THE AARYANS
A Senior secondary school Affiliated to C.B.S.E, New Dehli
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CHEMISTRY

By

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Solution

[Class – XII]

STUDENT NAME .....

Solutions: - Solutions are the homogeneous mixtures of two or more than two components.

Solute + Solvent = Solution

Low % **High %**

Binary solution: A solution having two components is called a binary solution.

Ex – A + B ⟶ Solution (Binary solution)
A+B+C ⟶ Solution (Not Binary solution)

Types of solution

Type of Solution	Solute	Solvent	Common Examples
Gaseous Solutions	Gas	Gas	Mixture of oxygen and nitrogen gases
	Liquid	Gas	Chloroform mixed with nitrogen gas
	Solid	Gas	Camphor in nitrogen gas
Liquid Solutions	Gas	Liquid	Oxygen dissolved in water
	Liquid	Liquid	Ethanol dissolved in water
	Solid	Liquid	Glucose dissolved in water
Solid Solutions	Gas	Solid	Solution of hydrogen in palladium
	Liquid	Solid	Amalgam of mercury with sodium
	Solid	Solid	Copper dissolved in gold

Expressing Concentration of Solutions: -

1. **Mass percentage (w/w):**

$$\text{Mass \% of a component} = \frac{\text{Mass of the component in the solution}}{\text{Total mass of the solution}} \times 100$$

Ex- if a solution is described by 10% glucose in water by mass, it means that 10 g of glucose is dissolved in 90 g of water resulting in a 100 g solution.

2. **Volume percentage (v/v):** $\text{Volume \% of component} = \frac{\text{volume of th component}}{\text{volume of the solution}} \times 100$

Ex -10% ethanol solution in water means that 10 mL of ethanol is dissolved in water such that the total volume of the solution is 100 mL

3. **Mass by volume percentage (w/v):** $\text{M/V \% of component} = \frac{\text{Mass of th component}}{\text{volume of the solution}} \times 100$

4. **Parts per million (ppm):** It is defined as the amount of substance in grams present in 10^6g of solution.

$$\text{PPM} = \frac{\text{Mass of th component}}{\text{Mass of the solution}} \times 10^6$$

Ex- The concentration of pollutants in water or atmosphere is often expressed in terms of μg mL^{-1} or ppm.

5. **Mole fraction:** It is the ratio of the number of moles of a particular component to the total number of moles of the solution**.** It is denoted by x.

Ex – **A + B** ⟶ **Solution (Binary solution)**

In a binary mixture, if the number of moles of A and B are n_A and n_B respectively

The mole fraction of A will be $x_A = \frac{n_A}{n_A + n_B}$

$\mathbf{X_1 + X_2 = 1}$

Similarly

The mole fraction of B will be $\boldsymbol{X_B = n_A / n_A + n_B}$

6. **Molarity:** It is defined as the number of moles of solute dissolved in one litre (or one cubic decimetre) of solution. It is denoted by M.

$$\textbf{Molarity} = \frac{\textbf{No.of moles of solute}}{\textbf{Volume of the solution}}$$

$$\textbf{No. of moles of solute} = \frac{\textbf{weight of solute(w)}}{\textbf{molar mass of solute(MM)}}$$

$$\textbf{M} = \frac{\textbf{w}}{\textbf{MM} \times \textbf{V(in litre)}}$$ **Unit – M or Mol/L**

7. **Molality:** It is defined as the number of moles of the solute present in one kilogram (kg) of the solvent. It is denoted by m.

$$\textbf{Molality} = \frac{\textbf{No.of moles of solute}}{\textbf{Mass of solvent}}$$

$$\textbf{No. of moles of solute} = \frac{\textbf{weight of solute(w)}}{\textbf{molar mass of solute(MM)}}$$

$$\textbf{m} = \frac{\textbf{w1}}{\textbf{MM} \times \textbf{W2(in Kg)}}$$ **Unit – m or Mol/Kg**

8. **Solubility:** Solubility of a substance is its maximum amount that can be dissolved in a specified amount of solvent at the specific temperature.
9. **Saturated Solution:** A solution in which no more solute can be dissolved at the same temperature and pressure is called a saturated solution.

10. **Solubility of a Solid in a Liquid:** Every solid does not dissolve in a given liquid. While sodium chloride and sugar dissolve readily in water naphthalene and anthracene do not. On the other hand, naphthalene and anthracene dissolve readily in benzene but sodium chloride and sugar do not. It is observed that polar solutes dissolve in polar solvents and non polar solutes in non polar solvents. **(That Means like dissolves like)**
11. **Effect of temperature on the solubility of a solid in a liquid:**
    - **For endothermic** process, solubility increases with increase in temperature.
    - **For exothermic** process, solubility decreases with increase in temperature.
12. **Pressure** does not have any significant effect on solubility of solids in liquids.

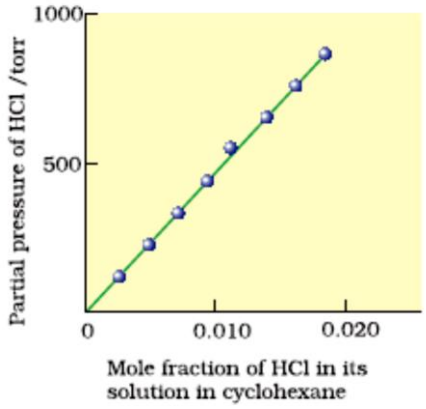
13. **Solubility of a gas in a Liquid:**

    - The solubility of gases **increase** with increase of pressure.
    - Solubility of gases in liquids **decreases** with rise in temperature. Due to this reason, aquatic species are more comfortable in cold water rather than in warm water.

Henry's Law: The partial pressure of the gas in vapour phase (p) is directly proportional to the mole fraction of the gas (x) in the solution.

$$P = K_H \times X$$

Here K_H is the **Henry's law constant**.



Graph between partial pressure of the gas Versus mole fraction of the gas in solution

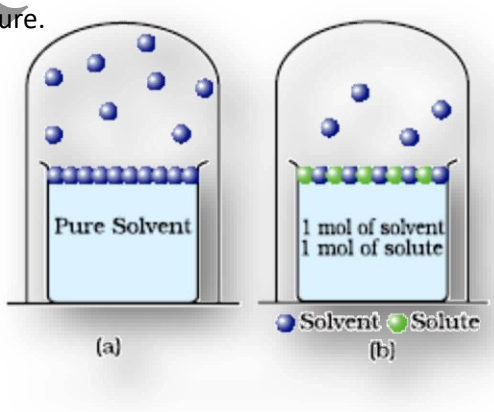
→ **Applications Henry's law**

- To increase the solubility of CO_2 in soft drinks and soda water, the bottle is sealed under high pressure.
- To avoid the toxic effects of high conc. of N_2 in blood, the tanks used by scuba drivers are filled with air diluted with helium. **(He = 11.7%, N_2=56.2%, O_2= 32%)**
- At high altitude, low blood O_2 causes climbers to become weak and make them unable to think clearly, which is known as anoxia**.**

Limitations of Henry's Law:

1. The pressure of the gas is not too high and temperature is not too low.
2. The gas should not undergo any chemical change.
3. The gas should not undergo association or dissociation in the solution.

Vapour pressure: - When liquid taken in a closed vessel, the pressure exerted by the vapour of liquid over the liquid surface at equilibrium and at particular temperature and pressure.



❖ **Roult's Law For Volatile Solute: –** for a solution of Volatile liquids, the partial vapour pressure of each component in the solution is directly proportional to its mole fraction.

