Productivity linked wage incentives	2) Organizational climate
3) Bonus	3) Job enrichment
4) Profit sharing	4) Employee recognition
5) Co-partnership	5) Job security
6) Retirement benefits	6) Employee Participation
7) Perquisites	7) Employee empowerment

ELEMENTS OF COMMUNICATION

- ‣ **Sender**
- ‣ **Message**
- ‣ **Encoding**
- ‣ **Media / Channel**
- ‣ **Decoding**
- ‣ **Receiver**
- ‣ **Feedback**

Scan For Video On: **Directing**

PLUS TWO BUSINESS STUDIES DIRECTING PART-1

Chapter - 8

Controlling

MEANING

- ▶ Refers to the measurement of accomplishment against the standard and the correction of deviations to assure attainment of objectives according to plans.

CONTROLLING PROCESS

▶ **Setting performance standards**

▶ **Measurement of actual performance**

▶ **Comparing actual performance with standards**

▶ **Analyzing deviations**

▶ **Taking corrective action**

LIMITATIONS OF CONTROLLING

▶ **Difficulty in setting quantitative standards**

▶ **Little control on external factors**

▶ **Resistance from employees**

▶ **Costly affair**

▶ **Technological change**

Chapter - 9

Financial Management

MEANING

▶ Financial management deals with procurement of funds and their effective utilization in the business

Financial decisions refer to decisions taken on financial operations pertaining to **investment decisions, Financing decisions, Dividend decision**

FACTORS AFFECTING DIVIDEND DECISION	FACTORS AFFECTING THE WORKING CAPITAL REQUIREMENTS
▶ Amount of earnings	▶ Nature of business
▶ Stability of earning	▶ Scale of operations
▶ Stability of dividends	▶ Seasonal factors
▶ Growth opportunities	▶ Credit allowed
▶ Cash flow positions	▶ Availability of raw materials
▶ Shareholders' preference	▶ Growth prospects
▶ Taxation policy	▶ Level of competition

Chapter - 10

Marketing Management

MEANING

▶ Referred to as performance of business activities that directs the flow of goods and services from the producers to consumers

ELEMENTS OF MARKETING MIX

PRODUCT	PRICE	PLACE	PROMOTION

FACTORS AFFECTING PRICE DETERMINATION

▶ Product cost

▶ The Utility and demand

▶ Extent of competition in the market

▶ Government and legal regulations

▶ Pricing objectives

▶ Marketing methods used

MERITS OF ADVERTISING

☑ **It helps the consumers to know about the various products**

☑ **It helps to create more employment opportunities**

☑ **It saves time and effort in selecting the product**

☑ **It educates the consumers about various uses of the produc**

DEMERITS OF ADVERTISING

☒ **Lack of feed back**

☒ **Most of the advertisements are misleading**

☒ **Encourage the sale of inferior products**

☒ **Some advertisements are bad taste**

☒ **It is an impersonal form of communication**

Chapter - 11

Consumer Protection

MEANING

▶ Consumer protection refers to the adoption of measures to protect consumers against the unscrupulous, exploitative and unfair practices of business community

Consumer Rights

▶ **Right to safety**

▶ **Right to informed**

▶ **Right to choose**

▶ **Right to be heard**

▶ **Right to seek redressal**

▶ **Right to consumer education**

Redressal Agencies Under the Consumer Protection Act

→ **National commission**

→ **State commission**

→ **District forum**

Quick Access QR Codes:

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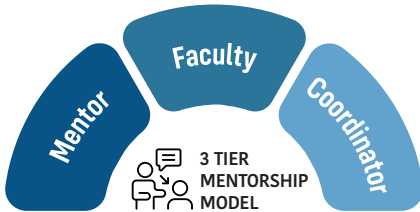YouTube Channel: Access all exam-related videos in one place!

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MATHEMATICS

Plus Two
Mathematics Study Guide

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Chapter - 1
Relations and Functions

Reflexive relation : $(a, a)\epsilon R$, for every $a\epsilon A$

Symmetric relation : $(a, b)\epsilon R$ implies that $(b, a)\epsilon R$, for all $a, b\epsilon R$

Transitive relation : $(a, b)\epsilon R \& (b, c)\epsilon R$ implies that $(a, c)\epsilon R$, for $a, b, c\epsilon A$

Equivalence relation : A relation which is reflexive, symmetric & transitive

One-one/Injective function: $f(x_1) = f(x_2)$ implies $x_1 = x_2$. Graphically, if no line parallel to x axis meets the graph of function at more than one point

Onto/Surjective function: If **RANGE = CODOMAIN,** then the function is onto

Bijective function: A function which is one-one and onto

Important Questions 💡

1 Check whether $R = \{(1,1)(1,2)(3,3)(3,4)(2,2)(2,1)(4,3)(4,4)\}$ **on** $\{1,2,3,4\}$ **is reflexive, symmetric or transitive**

2 Prove that the relation $R = \{(a, b): 2\ divides\ a - b\}$ **on** Z **is an equivalence relation**

3 Prove that the function $f(x) = 4x + 3$ **a bijective function**

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Relations and Functions

MARATHON REVISION
Plus Two
Topic: RELATIONS & FUNCTIONS

Inverse Trigonometric Functions

- **If** $\sin\theta = x$, **then** $\theta = \sin^{-1} x$

Function	Range	Domain
$\sin^{-1}$	$\left[-\dfrac{\pi}{2}, \dfrac{\pi}{2}\right]$	$[-1,1]$
$\tan^{-1}$	$\left(-\dfrac{\pi}{2}, \dfrac{\pi}{2}\right)$	R
$cosec^{-1}$	$\left[-\dfrac{\pi}{2}, \dfrac{\pi}{2}\right] - \{0\}$	$R-(-1,1)$
$\cos^{-1}$	$[o, \pi]$	$[-1,1]$
cot^{-1}	(o, π)	R
$\sec^{-1}$	$[o, \pi] - \left\{\dfrac{\pi}{2}\right\}$	$R-(-1,1)$

- $\sin^{-1}(-x) = -\sin^{-1} x, \ \tan^{-1}(-x) = -\tan^{-1} x, \ cosec^{-1}(-x) = -cosec^{-1}x$
- $\cos^{-1}(-x) = \pi - \cos^{-1} x, \ cot^{-1}(-x) = \pi - cot^{-1} x, \ sec^{-1}(-x) = \pi - sec^{-1}x$
- $\sin^{-1}(\sin x) = x, \ x\epsilon\left[-\dfrac{\pi}{2}, \dfrac{\pi}{2}\right]$
- $\sin(\sin^{-1} x) = x, \ x\epsilon\left[-1,1\right]$

Important Questions

1. **Find the principal value of** (i) $\tan^{-1}(-\sqrt{3})$ (ii) $\sec^{-1}(-2)$

2. **Find the value of** $\cos^{-1}\left(\cos\dfrac{4\pi}{3}\right)$

3. **Find the value of** $\tan^{-1}(1) + \cos^{-1}\left(-\dfrac{1}{2}\right) + \sin^{-1}\left(-\dfrac{1}{2}\right)$

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Inverse Trigonometric Functions

MARATHON REVISION
Topic: INVERSE TRIGONOMETRIC FUNCTIONS

Chapter - 3

Matrices

- A matrix is a rectangular arrangement of numbers or functions in rows and columns

- A matrix having m rows and n columns is called a matrix of order $m \times n$

Q. Construct a 2×3 matrix A such that $a_{ij} = 2i + j$

Answer:

$$A = \begin{bmatrix} a_{11} & a_{12} & a_{13} \\ a_{21} & a_{22} & a_{23} \end{bmatrix} = \begin{bmatrix} 2 \times 1 + 1 & 2 \times 1 + 2 & 2 \times 1 + 3 \\ 2 \times 2 + 1 & 2 \times 2 + 2 & 2 \times 2 + 3 \end{bmatrix} = \begin{bmatrix} 3 & 4 & 5 \\ 5 & 6 & 7 \end{bmatrix}$$

- **Transpose of a matrix (A^T):** It is obtained by interchanging rows and columns

- **Symmetric matrix :** A square matrix, A is called symmetric if $A^T = A$

- **Skew symmetric matrix :** A square matrix, A is called skew symmetric if $A^T = -A$

- For any square matrix A, $A + A^T$ is symmetric and $A - A^T$ is skew symmetric

- Any square matrix can be expressed as the sum of symmetric and skew symmetric matrices as

$$A = \left[\frac{1}{2}(A + A^T) \right] + \left[\frac{1}{2}(A - A^T) \right]$$
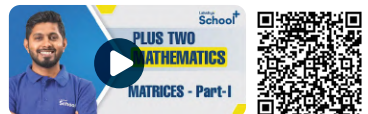
Important Questions

1. Express $A = \begin{bmatrix} 2 & -3 & 1 \\ 4 & -2 & 5 \\ -1 & 3 & 2 \end{bmatrix}$ as the sum of a symmetric and skew symmetric matrix

2. Find the value of x, y, z, w satisfying the matrix equation

$$2\begin{bmatrix} x & z \\ y & w \end{bmatrix} + 3\begin{bmatrix} 1 & -1 \\ 0 & 0 \end{bmatrix} = 3\begin{bmatrix} 3 & 5 \\ 4 & 6 \end{bmatrix}$$