Thus, for component 1

$$p_1 \propto x_1$$

and $p_1 = p_1^0 x_1$

where p_1^0 is the vapour pressure of pure component 1

Similarly, for component 2

$$p_2 = p_2^0 x_2$$

where p_2^0 represents the vapour pressure of the pure **Component 2**

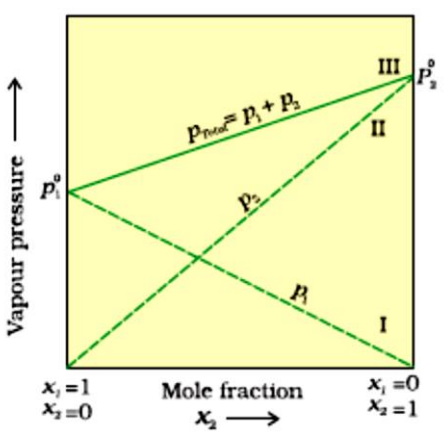
According to Dalton's Law

$$P_{Total} = P_1 + P_2$$

$$p_{total} = x_1 p_1^0 + x_2 p_2^0 \qquad (\therefore X_1 + X_2 = 1)$$

$$= (1 - x_2) p_1^0 + x_2 p_2^0$$

$$= p_1^0 + (p_2^0 - p_1^0) x_2$$



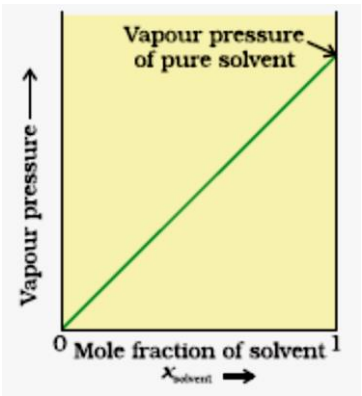
- If y_1 and y_2 are the mole fractions of the components 1 and 2 respectively in the vapour phase then

$$p_1 = y_1 p_{total}$$

$$p_2 = y_2 p_{total}$$

Roult's Law for Non-Volatile Solute: – When the solute is non – volatile Only the solvent molecules are present in vapour phase and contribute to vapour pressure. Then according to Raoult's Law-

$$p_1 \propto x_1$$
$$p_1 = x_1\ p_1^0$$



Raoult's Law as a special case of Henry's Law: -
If we compare the equations for Raoult's law and Henry's law, only the proportionality constant K_H differs from $p_1{}^0$. Thus, Raoult's law becomes a special case of Henry's law in which K_H becomes equal to $p_1{}^0$.

Ideal Solutions: - The solutions which **obey Raoult's law** over the entire range of concentration are known as ideal solutions.

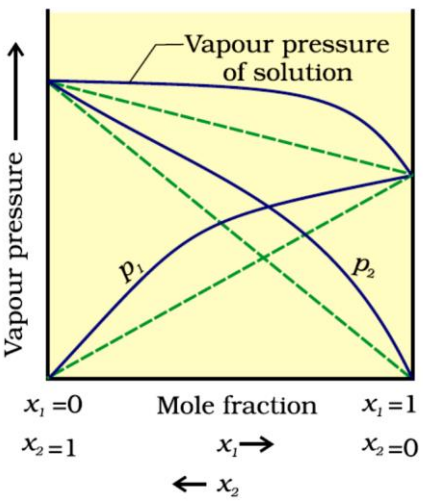
Conditions: - 1. $F_{A-A} = F_{B-B} = F_{A-B}$ **2.** $P_A = P°_A X_A$, $P_B = P°_B X_B$
3. $\Delta H_{MIX} = 0$ **4.** $\Delta V_{MIX} = 0$

Example: - 1. Benzene + Toluene 2. Methanol + Ethanol 3. n- Heptane + n-Hexane

Non- Ideal Solutions: - The solution which does not **obey Raoult's law** over the entire range of concentration is known as non- ideal solutions.

Types of non-ideal solution: -

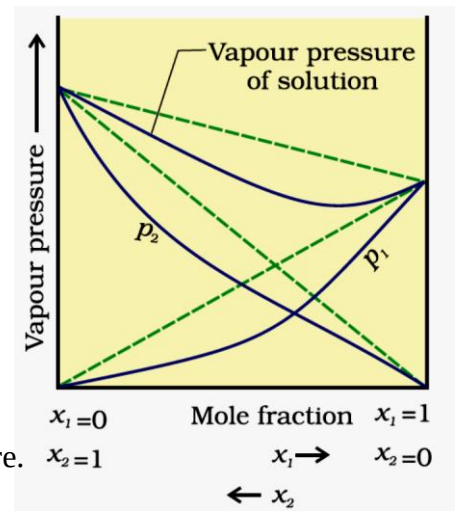
1. **Non- Ideal Solutions showing + Ve Deviation: -** In this case the intermolecular attractive forces between the solute-solvent molecules (A-B) are weaker than those between the solute-solute (A-A) and solvent-solvent (B-B) molecules.
So more vapour is formed.



Conditions: - 1. F_{A-A} & $F_{B-B} > F_{A-B}$ **2.** $P_A > P°_A X_A$, $P_B > P°_B X_B$
3. $\Delta H_{MIX} > 0$ **4.** $\Delta V_{MIX} > 0$

Example: - 1. Benzene + Acetone 2. Water + Ethanol

2. **Non- Ideal Solutions showing - Ve Deviation: -** In this case the intermolecular attractive forces between the solute-solvent molecules (A-B) are higher than those between the solute-solute (A-A) and solvent-solvent (B-B) molecules.
So more vapour is formed.



Conditions: - 1. F_{A-A} & $F_{B-B} < F_{A-B}$ **2.** $P_A < P°_A X_A$, $P_B < P°_B X_B$
3. $\Delta H_{MIX} < 0$ **4.** $\Delta V_{MIX} < 0$

Example: - 1. Water + HCl 2. Water + HNO_3

Azeotropes: - Azeotropes which are binary mixtures having the same Composition in liquid and vapour phase and boil at a constant temperature.

Types of Azeotropes: -

1. **Minimum Boiling Azeotrope: -** That binary mixture whose boiling point is less than either of the two components. It show +Ve deviation. **Ex –** Mix of Water (4.5%) + Ethanol(94.5%)

2. **Maximum Boiling Azeotrope: -** That binary mixture whose boiling point is more than either of the two components. It shows -Ve deviation. **Ex –** Mix of Water (32%) + HNO_3 (68%)

- **Colligative Properties: -** Properties of solution which depends on only the number of solute particles but not on the nature of solute are called Colligative properties.

1. **Relative Lowering of Vapour Pressure: -** Difference in the vapour pressure of pure solvent (P°) and solution (P) represents lowering in vapour pressure.

Lowering in vapour pressure = $P_1° - P_1$

Dividing lowering in vapour pressure by vapour pressure of pure solvent is called relative lowering of vapour pressure.

Relative lowering of vapour pressure = $P_1° - P_1 / P_1°$

Relative lowering of vapour pressure is equal to the mole fraction of the solute.

$$\frac{p_1^0 - p_1}{p_1^0} = x_2 , \quad \frac{p_1^0 - p_1}{p_1^0} = \frac{n_2}{n_1 + n_2}$$ For dilute solutions $n_2 << n_1$,

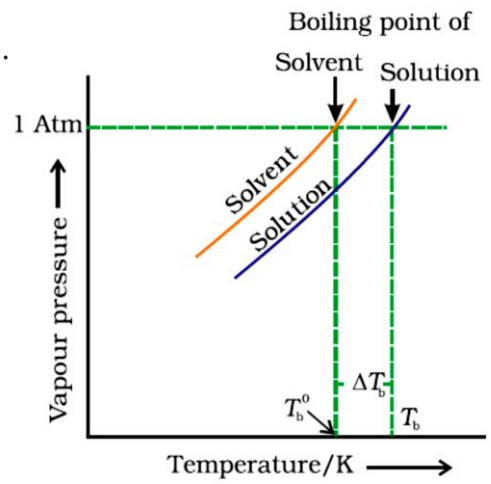
$$\frac{p_1^0 - p_1}{p_1^0} = \frac{n_2}{n_1}$$

or $$\frac{p_1^0 - p_1}{p_1^0} = \frac{w_2 \times M_1}{M_2 \times w_1}$$

Where W_1 = Mass of solvent, W_2 = Mass of solute
M_1 = M.M of solvent, M_2 = M.M of solute

2. **Elevation of Boiling Point: -** The difference b/w the boiling point of pure solvent ($T_b°$) and the boiling point of solution(T_b). It is known as elevation of boiling Point (ΔT_b).

$$\Delta T_b = T_b - T_b°$$



For **dilute solutions** the elevation of boiling point (ΔT_b) is directly proportional to the Molality. Thus

$$\Delta T_b \propto m$$

or $$\Delta T_b = K_b\, m$$

K_b is called Boiling Point Elevation Constant or Molal Elevation Constant (**Ebullioscopic Constant**). The unit of K_b is K kg mol^{-1}.

$$\Delta T_b = \frac{Kb \times W1}{MM \times W2(\text{in Kg})}$$

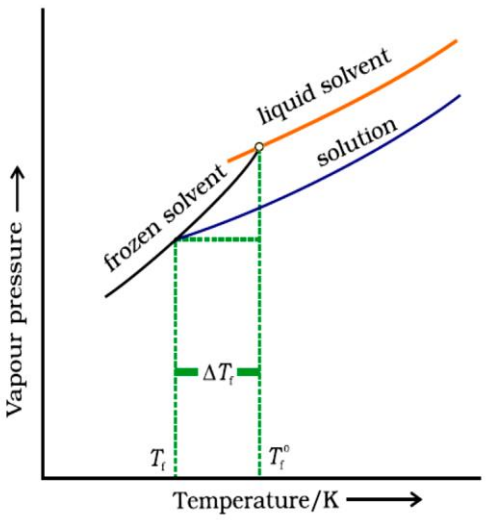
- **Ebullioscopic Constant: -** It is equal to elevation in boiling point that takes place when the Molality of the solution is unity.

3. **Depression of Freezing Point: -** The difference b/w the freezing point of pure solvent ($T_f°$) and the freezing point of solution (T_f).It is known as depression of freezing Point (ΔT_f).

$$\Delta T_f = T_f° - T_f$$

For **dilute solutions** the Depression of Freezing Point (ΔT_f) is directly proportional to the Molality. Thus

$$\Delta T_f \propto m$$
$$\Delta T_f = K_f\, m$$



K_f is called Freezing Point Depression Constant or Molal Depression Constant or **Cryoscopic Constant**. The unit of Kf is K kg mol^{-1}.

$$\Delta T_f = \frac{Kf \times W1}{MM \times W2(\text{in Kg})}$$

- **Cryoscopic Constant: -** It is equal to Depression in Freezing point that takes place when the Molality of the solution is unity.
- **Semi Permeable Membranes (SPM): -** A membrane through which only solvent molecules can pass but not the solute molecules. **Ex** – cellophane, pig's bladder.

4. **Osmosis: -** The phenomenon of flow of solvent molecules through a semi permeable membrane from pure solvent to solution is called osmosis.

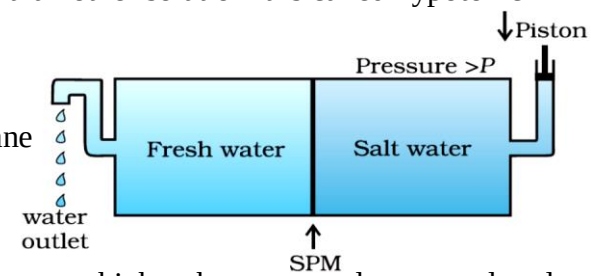
5. **Osmotic pressure: -** The excess pressure that must be applied to solution to prevent the entry of solvent into solution through a semi permeable membrane is called osmotic pressure. It is denoted by π.

π = CRT where C = M = n/v and n = W/ MM Thus

$$\pi = \frac{W \times R \times T}{MM \times V}$$

- **Isotonic Solution**: Two solutions having same osmotic pressure at a given temperature are called isotonic solution.
- **Hypertonic Solution**: If a solution has more osmotic pressure than other solution it is called hypertonic solution.
- **Hypotonic Solution:** If a solution has less osmotic pressure than other solution it is called hypotonic solution.

6. **Reverse Osmosis & Water Purification**: The process of movement of solvent through a semi permeable membrane from the solution to the pure solvent by applying excess pressure on the solution side is called reverse osmosis.



7. **Abnormal Molar Masses: -** Molar mass that is either lower or higher than expected or normal molar mass is called as abnormal molar mass.
8. **Van't Hoff factor:** Van't Hoff introduced a factor **i ,** This factor *i* is defined as:

$$i = \frac{\text{Normal molar mass}}{\text{Abnormal molar mass}} = \frac{\text{Observed colligative property}}{\text{Calculated colligative property}}$$

$$i = \frac{\text{Total number of moles of particles after association/dissociation}}{\text{Number of moles of particles before association/dissociation}}$$

For dissociation $\propto = \frac{i-1}{n-1}$, for association $\propto = (1\text{-}i)\frac{n}{n-1}$

n = no. of ions,
$\propto$ = degree of disso/asso

- In case of association, i< 1
- In case of dissociation, i> 1
- When there is neither association nor dissociation i=1

- Van't Hoff factor modifies the equations for Colligative properties as follows:

Relative lowering of vapour pressure of solvent = $\frac{p_1^o - p_1}{p_1^o} = i.\frac{n_2}{n_1}$

Elevation of Boiling point, $\Delta T_b = i\ K_b\ m$

Depression of Freezing point, $\Delta T_f = i\ K_f\ m$

Osmotic pressure of solution, $\delta\ \pi = i\ n_2\ R\ T\ /\ V$

CBSE Class 12 English Core
Revisoin Notes
Flamigo Poem-2
An Elementary School Classroom in a Slum

In this poem the poet focuses on the theme of social injustice and inequalities. He presents the pathetic and miserable picture of the elementary classroom in a slum. These children have pale and lifeless faces and some are even diseased.They are like rootless weeds which are uncared and unwanted with their disorderly hair torn around their faces.

They are depressed and oppressed with the burdens of life and keep their heads down. They have stunted growth. One of the girls is apparently burdened with the miseries of poverty. One of the boys has inherited his father's disease and has stunted growth. Another student is sitting unnoticed and he is yearning to play outdoors. A sweet young boy is sitting at the back of the dim classroom. He is dreaming of a squirrel's game in the trees and probably other interesting things.

The walls are dirty and creamy and on them are hung the donations given to the school in the form of pictures, paintings, Shakespeare's portrait and maps which are meaningless for the children. They exhibit the world of the elite and the privileged while the children in the slum have a future that is sealed and confined to the slum. Their future is dark and limited. The donations on the walls only add to the frustration of the children. They are tempted to attain what would be unattainable for them. The children studying in these schools do not have the means to go and explore the world. For them what they see through their classroom windows, the narrow street and the lead sky is the world.

Shakespeare is wicked for them as he has written only about the rich, beautiful world tempting them to steal.

The map is of no interest to them because it does not reflect the world they live in-cramped and dark lanes. Their lives start in darkness and ends in utter darkness. They are undernourished and their poverty has distorted their vision as they spend their whole time in foggy slums. The poet feels that the map which shows beautiful and exotic places should be replaced with slums as it is not the world they live in.

Unless the governor inspector and visitor play a vital role in bringing about a change, their lives will remain in dark. The slum children will be able to peep through the window only when the gap between the two worlds is bridged.

They should break the barriers till they come out of the dirty surroundings and their world should be extended into the green fields, golden sands and bright world. They should have the freedom of expression and their outlook be broadened. Thus, the children in the slum can progress only if they are given good education and the freedom to move into a world of opportunities and progress. The poet also states that history is made only by those people who have the power of knowledge. Hence, educating and letting the children into a free world of opportunities would release them from the suffocating, wretched life in a slum.

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- He presents the pathetic and miserable picture of the elementary classroom in a slum.
- These children have pale and lifeless faces.
- They are like rootless weeds which are uncared and unwanted with their disorderly hair torn around their faces.
- They are depressed and oppressed with the burdens of life and keep their heads down. They have stunted growth.
- They inherit the diseases of their father.
- Some of them do have dreams. A sweet young boy is sitting at the back of the dim classroom. He is dreaming of a squirrel‟s game in the trees and probably other interesting things.
- The walls are dirty and creamy and on them are hung the donations given by the rich and also Shakespeare‟s portrait.
- A civilized dome found in the cities and Tyrolese valleys with beautiful flowers are also put up.
- The map on the wall shows the children, the beautiful world outside; but for these children of the slum it is meaningless.
- The children studying in these schools do not have the means to go and explore the world. For them what they see through their classroom windows, the narrow street and the lead sky is the world.
- Shakespeare is wicked for them as he has written only about the rich, beautiful world tempting them to steal.62

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- Their lives start in darkness and ends in utter darkness.
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- replaced with slums as it is not the world they live in.
- Unless the governor inspector and visitor play a vital role in bringing about a change, their lives will remain in dark.
- The slum children will be able to peep through the window only when the gap
- between the two worlds is bridged.
- They should break the barriers till they come out of the dirty surroundings and their world should be extended into the green fields, golden sands and bright world.
- They should have the freedom of expression and their outlook be broadened.
- For, only the educated and learned people can create history whose language has strength and power.