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MATHEMATICS
MATRICES - Part-I

Determinants

- **Determinant of a square matrix A** $= |A| = \Delta = det.A$

- **Determinant of a square matrix of order 2**
$$\begin{vmatrix} a & b \\ c & d \end{vmatrix} = ad - bc$$

- **Determinant of a square matrix of order 3**
$$\begin{vmatrix} a & b & c \\ d & e & f \\ g & h & i \end{vmatrix} = a\begin{vmatrix} e & f \\ h & i \end{vmatrix} - b\begin{vmatrix} d & f \\ g & i \end{vmatrix} + c\begin{vmatrix} d & e \\ g & h \end{vmatrix}$$

- **Singular matrix** – A square matrix, A is said to be singular if $|A| = 0$

- **Non-singular matrix** – A square matrix, A is said to be non-singular if $|A| \neq 0$

- **Area of triangle whose vertices are** $(x_1, y_1), (x_2, y_2)$ **and** (x_3, y_3) **is given by**
$$Area = \frac{1}{2}\begin{vmatrix} x_1 & y_1 & 1 \\ x_2 & y_2 & 1 \\ x_3 & y_3 & 1 \end{vmatrix}$$

- **Minor of an element** a_{ij} **of the determinant of matrix A is the determinant obtained by deleting** i^{th} **row and** j^{th} **column and denoted by** M_{ij}

- **Cofactor of** a_{ij} **is given by** $A_{ij} = (-1)^{i+j}M_{ij}$

- **If** $A = \begin{bmatrix} a_{11} & a_{12} & c_{13} \\ a_{21} & a_{22} & c_{23} \\ a_{31} & a_{32} & c_{33} \end{bmatrix}$**, then** $adj\ A = \begin{bmatrix} A_{11} & A_{21} & A_{31} \\ A_{12} & A_{22} & A_{32} \\ A_{13} & A_{23} & A_{33} \end{bmatrix}$**, where** A_{ij} **is cofactor of** a_{ij}

- **Inverse of a matrix A is denoted by** A^{-1}
$$A^{-1} = \frac{1}{|A|}adj.A, \ \ |A| \neq 0$$

- **Consider the system of equations,**
$$a_1x + b_1y + c_1z = d_1, \quad a_2x + b_2y + c_2z = d_2, \ \ a_3x + b_3y + c_3z = d_3$$
Let $A = \begin{bmatrix} a_1 & b_1 & c_1 \\ a_2 & b_2 & c_2 \\ a_3 & b_3 & c_3 \end{bmatrix}, \ \ X = \begin{bmatrix} x \\ y \\ z \end{bmatrix}, \ \ B = \begin{bmatrix} d_1 \\ d_2 \\ d_3 \end{bmatrix}$
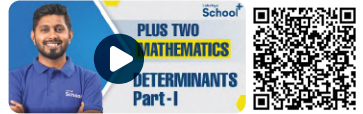**Here** $X = A^{-1}B$

Important Questions 💡

1 Find the value of x if $\begin{vmatrix} 2 & 4 \\ 5 & 1 \end{vmatrix} = \begin{vmatrix} 2x & 4 \\ 6 & x \end{vmatrix}$

2 Find the area of triangle with vertices $(3,8), (-4,2)$ and $(5,1)$

3 Solve by matrix method:
$3x - 2y + 3z = 8, \ \ 2x + y - z = 1, \ \ 4x - 3y + 2z = 4$

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MATHEMATICS
DETERMINANTS
Part-I

Chapter - 5

Continuity And Differentiability

- Suppose f is a real function on a subset of Real numbers and let c be a point in the domain of f. Then f is continuous at $x = c$ if $\lim\limits_{x \to c} f(x) = f(c)$

- **Standard Continuous Function** – Constant function, Polynomial function, Modulus function, Rational function, Trigonometric function are continuous in their domain

- **Differentiation** is the process of finding the rate at which a function is changing.

- If f and g are continuous functions, then

- $(f \pm g)(x) = f(x) \pm g(x)$ is continuous

- $(f.g)(x) = f(x).g(x)$ is continuous and

- $\left(\dfrac{f}{g}\right)(x) = \dfrac{f(x)}{g(x)}$ is continuous (where $g(x) \neq 0$)

- Every differential function is continuous, but the converse is not true

- Derivative of $y = f(x)$ is denoted by y' or $f'(x)$ or $\dfrac{dy}{dx}$

- $(u \pm v)' = u' \pm v'$,

- $(uv)' = uv' + vu'$ - **Product rule**

- $\left(\dfrac{u}{v}\right)' = \dfrac{vu' - uv'}{v^2}$ – **Quotient rule**

- **Chain rule** is rule to differentiate composites of functions. If $f(x) = vou, t = u(x)$
  and if both $\dfrac{dt}{dx}$ and $\dfrac{dv}{dt}$ exist then, $\dfrac{df}{dx} = \dfrac{dv}{dt} \times \dfrac{dt}{dx}$

- $\frac{d}{dx}(\sin^{-1} x) = \frac{1}{\sqrt{1-x^2}}$ $\frac{d}{dx}(\cos^{-1} x) = \frac{-1}{\sqrt{1-x^2}}$

  $\frac{d}{dx}(\tan^{-1} x) = \frac{1}{1+x^2}$ $\frac{d}{dx}(\cot^{-1} x) = \frac{-1}{1+x^2}$

  $\frac{d}{dx}(\sec^{-1} x) = \frac{1}{x\sqrt{1-x^2}}$ $\frac{d}{dx}(\csc^{-1} x) = \frac{-1}{x\sqrt{1-x^2}}$

  $\frac{d}{dx}(e^x) = e^x$ $\frac{d}{dx}(\log x) = \frac{1}{x}$

- **If two variables x and y are varying with respect to another variable t, i.e., if $x = f(t)$ and $y = g(t)$, then**

$$\frac{dy}{dx} = \left[\frac{\left(\frac{dy}{dt}\right)}{\left(\frac{dx}{dt}\right)}\right], \text{ if } \frac{dx}{dt} \neq 0.$$

- **To differentiate functions of the form $[u(x)]^{v(x)}$, Logarithmic differentiation is used. Provided $f(x)$ and $u(x)$ must be positive.**
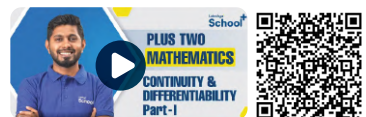
Properties of Logarithm

- $\log a^m = m \times \log a,$
- $\log ab = \log a + \log b$
- $\log \frac{a}{b} = \log a - \log b$

Important Questions

1. **Discuss the continuity of the function** $f(x) = \begin{cases} x^2 + 3, & if\ x \leq 2 \\ x^3 - 3, & if\ x > 2 \end{cases}$

2. **Find the value of k so that the function** $f(x) = \begin{cases} kx + 1, & if\ x \leq 5 \\ 3x - 5, & if\ x > 5 \end{cases}$ **is continuous**

3. **Find $\frac{dy}{dx}$ of any three of the following, if**

   (i) $y = \log(\cos(e^x))$ (iii) $x = a(t - \sin t), y = a(1 + \cos t)$

   (ii) $\sin^2 x + \cos^2 y = 1$ (iv) $y = x^x$

4. **If $y = 500 e^{7x} + 600 e^{-7x}$, show that $\frac{d^2 y}{dx^2} = 49y$**

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Continuity And Differentiability

PLUS TWO
MATHEMATICS
CONTINUITY &
DIFFERENTIABILITY
Part-I

Application Of Derivatives

- If a quantity y varies with another quantity x, satisfying some rule $y = f(x)$, then $\frac{dy}{dx}$ (or $f'(x)$) represents the rate of change of y with respect to x

- $\frac{dy}{dx}\big]_{x=x_0}$ (or $f'(x_0)$) represents the rate of change of y with respect to x at $x = x_0$

- A function f is said to be *Increasing*, if $f'(x) > 0$

- A function f is said to be *Decreasing* if $f'(x) < 0$

First Derivative Test

Let *f* be a function defined on an open interval I.
Let *f* be continuous at a critical point c in I. Then

i) If $f'(x)$ changes sign from positive to negative as *x* increases through *c*, then c is a point of local maxima.

ii) If $f'(x)$ changes sign from negative to positive as *x* increases through *c*, then c is a point of local minima.

iii) If $f'(x)$ does not change sign as *x* increases through *c*, then c is neither point of local maxima nor a point of local minima. In fact, such a point is called point of inflexion.

Second Derivative Test

Let *f* be a function defined on an interval I and c ε I. Let *f* be twice differentiable at c. Then

i) $x = c$ is a point of local maxima if $f'(c) = 0$ and $f''(c) < 0$
   Here, the value of $f(c)$ is local maximum value of *f*.

ii) $x = c$ is a point of local minima if $f'(c) = 0$ and $f''(c) > 0$
   Here, in this case, f(c) is local minimum value of f.

iii) The test fails if $f'(c) = 0$ and $f''(c) = 0$.

In this case, we go back to the first derivative test and find whether c is a point of maxima, minima or a point of inflexion.