Similes:

Like rootless weeds: the coarse, untidy and unkempt hair of the slum children is similarised to rootless weeds to bring forth the idea that the children were malnourished.

Like bottle bits on stones: the shining mended glasses of the spectacles is contrasted against the dark complexion of the malnourished slum children. The mental framed, broken glasses of the spectacles of the slum children is similarised to the shining bottle bits on stones.
The slum children settled on the waste heap is similarised to the splinters and pieces of broken bottle/glass against stones.
Like the broken glasses of the spectacles, the hopes , aspirations , ambitions lives of these slum children are completely shattered.

Like catacombs: The slum children are living in dark and dingy rooms which are similarised to catacombs in subterranean cemetery. The windows of these rooms look like the lids of catacombs. The future of the slum children is shut for ever like the dead bodies in the catacombs.

Slum as bid as doom: slum is similarised to hell of death. Living in slum is worse than death, rather it is a living hell.

Metaphors:

Rat's eyes: suggests the boy's curious, anxious and insecure nature. Like a rat always insecure, on the move, searching for food and safety, this small boy too shares the same condition.

Father's gnarled disease: the boy's father is handicapped with a crooked body. The boy has inherited his father's disease and the malnourished body of the paper seeming boy is no better than the crooked, disease-stricken body of his father.

Squirrel's game: Like the squirrel enjoys his freedom playing feely everywhere in nature, the boy also wants to play and enjoy his life with his endless curiosity. But he Is forced to be in the dark,dull and dreary classroom of the slum school.

Tree room: The hiding place of squirrel with great, comfort , security , curiosity and fun is contrasted with the gloomy and dull class room of the little boy.

Future painted with fog: Just as fog blocks, blurs or ruins vision, the slum children's future is vague and blurred with hopelessness, frustrations and lack of empathy and upliftment.

Lead sky: The normal bright and blue sky is described as lead sky, suggesting the dark and dull sky just as the base metal lead is . There is no blue and bright sky of life and future for the slum children.

Spectacles of steel: The poverty-stricken, skinny and skeletal bodies of the slum children look like wiry framework of steel just like that of a pair of spectacles. The expression also suggest the view of mass of students, visually impaired wearing low-cost and unhealthy spectacles with metal frames. These poor children are deprived of everything due to the callous attitude of the government officials.

PHYSICAL EDUCATION (048)
Class XII (2019–20)

Theory **Max. Marks 70**

Unit I Planning in Sports
- Meaning & Objectives Of Planning
- Various Committees & its Responsibilities (pre; during & post)
- Tournament – Knock-Out, League Or Round Robin & Combination
- Procedure To Draw Fixtures – Knock-Out (Bye & Seeding) & League (Staircase & Cyclic)
- Intramural & Extramural – Meaning, Objectives & Its Significance
- Specific Sports Programme (Sports Day, Health Run, Run For Fun, Run For Specific Cause & Run For Unity)

Unit II Sports & Nutrition
- Balanced Diet & Nutrition: Macro & Micro Nutrients
- Nutritive & Non-Nutritive Components Of Diet
- Eating For Weight Control – A Healthy Weight, The Pitfalls of Dieting, Food Intolerance & Food Myths

Unit III Yoga & Lifestyle
- Asanas as preventive measures
- Obesity: Procedure, Benefits & contraindications for Vajrasana, Hastasana, Trikonasana, Ardh Matsyendrasana
- Diabetes: Procedure, Benefits & contraindications for Bhujangasana, Paschimottasana, Pavan Muktasana, Ardh Matsyendrasana
- Asthema: Procedure, Benefits & contraindications for Sukhasana, Chakrasana, Gomukhasana, Parvatasana, Bhujangasana, Paschimottasana, Matsyasana
- Hypertension: Tadasana, Vajrasana, Pavan Muktasana, Ardha Chakrasana, Bhujangasana, Sharasana
- Back Pain: Tadasana, Ardh Matsyendrasana, Vakrasana, Shalabhasana, Bhujangasana

Unit IV Physical Education & Sports for CWSN (Children With Special Needs - *Divyang*)
- Concept of Disability & Disorder
- Types of Disability, its causes & nature (cognitive disability, intellectual disability, physical disability)
- Types of Disorder, its cause & nature (ADHD, SPD, ASD, ODD, OCD)
- Disability Etiquettes
- Advantage of Physical Activities for children with special needs
- Strategies to make Physical Activities assessable for children with special need.

Unit V Children & Women in Sports
- Motor development & factors affecting it
- Exercise Guidelines at different stages of growth & Development
- Common Postural Deformities - Knock Knee; Flat Foot; Round Shoulders; Lordosis, Kyphosis, Bow Legs and Scoliosis and their corrective measures
- Sports participation of women in India
- Special consideration (Menarch & Menstural Disfunction)
- Female Athletes Triad (Oestoperosis, Amenoria, Eating Disorders)

Unit VI Test & Measurement in Sports
- Motor Fitness Test – 50 M Standing Start, 600 M Run/Walk, Sit & Reach, Partial Curl Up, Push Ups (Boys), Modified Push Ups (Girls), Standing Broad Jump, Agility – 4x10 M Shuttle Run
- General Motor Fitness – Barrow three item general motor ability (Standing Broad Jump, Zig Zag Run, Medicine Ball Put – For Boys: 03 Kg & For Girls: 01 Kg)
- Measurement of Cardio Vascular Fitness – Harvard Step Test/Rockport Test - Computation of Fitness Index: $\frac{\text{Duration of the Exercise in Seconds} \times 100}{5.5 \times \text{Pulse count of 1-1.5 Min after Exercise}}$
- Rikli & Jones - Senior Citizen Fitness Test
  1. Chair Stand Test for lower body strength
  2. Arm Curl Test for upper body strength
  3. Chair Sit & Reach Test for lower body flexibility
  4. Back Scratch Test for upper body flexibility
  5. Eight Foot Up & Go Test for agility
  6. Six Minute Walk Test for Aerobic Endurance

Unit VII Physiology & Injuries in Sports

- Physiological factor determining component of Physical Fitness
- Effect of exercise on Cardio Respiratory System
- Effect of exercise on Muscular System
- Physiological changes due to ageing
- Sports injuries: Classification (Soft Tissue Injuries:(Abrasion, Contusion, Laceration, Incision, Sprain & Strain) Bone & Joint Injuries: (Dislocation, Fractures: Stress Fracture, Green Stick, Communated, Transverse Oblique & Impacted) Causes, Prevention& treatment
- First Aid – Aims & Objectives

Unit VIII Biomechanics & Sports

- Meaning and Importance of Biomechanics in Sports
- Types of movements (Flexion, Extension, Abduction & Adduction)
- Newton's Law of Motion & its application in sports
- Friction & Sports

Unit IX Psychology & Sports

- Personality; its definition & types – Trait & Types (Sheldon & Jung Classification) & Big Five Theory
- Motivation, its type & techniques
- Exercise Adherence; Reasons to Exercise, Benefits of Exercise
- Strategies for Enhancing Adherence to Exercise
- Meaning, Concept & Types of Aggressions in Sports

Unit X Training in Sports

- Strength – Definition, types & methods of improving Strength – Isometric, Isotonic & Isokinetic
- Endurance - Definition, types & methods to develop Endurance – Continuous Training, Interval Training & Fartlek Training
- Speed – Definition, types & methods to develop Speed – Acceleration Run & Pace Run
- Flexibility – Definition, types & methods to improve flexibility
- Coordinative Abilities – Definition & types
- Circuit Training - Introduction & its importance

Practical **Max. Marks 30**

01. Physical Fitness Test - 6 Marks
02. Proficiency in Games and Sports (Skill of any one Game of choice from the given list*)- 7 Marks
03. Yogic Practices - 7 Marks
04. Record File ** - 5 Marks
05. Viva Voce (Health/ Games & Sports/ Yoga) - 5 Marks

* Basketball, Football, Kabaddi, Kho-Kho, Volleyball, Handball, Hockey, Cricket, Bocce & Unified Basketball [CWSN (Children With Special Needs - Divyang)]

***Record File shall include:**

Practical-1: Fitness tests administration for all items.
Practical-2: Procedure for Asanas, Benefits & Contraindication for any two Asanas for each lifestyle disease.
Practical-3: Procedure for administering Senior Citizen Fitness Test for 5 elderly family members.
Practical-4: Any one game of your choice out of the list above. Labelled diagram of field & equipment (Rules, Terminologies & Skills).

Suggested Question Paper Design
Physical Education (Code No. 048)
Class XII (2019-20)

Marks: 70 **Duration: 3 hrs.**

SN	Typology of Questions	Objective Type/ MCQ 1 Mark	Short Answer I 3 Marks	Short Answer II 5 Marks	Marks
1	**Remembering**: Exhibit memory of previously learned material by recalling facts, terms, basic concepts, and answers.	5	3	2	24
2	**Understanding**: Demonstrate understanding of facts and ideas by organizing, comparing, translating, interpreting, giving descriptions, and stating main ideas	5	3	1	19
3	**Applying**: Solve problems to new situations by applying acquired knowledge, facts, techniques and rules in a different way.	5	2	1	16
4	**Analysing and Evaluating:** Examine and break information into parts by identifying motives or causes. Make inferences and find evidence to support generalizations. Present and defend opinions by making judgments about information, validity of ideas, or quality of work based on a set of criteria. **Creating**: Compile information together in a different way by combining elements in a new pattern or proposing alternative solutions.	5	2	-	11
	Total	**20x1=20**	**10x3=30**	**4x5=20**	**70 (34)**

There will be **Internal Choice** in questions of 1 mark (4 choices), 3 marks (3 choices) and 5 marks (2 choices)**.** In all, total 9 internal choices.

NCERT QUES ANS CLASS 12- THE COLD WAR ERA

ALL THE QUES ANS HAVE TO WRITE IN YOUR POLITICAL SCIENCE NOTE BOOK.

QUES 5- ANS. (page 8)

1) Cuban Missile Crisis engaged both the superpowers in the development of nuclear weapons to influence the world.
2) The Cold War did not eliminate rivalries between the two alliances. Due to mutual suspicions both armed themselves to the teeth & to constantly prepare for war. Huge stocks of arms were considered necessary to prevent wars from taking place. This was known as arms race.
3) Cold War led to several shooting wars for eg. Korean Crisis, Berlin Crisis, Congo Crisis etc.
4) But the two sides understood that war might occur in spite of restraint. As both powers have nuclear weapons, there will be vast devastation all over the world & left no single side as the winner.
5) Therefore US &USSR decided to collaborate in limiting or eliminating certain kinds of nuclear & non-nuclear weapons by signing various significant treaties like LTBT, nuclear Non Proliferation treaty, Anti Ballistic Missile treaty etc.

Ques 6 Ans-(page 7)

Superpowers had military alliances with smaller states who were helpful for them in gaining access to :

1) Vital resources, such as oil & minerals,
2) Locations, from where they could spy on each other,
3) Territory from, where superpowers could launch their weapons & troops
4) Lastly, economic support, to pay their military expenses.

Ques 7 Ans (page 7)

Yes the Cold War was a simple struggle for power and that ideology had nothing to do with it because-

1) The Cold war led to several shooting wars but this did not lead to another world war.

2) Despite direct confrontations in Korea (1950-53), the Congo in early 60s and several other places neither the alliance system cross certain limits.
3) Many lives were lost in some of these arenas like Korea, Vietnam and Afghanistan but the world was spared a nuclear war and global hostilities.

Ques 8 Ans (Page12)

8a part-

1) India's foreign policy towards the US and USSR during the Cold War period was neither active nor passive.
2) Despite being the founder member of NAM ,India was in favour of actively intervening in world affairs to soften Cold War rivalries, thereby prevent differences from escalating into a full fledge war.
3) Indian diplomats and leaders were often used to communicate and mediate between **C**old War in the early 1950s.

8b part-

1) Yes this policy served India's interest also, as Non alignment allowed India to take international decision that served India's interest rather than interest of super powers and its allies.
2) India often maintained a balance between two superpowers as if India felt ignored by one superpower it could tilt towards other superpowers.
3) Hence neither the alliance system could take India for granted.

Ques 9Ans (page 11)

1) The cold war intended to divide the world into two rival alliances. It was in this context that non-alignment offered the newly decolonised countries of Asia, Africa & Latin a third option not to join either alliance.

2) The idea of a New International Economic Order (NIEO) benefited the newly decolonised countries.
3) It gives the LDCs control over their natural resources exploited by the developed western countries.
4) It obtains access to western market so that the LDCs could sell their products and therefore, make trade more beneficial for the poorer countries.
5) It reduces the cost of technology from the Western countries.
6) It also provides the LDCs with a greater role in international economic institutions.

Thus, NAM as "Third Option '' by third world countries benefited their growth during the peak of the Cold War.

QUES 10 ANS (PAGE 13)

1) By the late 1970s NAM had become an economic pressure group and by late 1980s, the NIEO initiative had also faded due to stiff opposition from the developed countries, while the non aligned countries struggled to maintain their unity in the face of this opposition.
2) Non alignment both as an international movement and as the core of India's foreign policy lost some of its earlier relevance and effectiveness.
3) However, nonalignment contained some core values and long lasting or enduring ideas.
4) It was based on recognition that decolonised states share a historical affiliation and can become a powerful force if they come together.

5) It also meant that the poor countries of the world need not become followers of any big powers that they could pursue or follow an independent foreign policy.
6) In nutshell we can conclude that NAM has lost some of its relevance but stood test of adverse circumstances. It has served an important purpose of protecting & preserving interest of third world countries.

)

Chapter-1 : Review of Python

Learning Objectives:

At the end of this chapter the students will be able to understand:

- Interactive Mode
- Script Mode
- Data Types
- Functions in Python
- Sequential Statement
- Selective Statements
- Looping Statements
- String and String Methods
- List and List Methods
- Tuple and Tuple Methods
- Dictionary and Dictionary Methods

Introduction:

We have learnt Python programming language in the 11th class and continue to learn the same language program in class 12th also. We also know that Python is a high level language and we need to have Python interpreter installed in our computer to write and run Python program. Python is also considered as an interpreted language because Python programs are executed by an interpreter. We also learn that Python shell can be used in two ways, viz., interactive mode and script mode.

Interactive Mode: Interactive Mode, as the name suggests, allows us to interact with OS. Hear, when we type Python statement, interpreter displays the result(s) immediately. That means, when we type Python expression / statement / command after the prompt (>>>), the Python immediately responses with the output of it. Let's see what will happen when we type print "WELCOME TO PYTHON PROGRAMMING" after the prompt.

```
>>>print "WELCOME TO PYTHON PROGRAMMING"
WELCOME TO PYTHON PROGRAMMING
```

Example:

```
>>> print 5+10
15
>>> x=10
```

```
>>> y=20
>>> print x*y
200
```

Script Mode: In script mode, we type Python program in a file and then use interpreter to execute the content of the file. Working in interactive mode is convenient for beginners and for testing small pieces of code, as one can test them immediately. But for coding of more than few lines, we should always save our code so that it can be modified and reused.

Python, in interactive mode, is good enough to learn, experiment or explore, but its only drawback is that we cannot save the statements and have to retype all the statements once again to re-run them.

Example: Input any two numbers and to find Quotient and Remainder.