Important Questions

1. The radius of a circle is increasing uniformly at the rate of 3cm/sec. Find the rate at which the area of circle is increasing when the radius is 10cm

2. Consider the function $f(x) = 2x^3 - 6x^2 - 18x - 5$ find the intervals in which f is increasing or decreasing

3. Find local minimum and local maximum values of the function f given by
$$f(x) = 3x^4 + 4x^3 - 12x^2 + 12$$

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Application Of Derivatives

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MATHEMATICS
APPLICATION OF
DERIVATIVES
PART-I

Chapter - 7
Integrals

- **Integration is the inverse process of differentiation.**

- **Let $\frac{d}{dx}F(x) = f(x)$. Then we write $\int f(x)\,dx = F(x) + C$. these integrals are called indefinite integrals or general integrals; C is called constant of integration.**

- $\int[f(x) + g(x)]dx = \int f(x)dx + \int g(x)dx$

Some standard integrals

(1) $\int x^n dx = \frac{x^{n+1}}{n+1} + C$, $n \neq 1$. Also $\int dx = x + C$

(2) $\int \sin x\, dx = -\cos x + C$

(3) $\int \cos x\, dx = \sin x + C$

(4) $\int \cosec^2 x\, dx = -\cot x + C$

(5) $\int cosec\, x \cot x\, dx = -cosec\, x + C$

(6) $\int \sec x \tan x\, dx = \sec x + C$

(7) $\int \sec^2 x\, dx = \tan x + C$

(8) $\int \frac{dx}{\sqrt{1-x^2}} = \sin^{-1} x + C = -\cos^{-1} x + C$

(9) $\int a^x dx = \frac{a^x}{\log a} + C$

(10) $\int \frac{dx}{1+x^2} = \tan^{-1} x + C = -\cot^{-1} x + C$

(11) $\int e^x dx = e^x + C$

(12) $\int \frac{dx}{x\sqrt{x^2-1}} = \sec^{-1} x + C = -\cosec^{-1} x + C$

(13) $\int \frac{1}{x}dx = \log|x| + C$

Integration by partial fraction

(1) $\frac{px+q}{(x-a)(x-b)} = \frac{A}{(x-a)} + \frac{B}{(x-b)}$, $a \neq b$

(4) $\frac{px^2+qx+r}{(x-a)^2(x-b)} = \frac{A}{(x-a)} + \frac{B}{(x-a)^2} + \frac{C}{(x-b)}$

(2) $\frac{px+q}{(x-a)^2} = \frac{A}{(x-a)} + \frac{B}{(x-a)^2}$

(5) $\frac{px^2+qx+r}{(x-a)(x^2+bx+c)} = \frac{A}{(x-a)} + \frac{Bx+C}{x^2+bx+c}$

(3) $\frac{px^2+qx+r}{(x-a)(x-b)(x-c)} = \frac{A}{(x-a)} + \frac{B}{(x-b)} + \frac{C}{(x-c)}$

Integrals of some special functions

(1) $\int \frac{dx}{x^2-a^2} = \frac{1}{2a}\log\left|\frac{x-a}{x+a}\right| + C$

(4) $\int \frac{dx}{x^2+a^2} = \frac{1}{a}\tan^{-1}\frac{x}{a} + C$

(2) $\int \frac{dx}{a^2-x^2} = \frac{1}{2a}\log\left|\frac{a+x}{a-x}\right| + C$

(5) $\int \frac{dx}{\sqrt{x^2+a^2}} = \log|x + \sqrt{x^2 + a^2}| + C$

(3) $\int \frac{dx}{\sqrt{x^2-a^2}} = \log|x + \sqrt{x^2 - a^2}| + C$

(6) $\int \frac{dx}{\sqrt{a^2-x^2}} = \tan^{-1}\frac{x}{a} + C$

Integration by parts

▪ $\int I.II\, dx = I \int II\, dx - \int \left[\frac{d}{dx}I \int II\, dx\right] dx$

▪ $\int e^x[f(x) + f'(x)]dx = e^x f(x) + C$

Some special types of integrals

(i) $\int \sqrt{x^2 - a^2}\, dx = \frac{x}{2}\sqrt{x^2 - a^2} - \frac{a^2}{2}\log|x + \sqrt{x^2 - a^2}| + C$

(ii) $\int \sqrt{x^2 + a^2}\, dx = \frac{x}{2}\sqrt{x^2 + a^2} + \frac{a^2}{2}\log|x + \sqrt{x^2 + a^2}| + C$

(iii) $\int \sqrt{a^2 - x^2}\, dx = \frac{x}{2}\sqrt{a^2 - x^2} + \frac{a^2}{2}\sin^{-1}\frac{x}{a} + C$

Definite Integrals

·) $\int_a^b f(x)dx$ is defined as the area of the region bounded by the curve $y = f(x)$, $a \leq x \leq b$, the x-axis and the ordinates $x = a$ and $x = b$

·) $\int_a^b f(x)dx = [F(b) - F(a)]$; here a is the lower limit and b is the upper limit

Properties of Definite Integrals

(1) $\int_a^b f(x)dx = \int_a^b f(t)dt$

(2) $\int_a^b f(x)dx = -\int_b^a f(x)dx$, also $\int_a^a f(x)dx = 0$

(3) $\int_a^b f(x)dx = \int_a^c f(x)dx + \int_c^b f(x)dx$

(4) $\int_a^b f(x)dx = \int_a^b f(a+b-x)dx \Rightarrow \int_0^a f(a-x)dx$

(5) $\int_0^{2a} f(x)dx = \begin{cases} 2\int_0^a f(x)dx, \text{ if } f(2a-x) = f(x) \\ 0, \text{ if } f(2a-x) = f(x) \end{cases}$

(6) $\int_{-a}^a f(x)dx = \begin{cases} 2\int_0^a f(x)dx, \text{ if } f(-x) = f(x)[even\ function] \\ 0, \text{ if } f(-x) = -f(x)\ [odd\ function] \end{cases}$

Important Questions

1. The If $\int \frac{f(x)}{x^2+1}dx = \log|x^2+1| + C$, then $f(x) = $......

2. If $\int f(x)dx = \log|\tan x| + C$, then $f(x) = $......

3. Integrate the following w.r.t x

   (i) $\frac{3x-1}{(x-1)(x-2)(x-3)}$

   (ii) $e^x \sin x$

   (iii) $\frac{1}{x^2-6x+13}$

4. Evaluate: $\int_{\pi/6}^{\pi/3} \frac{\sin^4 x}{\sin^4 x + \cos^4 x}dx$

5. Evaluate: $\int_1^4 |x-2|\, dx$

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PLUS TWO
MATHEMATICS
INTEGRALS (Part-2)
(Definite Integrals)

Chapter - 8

Application Of Integrals

- The area of the region bounded by the curve $y = f(x)$, x-axis and the lines $x = a$ and $x = b$ $(b > a)$ is given by, Area $= \int_a^b f(x)\,dx = \int_a^b y\,dx$

- The area of the region bounded by the curve $x = g(y)$, y-axis and the lines $y = c$ and $y = d$ is given by, Area $= \int_c^d g(y)\,dy = \int_c^d x\,dy$

Important Questions

1. Using integration, find the area of the region bounded by the curve $x^2 + y^2 = 9$

2. Find the area of the parabola $y^2 = x$ and the lines $x = 1$, $x = 4$ and the x axis

3. Using integration, find the area of the region bounded by the curve $\frac{x^2}{25} + \frac{y^2}{9} = 1$

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Application Of Integrals

Chapter - 9

Differential Equations

- An equation involving derivatives of the dependent variable with respect to independent variable (variables) is known as a *Differential Equation.*

- Order of a differential equation is the order of the highest order derivative occurring in the differential equation

- Degree of a differential equation is the highest power (positive integer only) of the highest order derivative in it.

- A differential equation which can be expressed in the form $f(x)dx = f(y)dy$ is called a differential equation in variable separable form and then integrate both sides to get the solution

- A differential equation which can be expressed in the form $\frac{dy}{dx} = f(x,y)$ or $g\left(\frac{y}{x}\right)$

  Where, $f(x,y)$ and $g\left(\frac{y}{x}\right)$ are homogenous functions of degree zero is called a <u>homogeneous differential equation.</u>

  •) Here put $y = vx$ $\Rightarrow$ $\frac{dy}{dx} = v + x\frac{dv}{dx}$ **OR**   put $x = vy$ $\Rightarrow$ $\frac{dx}{dy} = v + y\frac{dv}{dy}$

- A differential equation of the form $\frac{dy}{dx} + Py = Q$, where P and Q are constants or functions of x alone is called a <u>first order linear differential equation</u>

  •) Here solution is $y.(I.F) = \int (Q \times I.F)dx + C$

Important Questions 💡

1 Find the order and degree of : $2x^2\frac{d^2y}{dx^2} + x^4\left(\frac{dy}{dx}\right)^3 - 7 = 0$

2 Solve the differential equation : $\sec^2 x \tan y \, dx + \sec^2 y \tan x \, dy = 0$

3 Solve the differential equation : $\frac{dy}{dx} - y = \cos x$

4 Solve the differential equation : $x \cos\left(\frac{y}{x}\right)\frac{dy}{dx} = y \cos\left(\frac{y}{x}\right) + x$

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Differential Equations

- -

Chapter - 10

Vector Algebra

- **Quantities having both magnitude and direction are called vectors**

- **Position vector of a point** $P(x,y,z)$ **is given as** $\overrightarrow{OP}(=\vec{r}) = x\hat{\imath} + y\hat{\jmath} + z\hat{k}$ **and its Magnitude by** $|\vec{r}| = \sqrt{x^2 + y^2 + z^2}$