Code: (Script mode)

```
a = input ("Enter first number")
b = input ("Enter second number")
print "Quotient", a/b
print "Remainder", a%b
```

Output: (Interactive Mode)

```
Enter first number10
Enter second number3
Quotient 3
Remainder 1
```


Variables and Types: One of the most powerful features of a programming language is the ability to manipulate variables. When we create a program, we often like to store values so that it can be used later. We use objects (variables) to capture data, which then can be manipulated by computer to provide information. By now, we know that object/ variable is a name which refers to a value.

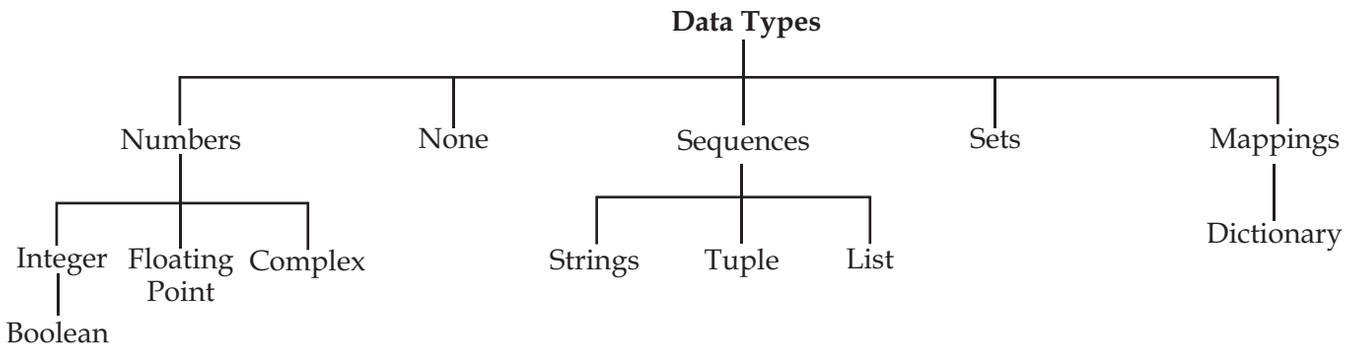
Every object has:

- An Identity,
- A type, and
- A value.

A. **Identity** of the object is its address in memory and does not get change once it is created. We may know it by typing id (variable)

We would be referring to objects as variable for now.

B. **Type** (i.e data type) is a set of values, and the allowable operations on those values. It can be one of the following:



1. **Number:** Number data type stores Numerical Values. This data type is immutable i.e. value of its object cannot be changed. Numbers are of three different types:
   - Integer & Long (to store whole numbers i.e. decimal digits without fraction part)
   - Float/floating point (to store numbers with fraction part)
   - Complex (to store real and imaginary part)
2. **None:** This is special data type with a single value. It is used to signify the absence of value/false in a situation. It is represented by None.
3. **Sequence:** A sequence is an ordered collection of items, indexed by positive integers. It is a combination of mutable (a mutable variable is one, whose value may change) and immutable (an immutable variable is one, whose value may not change) data types. There are three types of sequence data type available in Python, they are Strings, Lists & Tuples.
   - 3.1 **String-** is an ordered sequence of letters/characters. They are enclosed in single quotes (' ') or double quotes (" "). The quotes are not part of string. They only tell the computer about where the string constant begins and ends. They can have any character or sign, including space in them. These are **immutable.** A string with length 1 represents a character in Python.
   - 3.2 **Lists:** List is also a sequence of values of any type. Values in the list are called elements / items. These are **mutable** and indexed/ordered. List is enclosed in square brackets ([]).
   - 3.3 **Tuples:** Tuples are a sequence of values of any type and are indexed by integers. They are immutable. Tuples are enclosed in ().
4. **Sets:** Set is unordered collection of values of any type with no duplicate entry. It is immutable.
5. **Mapping:** This data type is unordered and mutable. Dictionaries fall under Mappings.
   - 5.1 **Dictionaries:** It can store any number of python objects. What they store is a **key -value** pairs, which are accessed using key. Dictionary is enclosed in curly brackets ({}).

C. **Value:** Value is any number or a letter or string. To bind value to a variable, we use assignment operator (=).

Keywords - are used to give some special meaning to the interpreter and are used by Python interpreter to recognize the structure of program.

A partial list of keywords in Python 2.7 is

and	del	from	not
while	as	elif	global
or	with	assert	else
if	pass	Yield	break
except	import	print	class
exec	in	Raise	continue
finally	is	return	def
for	lambda	try	

Operators and Operands

Operators are special symbols that represent computation like addition and multiplication. The values that the operator is applied to are called operands. Operators when applied on operands form an expression. Operators are categorized as Arithmetic, Relational, Logical and Assignment. Following is the partial list of operators:

Mathematical/Arithmetic operators: +, -, *, /, %, ** and //.
Relational operators: <, <=, >, >=, != or <> and ==.
Logical operators: or, and, and not
Assignment Operator: =, +=, -=, *=, /=, %=, **= and //=

Input and Output

Program need to interact with end user to accomplish the desired task, this is done using Input-Output facility. Input means the data entered by user (end user) of the program. In python, raw_input() and input ( ) functions are available for input.

Syntax of raw_input() is:

Variable = raw_input ([prompt])

Example:

>>>x = raw_input ('Enter your name: ')

Enter your name: ABC

Example:

y = int(raw_input ("enter your roll no"))

will convert the accepted string into integer before assigning to 'y'.

Syntax for input() is:

Variable = input ([prompt])

Example:

x = input ('enter data:')

Enter data: 2+ ½.0

Will supply 2.5 to x

Print: This statement is used to display results.

Syntax:

print expression/constant/variable

Example:

>>> print "Hello"

Hello

Comments: As the program gets bigger and more complicated, it becomes difficult to read it and difficult to look at a piece of code and to make out what it is doing by just looking at it. So it is good to add notes to the code, while writing it. These notes are known as comments. In Python, comments start with '#' symbol. Anything written after # in a line is ignored by interpreter. For more than one line comments, we use the following;

- Place '#' in front of each line, or
- Use triple quoted string. (""" """)

Functions in Python: A function is named sequence of statement(s) that performs a computation. It contains line of code(s) that are executed sequentially from top to bottom by Python interpreter. They are the most important building block for any software in Python. For working in script mode, we need to write the Python code in functions and save it in the file having .py extension. Functions can be categorized as belonging to

- Modules
- Built in
- User Defined

1. **Module:**

   A module is a file containing Python definitions (i.e. functions) and statements. Standard library of Python is extended as module(s) to a Programmer. Definitions from the module can be used into code of Program. To use these modules in a program, programmer needs to import the module. Once we import a module, we can reference (use) to any of its functions or variables in our code. There are two ways to import a module in our program, they are

- import
- from

Import: It is simplest and most common way to use modules in our code.

Syntax:

import modulename1 [, module name 2, ---------]

Example: Input any number and to find square and square root.

Example:

```
import math
x = input ("Enter any number")
y = math.sqrt(x)
a = math.pow(x,2)
print "Square Root value=",y
print "square value=",a
```

output:

```
Enter any number25
Square Root value= 5.0
square value= 625.0
```

From statement: It is used to get a specific function in the code instead of complete file. If we know beforehand which function(s), we will be needing, then we may use 'from'. For modules having large number of functions, it is recommended to use from instead of import.

Syntax

>>> from modulename import functionname [, functionname…..]

from modulename import *

will import everything from the file.

Example: Input any number and to find square and square root.

Example:

```
from math import sqrt,pow
x=input("Enter any number")
y=sqrt(x)        #without using math
a=pow(x,2)       #without using math
print "Square Root value =",y
print "square value =",a
```

Enter any number100

Square Root value = 10.0

square value = 10000.0

The functions available in math module are:

ceil() floor() fabs() exp() log() log10() pow() sqrt() cos() sin() tan() degrees() radians()

Some functions from random module are:

random() randint() uniform() randrange()

2. Built in Function:

Built in functions are the function(s) that are built into Python and can be accessed by Programmer. These are always available and for using them, we don't have to import any module (file). Python has a small set of built-in functions as most of the functions have been partitioned to modules. This was done to keep core language precise.

abs() max() min() bin() divmod() len() range() round() bool() chr() float() int() long() str( ) type( ) id( ) tuple( )

3. User Defined Functions:

In Python, it is also possible for programmer to write their own function(s). These functions can then be combined to form module which can be used in other programs by importing them. To define a function, keyword 'def' is used. After the keyword comes an identifier i.e. name of the function, followed by parenthesized list of parameters and the colon which ends up the line, followed by the block of statement(s) that are the part of function.

Syntax:

def NAME ([PARAMETER1, PARAMETER2, …..]):

#Square brackets include optional part of statement

statement(s)

Example: To find simple interest using function.

Example:

```
def SI(P,R,T):
    return(P*R*T)
```

Output:

```
>>> SI(1000,2,10)
20000
```

Parameters and Arguments

Parameters are the value(s) provided in the parenthesis when we write function header. These are the values required by function to work. If there is more than one value required by the function to work on, then, all of them will be listed in parameter list separated by comma.

Example: def SI (P,R,T):

Arguments are the value(s) provided in function call/invoke statement. List of arguments should be supplied in same way as parameters are listed. Bounding of parameters to arguments is done 1:1, and so there should be same number and type of arguments as mentioned in parameter list.

Example: Arguments in function call

```
>>> SI (1000,2,10)
```

1000,2,10 are arguments. An argument can be constant, variable, or expression.

Example: Write the output from the following function:

```
def SI(p,r=10,t=5):
   return(p*r*t/100)
```

if we use following call statement:

```
SI(10000)
SI(20000,5)
SI(50000,7,3)
```

Output

```
>>> SI(10000)
5000
>>> SI(20000,5)
5000
>>> SI(50000,7,3)
10500
```


Flow of Execution

Execution always begins at the first statement of the program. Statements are executed one after the other from top to bottom. Further, the way of execution of the program shall be categorized into three ways; (i) sequence statements, (ii) selection statements, and (iii) iteration or looping statements.

Sequence statements: In this program, all the instructions are executed one after another.

Example:

Program to find area of the circle.

```
r = input("enter any radius of the circle")
a = 3.14*r*r
print "Area=",a
```

output:

enter any radius of the circle7

Area = 153.86

In the above program, all three statements are executed one after another.

Selective Statements: In this program, some portion of the program is executed based upon the conditional test. If the conditional test is true, compiler will execute some part of the program, otherwise it will execute other part of the program. This is implemented in python using if statement.

Syntax:

```
if (condition):
    statements
else
    statements
```

(or)

```
if (condition):
    statements
elif (condition):
    statements
else:
    Statements
```


Example:

1. Program to find the simple interest based upon number of years. If number of years is more than 12 rate of interest is 10 otherwise 15.

   Code:

```
p = input("Enter any principle amount")
t = input("Enter any time")
if (t>10):
    si = p*t*10/100
else:
    si = p*t*15/100
print "Simple Interest = ",si
```

   output:

   Enter any principle amount 3000

   Enter any time12

   Simple Interest = 3600

2. Write a program to input any choice and to implement the following.

Choice	Find
1.	Area of square
2.	Area of rectangle
3.	Area of triangle

Code:

```
c = input ("Enter any Choice")
if(c==1):
    s = input("enter any side of the square")
    a = s*s
    print"Area = ",a
elif(c==2):
    l = input("enter length")
    b = input("enter breadth")
    a = l*b
    print"Area = ",a
elif(c==3):
     x = input("enter first side of triangle")
      y = input("enter second side of triangle")
      z = input("enter third side of triangle")
      s = (x+y+z)/2
      A = ((s-x)*(s-y)*(s-z))**0.5
      print"Area=",A
else:
    print "Wrong input"
```

Output:

```
Enter any Choice2
enter length4
enter breadth6
Area = 24
```

Iterative statements: In some programs, certain set of statements are executed again and again based upon conditional test. i.e executed more than one time. This type of execution is called looping or iteration. Looping statement in python is implemented by using 'for' and 'while' statement.

Syntax: (for loop)

```
for variable in range(start,stop+1,step):
        statements
```

Syntax: (while loop)

```
while (condition):
        Statements
```

Example:

1. Write a program to input any number and to print all natural numbers up to given number.

   Code:

```
n = input("enter any number")
for i in range(1,n+1):
    print i,
```

   Output:

```
enter any number10
1 2 3 4 5 6 7 8 9 10
```

2. Write a program to input any number and to find sum of all natural numbers up to given number.

   Code:

```
n = input("Enter any number")
sum= 0
for i in range(1,n+1):
    sum = sum+i
print "sum=",sum
```

   Output:

```
Enter any number5
sum = 15
```

3. Write a program to input any number and to find reverse of that number.

   Code:

```
n = input("Enter any number")
r = 0
while(n>0):
    r = r*10+n%10
    n = n/10
```

```
print "reverse number is", r
```

Output:

```
>>>
Enter any number345
reverse number is 543
>>>
```

Example: Write the output from the following code:

1.
```
sum = 0
for i in range(1,11,2):
    sum+ = i
print "sum = ", sum
```
output:

sum = 25

2.
```
sum = 0
i = 4
while (i<=20):
    sum+=i
    i+= 4
print "Sum = ",sum
```
output:

Sum = 60

Example: Interchange for loop into while loop

1.
```
for i in range(10,26,2):
    print i
```
Ans:
```
i=10
while(i<26):
    print i
    i+=2
```

2.
```
s=0
for i in range(10,50,10):
    s + =i
```

```
print " Sum= ", s
```

Ans:

```
s = 0
i = 10
while(i<50):
    s+ = i
    i+ = 10
print "Sum=",s
```

Example: Interchange while loop in to for loop.

```
i = 5
s = 0
while (i<25):
    s+ = i
    i + = 5
print " Sum =", s
```

Ans:

```
s = 0
for i in range(5,25,5):
    s+=i
print "Sum = ", s
```


Example: How many times following loop will execute.

1.
```
for i in range(10,50,5):
    print i
```
Ans:

i values are 10,15,20,25,30,35,40,45

8 times

2.
```
i=4
while(i<25):
    print i
    i+=4
```
Ans:

i values are 4,8,12,16,20,24

6 times

String:

In python, consecutive sequence of characters is known as a string. An individual character in a string is accessed using a subscript (index). The subscript should always be an integer (positive or negative) and starts from 0. A literal/constant value to a string can be assigned using a single quotes, double quotes or triple quotes. Strings are immutable i.e. the contents of the string cannot be changed after it is created.

Strings Operations:

+ (Concatenation)
* (Repetition)
in (Membership)
not in
range (start, stop[,step])
slice[n:m]

Example: Write the output from the following code:

1. A = 'Global'
   B = 'warming'
   print A+B
   Ans: Globalwarming
2. A = 'Global'
   Print 3*A
   Ans: 'GlobalGlobalGlobal'
3. A='Global'
   'o' in A
   Ans: True
4. A='Global'
   'g' in A
   Ans: False
5. A='Global'
   'o' not in A
   Ans: False
6. A='Global'
   'g' not in A
   Ans: True

String methods & built in functions:

len() capitalize() find(sub[,start[, end]]) isalnum() isalpha()

isdigit() lower() islower() isupper() upper() lstrip()
rstrip() isspace() istitle() replace(old,new) join ()
swapcase() partition(sep) split([sep[,maxsplit]])
Example:

```
>>> s='Congratulations'
>>> len(s)
15
>>> s.capitalize()
'Congratulations'
>>> s.find('al')
-1
>>> s.find('la')
8
>>> s[0].isalnum()
True
>>> s[0].isalpha()
True
>>> s[0].isdigit()
False
>>> s.lower()
'congratulations'
>>> s.upper()
'CONGRATULATIONS'
>>> s[0].isupper()
True
>>> s[1].isupper()
False
>>> s.replace('a','@')
'Congr@tul@tions'
>>> s.isspace()
False
>>> s.swapcase()
'cONGRATULATIONS'
>>> s.partition('a')
('Congr', 'a', 'tulations')
>>> s.split('ra',4)
```

```
['Cong', 'tulations']
>>> s.split('a')
['Congr', 'tul', 'tions']
>>> a=' abc '
>>> a.lstrip()
'abc '
>>> a.rstrip()
' abc'
```

Examples:

Example: Write a program to input any string and count number of uppercase and lowercase letters.