- **scalar components of a vector are its direction ratios**

- **scalar components of a unit vector are its direction cosines**

- **If** l, m, n **are the direction cosines of a line, then** $l^2 + m^2 + n^2 = 1$

- **Unit vector in the direction of** $\vec{a}$, $\hat{a} = \frac{\vec{a}}{|\vec{a}|}$

- **The scalar product of two given vectors** $\vec{a}$ and $\vec{b}$ **having angle between them** θ **is defined as** $\vec{a} \cdot \vec{b} = |\vec{a}||\vec{b}| \cos \theta$

- **Angle between the vectors** $\vec{a}$ and $\vec{b}$ **is given by,** $\cos \theta = \frac{\vec{a}.\vec{b}}{|\vec{a}||\vec{b}|}$

- **If** $\vec{a}$ and $\vec{b}$ **are perpendicular, then** $\vec{a} \cdot \vec{b} = 0$

- **The vector product of two given vectors** $\vec{a}$ and $\vec{b}$ **having angle between them** θ **is defined as** $\vec{a} \times \vec{b} = |\vec{a}||\vec{b}| \sin \theta \, \hat{n}$,

- **where** $\hat{n}$ **is a unit vector perpendicular to the plane containing** $\vec{a}$ and $\vec{b}$

- **Unit vector perpendicular to** $\vec{a}$ **and** $\vec{b} = \frac{\vec{a} \times \vec{b}}{|\vec{a} \times \vec{b}|}$

- **If we have two vectors** $\vec{a}$ and $\vec{b}$, **given in component form as** $\vec{a} = a_1 \hat{i} + a_2 \hat{j} + a_3 \hat{k}$ **and** $\vec{b} = b_1 \hat{i} + b_2 \hat{j} + b_3 \hat{k}$ **and** λ **be any scalar,**

  then $\vec{a} \pm \vec{b} = (a_1 \pm b_1)\hat{i} + (a_2 \pm b_2)\hat{j} + (a_3 \pm b_3)\hat{k}$

  $\lambda\vec{a} = (\lambda a_1)\hat{i} + (\lambda a_2)\hat{j} + (\lambda a_3)\hat{k}$

  $\vec{a} \cdot \vec{b} = a_1 b_1 + a_2 b_2 + a_3 b$

  $\vec{a} \times \vec{b} = \begin{vmatrix} \hat{i} & \hat{j} & \hat{k} \\ a_1 & b_1 & c_1 \\ a_2 & b_2 & c_2 \end{vmatrix}$

- **If** $\vec{a}$ and $\vec{b}$ **are adjacent sides of triangle, then its** $Area = \frac{1}{2}|\vec{a} \times \vec{b}|$

- **If** $\vec{a}$ and $\vec{b}$ **are adjacent sides of parallelogram, then its** $Area = \frac{1}{2}|\vec{a} \times \vec{b}|$

Important Questions 💡

1 **Let** $\vec{a} = \hat{i} + \hat{j} + \hat{k}$, $\vec{b} = 2\hat{i} + m\hat{j} + 3\hat{k}$.

  i) **If** $\vec{a}$ **is perpendicular to** $\vec{b}$, **find** m

  ii) **Find a vector** $\vec{c}$ **perpendicular to both** $\vec{a}$ and $\vec{b}$

2 **If** $\vec{a} = 3\hat{i} - 2\hat{j} - \hat{k}$, **then find a vector in the direction of** $\vec{a}$ **having magnitude 5**

3 **Find the area of the parallelogram whose adjacent sides are given by the vectors**

  $\vec{a} = 3\hat{i} + \hat{j} + 4\hat{k}$ **and** $\vec{b} = \hat{i} - \hat{j} + \hat{k}$

Click For Video on: **Vector Algebra**

Chapter - 11
Three-dimensional Geometry

▪ **Vector equation of a line that passes through the given point whose position vector is $\vec{a}$ and parallel to a given vector $\vec{b}$ is**

$$\vec{r} = \vec{a} + \lambda\vec{b}$$

▪ **Cartesian equation of a line through a point (x_1, y_1, z_1) and having direction ratios a, b, c is** $\frac{x-x_1}{a} = \frac{y-y_1}{b} = \frac{z-z_1}{c}$

▪ **If θ is the acute angle between** $\vec{r} = \vec{a_1} + \lambda\vec{b_1}$ **and** $\vec{r} = \vec{a_2} + \mu\vec{b_2}$ **then**

$$\cos\theta = \left|\frac{\vec{b_1} \cdot \vec{b_2}}{|\vec{b_1}||\vec{b_2}|}\right|$$

▪ **Shortest distance between** $\vec{r} = \vec{a_1} + \lambda\vec{b_1}$ **and** $\vec{r} = \vec{a_2} + \mu\vec{b_2}$ **is** $d = \left|\frac{(\vec{a_2}-\vec{a_1})\cdot(\vec{b_1}\times\vec{b_2})}{|\vec{b_1}\times\vec{b_2}|}\right|$

▪ **Distance between parallel lines** $\vec{r} = \vec{a_1} + \lambda\vec{b}$ **and** $\vec{r} = \vec{a_2} + \mu\vec{b}$ **is** $\left|\frac{(\vec{a_2}-\vec{a_1})\times\vec{b}}{|\vec{b}|}\right|$

Important Questions 💡

1 Find the shortest distance between the skew lines $\vec{r} = (\hat{\imath} + 2\hat{\jmath} + \hat{k}) + \lambda(\hat{\imath} - \hat{\jmath} + \hat{k})$ and $\vec{r} = (2\hat{\imath} - \hat{\jmath} - \hat{k}) + \mu(2\hat{\imath} + \hat{\jmath} + 2\hat{k})$

2 Find the angle between the lines: $\frac{x-2}{2} = \frac{y-1}{5} = \frac{z+3}{-3}$ and $\frac{x+2}{-1} = \frac{y-4}{8} = \frac{z-5}{4}$

Click For Video On
Three-dimensional Geometry

Chapter - 12
Linear Programming

- Objective function Linear function $Z = ax + by$, where a, b are constants, which has to be maximized or minimized is called a linear objective function.

- The conditions $x \geq 0, y \geq 0$ are called non-negative restrictions, and it represents the first quadrant

Graphical method of solving linear programming

- The graph of the system (shaded region) consists of the points common to all half planes determined by the inequalities obtained. It is called the feasible region

Corner point method

Let R be the feasible region for a linear programming problem and let $Z = ax + by$ be the objective function. When Z has an optimal value (maximum or minimum), where the variables x and y are subject to constraints described by linear inequalities, this optimal value must occur at a corner point (vertex) of the feasible region.

- If the feasible region is **bounded,** then the objective function Z has both a **maximum** and a **minimum** value on R and each of these occurs at a corner point of R.

- If the feasible region is **unbounded,** then a maximum or a **minimum** value of the objective function may not exist. However, if it exists, it must occur at a corner point of the feasible region

Important Questions

1. Solve the LPP graphically: Maximize $Z = 4x + y$

   Subject to the constraints:
   $$x + y \leq 50, \quad 3x + y \leq 90, \quad x \geq 0, \quad y \geq 0$$

- $P(AUB) = P(A) + P(B) - P(A \cap B)$

- $P(A') = 1 - P(A)$

- The **Conditional Probability** of an event A, given that B has already occurred is given by $P(A/B) = \frac{P(A \cap B)}{P(B)}$, $P(B) \neq 0$　　　**OR**　　　$P(A/B) = \frac{n(A \cap B)}{n(B)}$

- **Multiplication theorem**
  $P(A \cap B) = P(A)P(B/A)$, $P(A) \neq 0$

- If A and B are **Independent events,** then $P(A \cap B) = P(A)P(B)$
  also, $P(A/B) = P(A)$, $P(B) \neq 0$

- **Bayes' theorem** – $E_1, E_2, \ldots, E_n$ are events which constitute a partition of sample space S, i.e., $E_1, E_2, \ldots, E_n$ are pairwise disjoint and $E_1 \cup E_2 \cup \ldots \cup E_n = S$, and A be any event with nonzero probability, then

$$P(E_i/A) = \frac{P(E_i)P(A/E_i)}{\sum_{j=1}^{n} P(E_j)P(A/E_j)}$$

- If E_1 and E_2 are 2 non empty events which constitute a partition of sample space S, i.e., E_1 and E_2 are disjoint and $E_1 \cup E_2$ = S and A is any event of nonzero probability, then the probability of choosing E_2 given that A is already occurred is given by

$$P(E_2/A) = \frac{P(E_2)P(A/E_2)}{P(E_1)P(A/E_1) + P(E_2)P(A/E_2)}$$

Important Questions 💡

1 If $P(A) = 7/13$, $P(B) = 9/13$ and $P(A \cup B) = 7/11$, then find

　i)　$P(A \cap B)$

　ii)　$P(B/A)$

2 A and B are independent events. The probability that A can solve a problem is 2/3, and the probability that B can solve the same problem is 3/5, find the probability that

i) Both solves the problem

ii) At least one of A and B will solve the problem

iii) None of the two will solve the problem.

iv) Exactly one solves the problem

3 Three cards are drawn successively, without replacement from a pack of 52 well shuffled cards. What is the probability that first two cards are kings and the third card drawn is an ace?

4 Bag I contain 3 red and 4 black balls while another Bag II contains 5 red and 6 black balls. One ball is drawn at random from one of the bags and it is found to be red. Find the probability that it was drawn from Bag II?

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ECONOMICS

Chapter - 1

Introduction

- **FATHER OF ECONOMICS - ADAM SMITH**

THE CENTRAL PROBLEMS OF AN ECONOMY

- **What to produce and in what quantity?**
  Related to allocation of resources

- **For whom to produce?**
  Related to production technology

- **How to produce?**
  Related to distribution

ECONOMIC SYSTEMS	FEATURES
Capitalism	Price mechanism, profit motive, private ownership
Socialism	Planning, welfare goal, public ownership
Mixed Economy	Public-Private Ownership, Price Systems and Planning, Welfare and Profit motive.

MICROECONOMICS	MACROECONOMICS
Analyses the Individual units of the economy	Analyses the economy as a whole
Also known as price theory	Also known as income theory
Eg. An individual's income	Eg. National Income

Chapter - 2
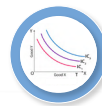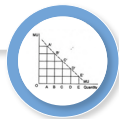
Theory of Consumer Behaviour

Utility

Utility is the want satisfying power of a commodity

Law of diminishing marginal utility

Law of diminishing marginal utility states that marginal utility from consuming each additional unit of a commodity declines as its consumption increases

Indifference Curve

Indifference curve shows the locus of points of combination of two commodities which give the same level of utility to the consumer

PROPERTIES OF INDIFFERENCE CURVE

Indifference curve has a negative slope

Indifference curve is convex to the origin

Higher indifference curve gives higher utility

Two Indifference curves never intersect each other

A collection of indifference curves is known as Indifference map

Law of Demand
Law of demand explains the negative relationship between price of a good and its demand

Substitutes
When two goods are substituted for each other such goods are called substitute goods. eg: Tea and coffee

Complementary Goods
The goods which are jointly demanded for a particular use are called complementary goods eg: car and petrol

Market demand
The sum of individual demand is called as market demand

Chapter - 3

Production and Cost

- **PRODUCTION FUNCTION:**

  It is the functional relationship between factor inputs There are two types of production function

1 **Short run production function:**
The situation in which application of one factor is varied while all other factors kept constant

2 **Long run production function:**
The effect of proportionate change in all inputs on output is called long run production function

- Total product TP it is the total output produced by variable input
- Average product AP = TP/L
- Marginal product MP= ΔTP/Δ L
- Average Cost AC =TC/Q OR AC=AFC+AVC
- Average Fixed Cost AFC = TFC/Q
- Average Variable Cost AVC= TVC/Q
- Marginal Cost MC= Δ TC/ ΔQ

Interactive Exam Tip:

Sketch demand and supply curves with labeled axes and equilibrium points to reinforce your understanding.

Explore **Production and Cost with Video**

CONSUMER AND PRODUCER SURPLUS & MARKET STRUCTURES

Chapter - 4

Theory of Firm Under Perfect Competition

FEATURES OF PERFECT COMPETITION
Large number of buyers & seller
Homogeneous products
Uniform price
Firm is a price taker

EQUILIBRIUM OF A COMPETITIVE FIRM
P=MC=MR
MC is non decreasing at equilibrium output
P ≥ AVC or P ≥ AC

Click for **Theory of Firms under Perfect Competition Vide**

Chapter - 5

Market Equilibrium

AT EQUILIBRIUM MARKET

demand will be equal to market supply

PRICE CEILING

Upper price limit imposed by the government

PRICE FLOOR

Lower price limit imposed by the government

Visualization:

Graphs: Consumer surplus is the area above price and below the demand curve; producer surplus is below price and above the supply curve.

Click for
Market Equilibrium Video

MACROECONOMIC INDICATORS – NATIONAL INCOME & KEY METRICS

Chapter - 1

Introduction

- **GREAT DEPRESSION – FEATURES**
  From 1929 to 1933, Started in the United States, Production declined, Unemployment increased, Factories closed

CLOSED ECONOMY

An economy that has no economic relations with other countries

OPEN ECONOMY

An economy that has economic relations with other countries

NATIONAL INCOME

It is the sum total of the money value of all final goods and services produced in a country during a financial year

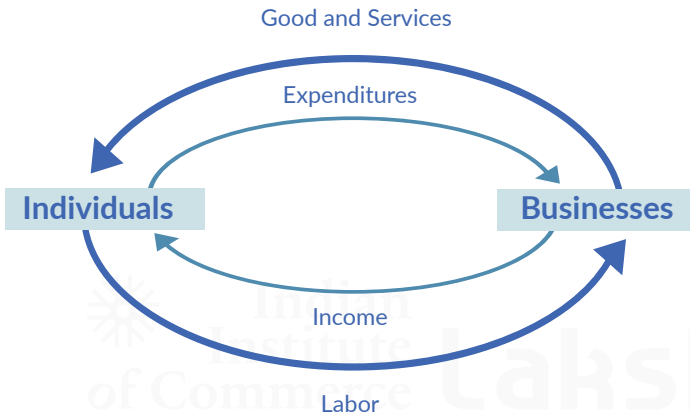**RELATED TERMS: GDP, NDP, GNP, NATIONAL INCOME (NI).**

Video Guide to
Introduction to Macro Economics

Chapter - 2
National Income Accounting

• CIRCULAR FLOW OF INCOME

Good and Services

Expenditures

Individuals   **Businesses**

Income

Labor

• MEASUREMENT OF NATIONAL INCOME

INCOME APPROACH

Adds up total earnings from production
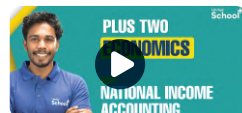(GDP = W+R+In+P)

EXPENDITURE APPROACH

Total spending on goods and services
(GDP = C+I+G+X-M)

PRODUCTION APPROACH

Value-added at each production stage

• **GDP DEFLATOR:** It is the ratio between nominal GDP(GDP) and real GDP(gdp)

• **RELATED TERMS:** GDP, NDP, GNP, National Income (NI).

Video Guide to
National Income Accounting

Chapter - 3

Money And Banking

M1=CU+DD (Currency+Demand deposits)
M2= M1+Saving deposits with post office savings
M3= M1+Fixed deposit with commercial banks
M4= M3+Saving deposits of post office savings bank excluding national saving certificate

Chapter - 4

Determination of Income and Employment

- **EFFECTIVE DEMAND**

  Effective demand is a point in which Aggregate Demand is equal to Aggregate Supply
  Effective demand--- AD = A

Consumption function

APC + APS =1	APC + APS =1
APC = 1 – APS	APC = 1 – APS
APS = 1 – APC	APS = 1 – APC

Paradox of Thrift

If all the people in the economy increase the proportion of income they save, the total value of savings in the economy will not increase. It will either decline or remain unchanged.

Chapter - 5

Government Budget and The Economy

- **COMPONENTS OF GOVERNMENT BUDGET**
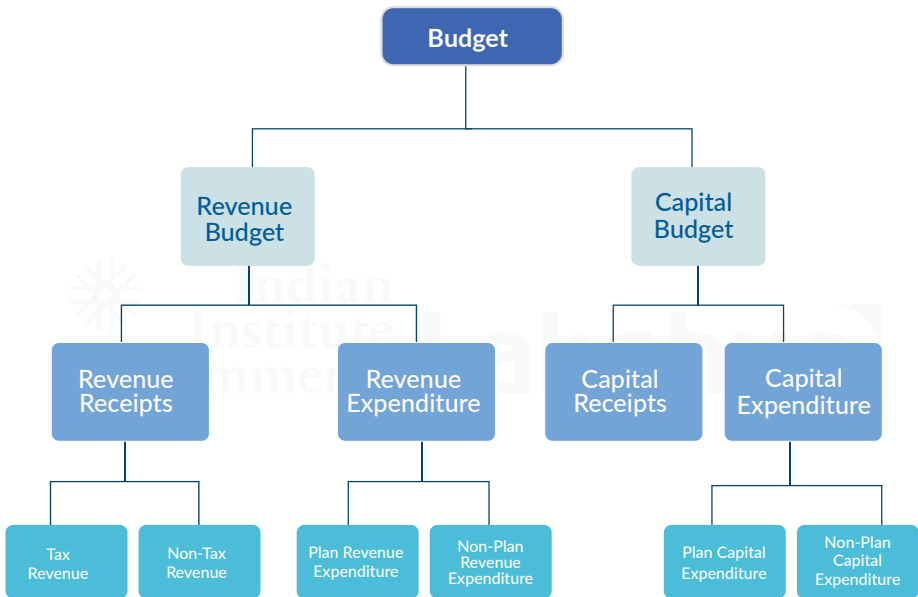
Balanced Budget	Revenue and Expenditureequal	R=E
Deficit Budget	Expenditure more than Revenue	E>R
Surplus Budget	Revenue more than Expenditure	R>E

DEFICIT REDUCTION

- Cutting down waste full and unimportant public expenditure

- Imposing fresh taxes

- Making tax collection more effective

- Selling shares of public sector undertakings

Chapter - 6

Open Economy Macro Economics

BALANCE OF TRADE (BOT)

The difference between a country's total exports (X) and imports (M) for a year. Only visible items (Goods) are included

BALANCE OF PAYMENTS (BOP)

A comprehensive record of all visible and invisible financial transactions of a country with other countries in a year.

• BALANCE OF PAYMENTS ACCOUNTS

A Current Account - Account containing goods, services and transfer payments.

Current Account Balance --- Current account receipts = Current Account Expenditure

Current Account Surplus ---- Current account receipts > Current Account Expenditure

Current Account Deficit ----- Current account receipts < Current Account Expenditure

B Capital Account - Account of the transactions of assets such as money, shares and debt made by one country with other countries in a year.

C Official Reserve Account.

D Errors and omissions - Account containing missing accounts

- **METHODS OF DETERMINING THE EXCHANGE RATE**

1 FLEXIBLE EXCHANGE RATE

The exchange rate is determined by the demand and supply of foreign currency. No government intervention.

2 FIXED EXCHANGE RATE

The exchange rate is decided by the Government / Central Bank

3 MANAGED OR FLOATING EXCHANGE RATE

- A mixture of fixed exchange rate and flexible exchange rate.
- The government sets upper and lower limits on the exchange rate. The exchange rate will be flexible within these limits.

- Core Concepts Review: Focus on terms like elasticity, GDP, inflation, and surplus.
- Practice Diagrams: Ensure you're familiar with demand-supply, cost curves, and economic indicators.

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Chapter - 1
Review of C++ Programming

1 **TOKENS**

Basic building blocks of C++ programs. Classified into keywords, identifiers, literals, punctuators and operators

Keywords	Reserved words that convey specific meaning to the language compiler
Identifiers	User-defined words to identify memory locations, statements, functions etc
Literals	Tokens that do not change their value during the program run. They are also known as constants. Classified into integer constants, floating point constants, character constants and string constants
Punctuators	special characters like (; , ,#,)
Operators	Symbols that trigger a specific operation

2 **TYPE MODIFIERS**

The keyword signed, unsigned, short and long are type modifiers.
They are used with data types to modify the size of memory space and range

3 EXPRESSIONS

Expressions are constituted by operators and required operands to perform an operation. Based on the operators used, they are classified into arithmetic expression, relational expression and logical expressions.

4 TYPE CONVERSION

It is the process of converting the current data type of a value into another type. It may be implicitly(type promotion) or explicitly(type casting) converted. In implicit type conversion the compiler converts a lower type into a higher type. In explicit type conversion, user is responsible for the conversion.

5 VARIOUS STATEMENTS IN A C++ PROGRAM

Declaration, input , output, assignment

6 CONTROL STATEMENTS

They are used to alter the sequential flow of program execution
These are classified into two: (i) decision making/selection statements and
(ii) iteration statements.

Selection statements : if, if else, switch, condition

looping statement : entry controlled testing at first (for, while)

exit controlled : testing at last(do while)

Four components of loop : initialisation, testing, updation, loop body

7 NESTING OF LOOPING STATEMENTS

Placing a loop inside the body of another loop is called nesting of a loop

8 **JUMP STATEMENTS**

Transfer of program control from one place to another place are called jump statements. C++ provides four jump statements that perform unconditional control transfer in a program. They are return, goto, break and continue statements.

return statement:
The return statement is used to transfer control back to the calling program or to come out of a function.

goto statement:
The goto statement can transfer the program control to anywhere in the function. The target destination of a goto statement is marked by a label, which is an identifier.

break statement:
When a break statement is encountered in a loop, it takes the program control outside the immediate enclosing loop.

continue statement:
It used for skipping over a part of the code within the loop body and forcing the next iteration.

Click for
Video on Review of C++ Programming

PLUS TWO
COMPUTER APPLICATIONS
REVIEW OF C++
PROGRAMMING

Chapter - 2 **Arrays**

1 **DEFINITION**

An array is a collection of elements of the same type placed in contiguous memory locations. Eg : int A[10]; ,int NUM[20];

2 INDEX NUMBER OR SUBSCRIPT

An array element can be accessed using its position in the list, called index number or subscript

3 DECLARING ARRAYS

Data_type array_name[size]; eg:- int num[10];

4 ARRAY INITIALISATION

Array elements can be initialized in their declaration statements.
Eg:-int mark[4]={90,95,92,78,86};.

5 MEMORY ALLOCATION FOR ARRAYS

Total bytes = size of data_type x size of the arra

6 TRAVERSAL

Accessing each element of an array at least once.eg:- display all elements

7 STRING HANDLING USING ARRAYS

A character array can be used to store a string. A null character '\0' is stored at the end of the string. This character is used as the string terminator.

8 MEMORY ALLOCATION FOR STRINGS

The memory required to store a string will be equal to
the number of characters in the string plus one byte for null character.

9 INPUT/OUTPUT OPERATIONS ON STRINGS

- gets() function is used to input string containing white spaces.
- puts() function is used to display a string data on the standard outputdevice

PLUS TWO
COMPUTER APPLICATIONS
CHAPTER 2
ARRAYS

Click for Video on **Arrays**

Chapter - 3 Functions

1 MODULARIZATION

In programming, the entire problem will be divided into small sub problems that can be solved by writing separate programs. This kind of approach is known as modular programming. The process of breaking large programs into smaller sub programs is called modularization.

Merits of modular programming:	Demerits of modular programming:
• Reduces the size of the program. • Less chance of error occurrence. • Reduces programming complexity • Improves reusability	• Proper breaking down of the problem is a challenging task. • Each sub problem must be independent of others.

2 FUNCTION

Function is a named unit of statements in a program to perform a specific task. main() is an essential function in C++ programs . The execution of the program begins in main(). Two types of functions

• Predefined functions / built-in functions - ready to use programs
• User defined functions

A PREDEFINED FUNCTIONS

Console functions for character I/O (header file cstdio) getchar( ) - used to input a character ,putchar( ) - used to display a character gets()-used to input a string with white space puts()-Stream functions for input / output operations

Stream functions for input / output operations(header file iostream)

a. cin.get():
It can accept a single character or multiple characters through the keyboard.

b. cin.getline():
It accepts a string through the keyboard.

c. cout.put():
It is used to display a character constant or the content of a character variable given as argument.

d. cout.write():
This function displays the string contained in the argument

String Functions[header file is cstring)

a. strlen():
This function is used to find the length of a string .Syntax: int strlen(string);

b. strcpy():
This function is used to copy one string into another. Syntax: strcpy(string1,string2);

c. strcat():
This function is used to append one string into another string. The length of the resultant string is the total length of the two strings. Syntax:strcat(string1,string2);

d. strcmp():
This function is used to compare two strings. In this comparison, the alphabetical order of characters in the strings are considered. Syntax:strcmp(string1,string2);

e. strcmpi():
This function is used to compare two strings ignoring the cases. In this comparison, the alphabetical order of characters in the strings are considered. Syntax:strcmpi(string1,string2);

Mathematical Functions:- [header file is cmath]

a. abs():
used to find the absolute value of a number. syntax: int abs(int);

b. fabs():
used to find the absolute value of a floating point number

c. sqrt():
used to find the square root of a number. syntax: double sqrt(double);

d. pow():
used to find the power of a number. double pow(double,double);

Character Functions:[header file is cctype]

a. isupper():
the function is used to check whether a character is in upper case or not. It returns a 1 if the character is in uppercase and 0 otherwise.

b. islower():
This function is used to check whether a character is in lower case or not.

c. isalpha():
This function is used to check whether a character is an alphabet or not.

d. isdigit():
This function is used to check whether the character is a digit or not.

e. isalnum(): This function is used to check whether a character is alphanumeric or not.

f. toupper():
This function is used to convert a lower case character to an upper case.

g. tolower():
This function is used to convert an upper case character to a lower case.

B USER DEFINED FUNCTIONS

C++ provides the facility to create our own functions for some specific tasks. Everything related to a function such as the task to be carried out, the name and data required are decided by the user and hence they are known as **Userdefined Functions**

Syntax: data_type function_name(argument_list)
{statements in the body;}

3 **PROTOTYPE OF FUNCTIONS**

A function prototype is the declaration of a function by which
compiler is provided with the information about the function such as the name of the
function, its return type, the number and type of arguments, and its accessibility.

syntax: data_type function_name(argument_list);

4 **ARGUMENTS OF FUNCTIONS**

Arguments or parameters are the values from the calling function to the
called **Function**.
The variables used in the function definition as arguments are known as **Formal
Arguments.**

The constants, variables or expressions used in the function call are known as
Actual(original) Arguments.

5 **METHODS OF CALLING FUNCTION**

Based on the method of passing arguments, the function
calling methods can be classified as Call by Value method and Call by **Reference
method.**

a. **Call by Value (Pass by Value) method:**
In this method , the values of the
actual parameters are copied into the formal parameters . So any changes
made inside the formal parameters are not reflected back to the actual
parameters.

b. **Call by Reference (Pass by Reference) method:**
In this method , the values of the actual parameters are shared into the formal
parameters . So any changes made inside the formal parameters are reflected
back to the actual parameters.

Here a reference variable is used as the formal argument. An ampersand(&)
symbol is placed in between the data type and the variable
in the function header.

6 **SCOPE AND LIFE OF VARIABLES AND FUNCTIONS**

The concept of availability or accessibility of variables and functions is termed as their scope and life time.

There are two type of scope local and global

PLUS TWO
COMPUTER APPLICATIONS
CHAPTER 3
FUNCTIONS

Chapter - 4
Web Technology

1 **WEBSITE**

A website is a collection of web pages. Web pages are developed with the help of HTML (Hyper Text Markup Language).

2 **PAYMENT GATEWAY**

It's is a server that acts as a bridge between merchant server and bank server and transfers money in an encrypted format whenever an online payment is made.

3 **WEB SERVER**

• A web server is a powerful computer that hosts websites. • It consists of a server computer that runs a server operating system and a web server software.

• Eg. for server operating system: Ubuntu, Microsoft Windows Server

• Eg. for web server software: Apache Server, Microsoft Internet Information Server (IIS)

4 SOFTWARE PORTS

A software port is used to connect a client computer to a server to access its services like HTTP, FTP, SMTP, etc. To distinguish the ports, the software ports are given unique numbers. it is a 16-bit number software Ports:-**FTP(20 &21), SSH(22), SMTP(25), DNS(53), HTTP(80), POP3(110),HTTPS(443)**

5 DNS (DOMAIN NAME SYSTEM) SERVERS

DNS server returns the IP address of a domain name requested by the client computer.

6 STATIC AND DYNAMIC WEB PAGES

STATIC WEB PAGE	DYNAMIC WEB PAGE
Content and layout is fixed	Content and layout may change
Never use databases	Uses database
Directly run on the browser	Runs on the server
Easy to develop	Programming skills

7 SCRIPTS

• Scripts are program codes written inside HTML pages.
• Script are written inside<script> and </script> tags.

Types of scripting languages
Scripting languages are classified into two:

1. Client side scripts Eg:- JavaScript, VB script.
2. Server side scriptsEg:- Perl, PHP, ASP, JSP, etc

8 DIFFERENCE BETWEEN CLIENT SIDE & SERVER SIDE SCRIPTING

CLIENT SIDE SCRIPTING	SERVER SIDE SCRIPTING
Script is copied to the client browser	It remains in the Web Serve
Executed in the client browser	Used to connect to databases & return data from the web server
Users can block client side scripting	Server scripting cannot be blocked by a user
Features of the webserver affects the coding	Features does not affects the coding.

9 SCRIPTING LANGUAGES

1. **JavaScript:**
   Developed by Brendan Eich. Ajax(Asynchronous JavaScript and Extensible Markup Language) technology is used in JavaScript.

2. **VBScript:**
   Developed by Microsoft Corporation.

3. **PHP:**
   Stands for "PHP-Hyper text Preprocessor", developed by Rasmus Lerdorf.

4. **ASP:**
   Stands for Active Server pages.

5. **JSP:**
   Stands for Java Server Pages

6. **CSS:**
   Stands for Cascading Style Sheets.

   - Inline - the CSS style is applied to each tag.
   - Embedded - CSS codes are placed within the tag.
   - Linked CSS - external CSS file linked with the webpage.

10 BASIC STRUCTURE OF AN HTML DOCUMENT

`<html><head><title></title></head><body></body></html>`

- HTML is the standard markup language for creating Web pages
- The commands used in HTML are called tags.
- The additional information supplied with HTML tags are called attributes.
- HTML file is to be saved with an extension .html or .htm

- Container tags and empty tags

> ○ Tags that requires opening tag and closing tag is called container tag.`<body>`
>
> ○ Tags that requires only opening tag is called empty tag. Eg:`<br>`,`<img>`

11 IMPORTANT TAGS AND ATTRIBUTES

Heading Tags:-`<h1></h1>`,`<h2></h2>`,`<h3></h3>`,`<h4></h4>`,`<h5></h5>`,`<h6></h6>`.

Attribute align
values are left,right and center.

`<b>` tag making the text bold.
`<s>` and `<strike>` Striking through the text.
`<big>`:- Making the text big sized.
`<small>`:-Making the text small sized.
`<strong>`:-Making the text bold text.
`<em>`:- Emphasizing the text.
`<i>` tag Italicizing the text.
`<u>` tag Underlining the text.

`<marquee>`tag:
Displaying the text in a scrolling marquee.

Attributes of `<marquee>`
height,width,direction(up,down,left,right),behaviour(scroll,slide,alternate),scrolldelay, scr, ollamount,loop,bgcolor,hspace(horizontal space),vspace(vertical space)

`<font>` tag:
specifying the font characteristics. Attributes are color,face(type of the font),size(values ranges from 1 to 7,default value is 3)

<img> Tag:
To insert images in HTML pages.

Attributes of image tag are src(source),width,height,vspace,hspace,align etc

Comments in HTML:
HTML comments are placed within <!-- --> tag

Chapter - 5
Web Designing using HTML

1 **LISTS IN HTML**

○ Ordered list(
):- Attributes – start and type(Arabic Numerals,Upper Case Alphabets,Lower CaseAlphabets,Roman Numeral Upper,Roman Numeral Lower).

○ .Unordered list(
):-Attributes - type(disc,circle,square)

○ .Definition List(<dl><dt></dt><dd></dd></dl>)[dl-definition list,dt- definition term,dd- definition description]

2 **<TABLE> TAG IS USED TO CREATE TABLES**

This tag needs the support of some other tags like <TH>, <TR> and <TD> for constructing tables

○ Attributes of <table>: Border ,. Bordercolor , Bgcolor ,Background, Cellspacing, Cellpadding

3 <FRAMESET> TAG

Used for dividing the browser window. Attributes are cols,rows border,bordercolor

4 <FORM> TAG

Used for creating a form with various form controls. Attributes are action(specifies the URL),method(get method and post method),target (specifies the target window)

4 FORM CONTROLS

- <input> Tag.To make form controls such as Text Box, Radio Button, Submit Button.

Attributes are:

a. type : Values are text,password,checkbox,radio,reset,submit,button

b. name: used to give a name to the control.

c. value: used to provide an initial value.

d. size: sets the width of the input texts.

e. maxlength: specifies the maximum size.

- **<textarea> Tag:** Used for creating a multiline entry text box. Attributes are name,rows,cols.

- **<select> Tag:** Used to create a drop down list box . Attributes are name,size,multiple.

- **<fieldset> Tag:** Used for grouping related data in a form.

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MARATHON REVISION
Plus Two
Topic: CHAPTER 3 - CONT'D & CHAPTER 4 - WEB TECHNOLOGY

Chapter - 6
Client Side Scripting Using JavaScript

1 JAVASCRIPT

JavaScript is the most commonly used scripting language at the client side. JavaScript was developed by Brendan Eich for the Netscape Browser. JavaScript is supported by all web browsers

2 <SCRIPT>TAG

<SCRIPT>Tag is used to include scripting code in an HTML page. Scripts are programming codes within HTML page. Language attribute specifies the type of scripting language used.

Eg:- <SCRIPT Language="javascript">

....

....

</SCRIPT>

3 FUNCTIONS IN JAVASCRIP

A function is a group of instructions with a name that can perform a specific task. JavaScript has a lot of built-in functions that can be used for different purposes. In Javascript a function can be defined with the keyword "function"
function function_name()
{ body of the function; }

4 DATA TYPES IN JAVASCRIPT

- Number: All numbers fall into this category. Eg: 100, 9.8, -1.6, +10001
- String: Any combination of characters enclosed within double quotes.Eg: "Hai", "45", "true", "false"
- Boolean: Only two values fall in this type. They are True and False

5 VARIABLES

In JavaScript , variables can be declared by using the keyword **var**.

var x,y;
x=25;
y="Kerala";

6 BUILT IN FUNCTIONS

● **alert()** Used to display a message on the screen.

● **isNaN()** Used to check whether a value is number or not

● **toUpperCase()** Used to Converts a lowercase character to an upper case.

● **toLowerCase()** Used to Converts an uppercase character to a lower case.

● **charAt()** Used to Returns the character at a particular position. The counting starts at zero.

● length property Used to returns the length of the string

7 THE VARIOUS JAVASCRIPT EVENTS

● **onClick:**
It occurs when the user clicks over an object.

● **onMouseEnter:**
It occurs when the mouse pointer is moved onto an object.

● o**nMouseLeave:**
It occurs when the mouse pointer is moved out of an object.

● **onKeyDown:**
It occurs when the user is pressing a key on the keyboard

● **onKeyUp:**
It occurs when the user releases a pressed key

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Development Basics

Chapter - 7
Web Hosting

1 WEB HOSTING

The service of providing storage space in a web server.

Shared Hosting:
Multiple websites are shared on a single web server. Cheaper and easy to use.
But heavy traffic slows the webserver.

Dedicated Hosting:
Uses a single , powerful web server for hosting.
Advantage are very speed and performance is stable.
But it is highly expensive.

Virtual Private Server:
It is a physical server that is virtually partitioned into several servers using the virtualization technology. Some popular server virtualization software's are VMware, Virtualbox, FreeVPS,

2 FTP CLIENT SOFTWARE'S

It transfers files from one computer to another on the\ internet.
The popular FTP Client Software's are FileZilla, CuteFTP, SmartFTP.

3 FREE HOSTING

provides web hosting services free of charge.

4 CONTENT MANAGEMENT SYSTEM(CMS)

Refers to a web based software system which is capable of creating, administering and publishing web sites.

5 RESPONSIVE WEB DESIGN

It is the custom of building a website suitable to work on every devise and every screen size.

6 ICANN

Internet Corporation for Assigned Names and Numbers

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Development Basics

Chapter - 8
Database Management System(DBMS)

1 DATABASE

An organized collection of inter related data items stored together with minimum redundancy

2 DBMS(DATABASE MANAGEMENT SYSTEM)

A system which has some set of rules and relationships which allows for the definition, creation, retrieval, updation, maintenance and protection of the databases.

3 ADVANTAGES

- Database reduces data redundancy.
- Database can control data inconsistency.
- Efficient data access.
- Data integrity can be maintained

- Data security can be ensured.
- Database facilitates the sharing of data.
- Enforces the necessary standards.
- Offers a facility to do the backup and recovery

4 DATA ABSTRACTION

The developers hide the complexity of the database from users through several levels of abstraction.

They are :

a. Physical Level:
The lowest level of database abstraction.
This level describes that how the data are actually stored on the storage devices.

b. Logical Level:
The next higher level of database abstraction.
This level describes that what data are actually stored in the database.

c. View Level:
The highest level of database abstraction.
This level is concerned with the way in which data are viewed by individual users.

5 DATA INDEPENDENCE

The ability to modify the schema definition at one level without affecting the schema definition at the next higher level.

A. Physical Data Independence:

The ability to modify the schema followed at physical level without affecting the schema followed logical level.

B. Logical Data Independence:

The ability to modify the schema followed at logical level without affecting the schema followed view level.

6 USERS OF DATABASE

- Database administrator (DBA)

- Application Programmers

- Sophisticated Users

- Naive users Database administrator

7 RDBMS (RELATIONAL DATABASE MANAGEMENT SYSTEM)

Database represented as a collection of tables called relation

8 TERMINOLOGIES IN RDBMS

- **Relation(Table):** collection of data elements organized in terms of rows and columns.

- **Tuple:** The row(records) of a relation.

- **Attribute:** The columns of a relation.

- **Degree:** The number of attributes in a relation.

- **Cardinality:** The number of rows or tuples in a relation.

9 KEYS

An attribute or a collection of attributes in a relation that uniquely distinguishes each tuple from other tuples in a given relation.

- **Candidate key:**
  The minimal set of attributes that uniquely identifies a row in a relation.

- **Primary key:**
  one of the candidate keys chosen to be the unique identifier for a table by the database designer.

- **Alternate keys:**
  A candidate key that is not the primary key.

- **Foreign keys:**
  A candidate key which is the primary key of another table.

Chapter - 9

Structured Query Language(SQL)

1 **STRUCTURED QUERY LANGUAGE**

Structured Query Language (SQL) is designed for managing data in relational database management system (RDBMS)

2 **COMPONENTS OF SQL**

Structured Query Language (SQL) is designed for managing data in relational database management system (RDBMS)

- **Data Definition Language(DDL):**
  CREATE TABLE, ALTER TABLE, DROP TABLE.
- **Data Manipulation Language(DML):**
  SELECT, INSERT INTO, UPDATE, DELETE FROM.
- **Data Control Language(DCL):**
  GRANT, REVOKE.

3 **DATA TYPES IN SQL**

SClassified into three: **Numeric, String (text), Date and Time**

4 **DEFERENCE BETWEEN CHAR(SIZE) AND VARCHAR(SIZE)**

includes letters, digits and special symbols. CHAR is a fixed length character data type. It consumes the declared size. **VARCHAR** represents variable length strings. It consumes only the actual size of the string, not the declared size.

5 CREATE TABLE COMMAND

CREATE TABLE <table_name>(<column1> < data_type1> (size), <constraint> ....);

6 COLUMN CONSTRAINTS

Rules enforced on data that are entered into the column of a table.

- **NOT NULL:**
  Specifies that a column can never have null values.

- **AUTO_INCREMENT**:
  Performs an automatic increment feature.

- **UNIQUE:**
  It ensures that no two rows have the same value.

- **PRIMARY KEY:**
  This constraint declares a column as the primary key of the table.

- **DEFAULT:**
  A default value can be set for a column.

7 AGGREGATE FUNCTIONS

Rules enforced on data that are entered into the column of a table.

- **SUM():**
  Calculates the sum of a specified column.

- **AVG():**
  Calculates the average value in a specified column.

- **MAX():**
  Calculates the maximum value.

- **MIN():**
  Finds the minimum value.

- **COUNT():**
  Counts the number of non null values.

Chapter - 10
Enterprise Resource Planning(ERP)

1 ERP

ERP combines all the business requirements of an enterprise or company together into a single , integrated software that runs off a single database so that the various departments of an enterprise can share information and communicate each other more easily.

2 FUNCTIONAL UNITS OF ERP

Financial Module:
It can collect financial data from various functional departments and generate valuable financial reports.

Manufacturing module:
It contains necessary business rules to manage the entire production process.

Production Planning module:
It is used for optimizing the utilization of available resources and helps the organization to plan their production

HR Module:
Human Resource module of ERP focuses on the management of human resources and human capital.

Inventory Control Module:
This module covers processes of maintaining the appropriate level of stock in the ware house.

Purchasing Module:
It is used for making the required raw materials available in the right time and at the right price.

Marketing Module:
It is used for monitoring and tracking customer orders, increasing customer satisfaction, and for eliminating credit risks.

Sales and distribution module:
It includes inquiries , order placement, order scheduling , dispatching and invoicing.

Quality Management Module:
This module is used for managing the quality of the product

3 **BUSINESS PROCESS RE- ENGINEERING (BPR)**

It is the analysis and redesign of work flow within an enterprise. A business process consists of three elements.

4 **ERP SOLUTION PROVIDERS/PACKAGES**

Oracle, SAP(Systems Applications and Products), Odoo(it is open source ERP package) Microsoft Dynamics, Tally ERP

5 **BENEFITS OF ERP**

● improved resource utilization

● Better Customer Satisfaction

● Provides accurate information

● Decision making capability

● Increased flexibility

● Information Integrity

Chapter - 11
Trends and Issues in ICT

1 **MOBILE COMMUNICATION SERVICES**

Short Message Service (SMS):
It allows transferring short text messages containing up to 160 characters between mobile phones.

Multimedia Messaging Service (MMS):
It allows sending multimedia content (text,picture,audio and video file) using mobile phones.

Global Positioning System (GPS):
It is a satellite navigation system that is used to locate a geographical position anywhere on earth ,using its longitude and latitude. it is used in vehicles of transport companies to monitor the movements of their goods.

Smart card:
It is a plastic card embedded with a computer chip that stores and transacts data.
It is secure,intelligent and convenient

2 **MOBILE OPERATING SYSTEM**

It is an OS used in hand held devices such as smart phone,tablets,etc...
It manages the hardware ,multimedia function,Internet connectivity....

Eg: Android from Google, iOS from Apple.

Android mobile OS:
It is a Linux based OS for Touch screen devices such as smart phones and tablets. The interface of Android OS is based on touch input like swiping, tapping, pinching .....

3 INTELLECTUAL PROPERTY RIGHTS (IPR)

Intellectual Property Rights (IPR) are similar to any other property right like right over land, house, etc. IPR refers to the exclusive right given to a person over the creation of his/her mind, for a period of time.

Patent:
Exclusive right granted for an invention.

Trade Mark:
Distinctive sign that identifies certain goods or services produced or provided by an individual or a company.

Industrial Designs:
Refers to the ornamental or aesthetic aspects of an article.

CopyRight:
Legal right given to the creators for an original work, for a limited period of time.

4 INFRINGEMENT

Unauthorized use of intellectual property rights such as patents, copyrights, and trademarks.

5 CYBER SPACE

A virtual environment created by computer systems connected to the internet.

6 CYBER SPACE

It is a criminal activity in which computers or computer networks are used as a tool, target or a place of criminal activity.

Cyber crimes against individual:
- Identity Theft
- Harassment
- Impersonation and Cheating
- Violation of Privacy
- Dissemination of obscene material

Cyber Crime against Property
- credit card fraud
- intellectual property theft
- internet time theft

Cyber Crime against Government
- Cyber Terrorism
- Website Defacement
- Attack against e-governance websites

7 **CYBER LAWS**

Refers to the legal regulatory aspects of the internet. Information Technology Act 2000(Amended in 2008)

8 **CYBER FORENSICS**

It is the process of using scientific knowledge for identifying, collecting, preserving, analyzing and presenting evidence to the courts.

9 **INFOMANIA**

It is the state of getting exhausted with excess information.

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