Code:

```
s=raw_input("Enter any String")
rint s
u=0
l=0
i=0
while i<len(s):
    if (s[i].islower()==True):
        l+=1
    if (s[i].isupper()==True):
        u+=1
        i+=1
    print "Total upper case letters :", u
    print "Total Lower case letters :", l
```


Output:

```
Enter any String Python PROG
Python PROG
Total upper case letters: 5
Total Lower case letters: 5
```

Example:

Write the output from the following code:

```
s = 'Indian FESTIVALS'
i = 0
while i<len(s):
```

```
if (s[i].islower()):
        print s[i].upper(),
if (s[i].isupper()):
        print s[i].lower(),
i + =1
```

Ans:

iNDIANfestivals

List:

Like a string, list is a sequence of values. In a string, the values are characters, whereas in a list, they can be of any type. The values in the list are called elements or items or members. It is an ordered set of values enclosed in square brackets [ ]. Values in the list can be modified, i.e. it is mutable. As it is set of values, we can use index in square brackets [ ] to identify a value belonging to it.

List Slices: Slice operator works on list. This is used to display more than one selected values on the output screen. Slices are treated as boundaries and the result will contain all the elements between boundaries.

Syntax:

Seq = L [start: stop: step]

Where start, stop & step - all three are optional. If you omit first index, slice starts from '0' and omitting of stop will take it to end. Default value of step is 1.

Example:

```
>>> L=[10,20,30,40,50]
>>> L1=L[2:4]
>>> print L1
[30, 40]
```

List Methods:

append() extend () pop() del() remove()
insert() sort() reverse() len()

Example:

```
>>> L=[500,1000,1500,2000]
>>> L.append(2500)
>>> print L
[500, 1000, 1500, 2000, 2500]
>>> L1=[3000,3500]
>>> L.extend(L1)
```

```
>>> print L
[500, 1000, 1500, 2000, 2500, 3000, 3500]
>>> L.pop()
3500
>>> L.pop(3)
2000
>>> print L
[500, 1000, 1500, 2500, 3000]
>>> del L[2]
>>> print L
[500, 1000, 2500, 3000]
>>> L.remove(1000)
>>> print L
[500, 2500, 3000]
>>> L.insert(3,3500)
>>> print L
[500, 2500, 3000, 3500]
>>> L.reverse()
>>> print L
[3500, 3000, 2500, 500]
>>> L.sort()
>>> print L
[500, 2500, 3000, 3500]
>>> print len(L)
4
```


Note: Operator + & * can also be applied on the lists. + is used to concatenate the two lists and * is used to repeat the list given number of times.

Example:

```
>>> l=[10,20,30]
>>> m=[40,50]
>>> l=l+m
>>> print l
[10, 20, 30, 40, 50]
>>> b=m*3
```

```
>>> print b
[40, 50, 40, 50, 40, 50]
```

Dictionaries:

A dictionary is like a list, but more in general. In a list, index value is an integer, while in a dictionary index value can be any other data type and are called keys. The key will be used as a string as it is easy to recall. A dictionary is an extremely useful data storage construct for storing and retrieving all key value pairs, where each element is accessed (or indexed) by a unique key. However, dictionary keys are not in sequences and hence maintain no left-to-right order.

Key-value pair: We can refer to a dictionary as a mapping between a set of indices (which are called keys) and a set of values. Each key maps a value. The association of a key and a value is called a key-value pair.

Syntax:

my_dict = {'key1': 'value1','key2': 'value2','key3': 'value3'…'keyn': 'valuen'}

Note: Dictionary is created by using curly brackets(ie. {}).

Dictionary methods:

cmp() len() clear() get() has_key()
items() keys() values() update() dict()

Example:

```
>>> month=dict()
>>> print month
{}
>>> month["one"]="January"
>>> month["two"]="Feb"
>>> print month
{'two': 'Feb', 'one': 'January'}
>>> len(month)
2
>>> month.get("one")
'January'
>>> month.get("one","feb")
'January'
>>> month.keys()
['two', 'one']
>>> month.has_key("one")
True
```

```
>>> month.has_key("three")
False
>>> month.items()
[('two', 'Feb'), ('one', 'January')]
>>> month.values()
['Feb', 'January']
>>> m=month
>>> cmp(month,m)
0
>>> n=dict()
>>> cmp(m,n)
1
>>> cmp(n,m)
-1
>>> m.clear()
>>> print m
{}
```

Tuples:

A tuple is a sequence of values, which can be of any type and they are indexed by integer. Tuples are just like list, but we can't change values of tuples in place. Thus tuples are immutable. The index value of tuple starts from 0.

A tuple consists of a number of values separated by commas. For example:

```
>>> T=10, 20, 30, 40
>>> print T
(10, 20, 30, 40)
```

But in the result, same tuple is printed using parentheses. To create a tuple with single element, we have to use final comma. A value within the parenthesis is not tuple.

Tuple Slices: Slice operator works on Tuple also. This is used to display more than one selected value on the output screen. Slices are treated as boundaries and the result will contain all the elements between boundaries.

Syntax:

Seq = T [start: stop: step]

Where start, stop & step - all three are optional. If we omit first index, slice starts from '0'. On omitting stop, slice will take it to end. Default value of step is 1.

Example:

```
>>> T=(10,20,30,40,50)
>>> T1=T[2:4]
>>> print T1
(30, 40)
```

In the above example, starting position is 2 and ending position is 3(4-1), so the selected elements are 30 & 40.

Tuple functions:

cmp( ) len( ) max( ) min( ) tuple( )

Example:

```
>>> T=tuple()
>>> print T
()
>>> T=["mon","tue","wed","thu","fri","sat","sun"]
>>> print T
['mon', 'tue', 'wed', 'thu', 'fri', 'sat', 'sun']
>>> len(T)
7
>>> min(T)
'fri'
>>> max(T)
'wed'
>>> T1=T
>>> T2=(10,20,30)
>>> cmp(T,T1)
0
>>> cmp(T2,T1)
1
>>> cmp(T1,T2)
-1
```

LET'S REVISE

Interactive Mode: Interactive Mode, as the name suggests, allows us to interact with OS.

Script Mode: In script mode, we type Python program in a file and then use interpreter to execute the content of the file.

Number: Number data type stores Numerical Values.

Sequence: A sequence is an ordered collection of items, indexed by positive integers.

Arithmetic operators: +, -, *, /, %, ** and //.

Relational operators: <, <=, >, >=, != or <> and ==.

Logical operators: or, and, and not

Assignment Operator: =, +=, -=, *=, /=, %=, **= and //=

Functions in Python: A function is named sequence of statement(s) that performs a computation.

Module: A module is a file containing Python definitions (i.e. functions) and statements. Standard library of Python is extended as module(s) to a Programmer.

String: In python, consecutive sequence of characters is known as a string. An individual character in a string is accessed using a subscript (index).

List: Like a string, list is a sequence of values. List can be of any type.

Dictionaries: A dictionary is like a list, but more in general. In a list, index value is an integer, while in a dictionary index value can be any other data type and are called keys.

Tuples: A tuple is a sequence of values, which can be of any type and they are indexed by integer.

EXERCISE

1. Write the output from the following code:

   a)
```
x = 10
y = 20
if (x>y):
    print x+y
else:
    print x-y
```

   b)
```
print "Inspirational stories \n for \t Children"
```

   c)
```
s = 0
for I in range(10,2,-2):
    s+=I
print "sum= ",s
```

   d)
```
n = 50
i = 5
s = 0
while i<n:
    s+ = i
    i+ = 10
print "i=",i
print "sum=",s
```

   e)
```
y = 2000
if (i%4==0):
    print "Leep Year"
else:
    print "Not leep year"
```

2. Write for statement to print the following series:
   a) 10,20,30…….300
   b) 105,98,91,….7

3. Write the while loop to print the following series:
   a) 5,10,15,…100
   b) 100,98,96,…2

4. How many times are the following loop executed?

   a) for a in range(100,10,-10):
      print a

   b) i = 100
   while(i<=200):
      print i
      i + =20

   c) for b in (1,10):
      print b

   d) i = 4
   while (i>=4):
      print i
      i+ = 10

   f) i=2
   while (i<=25)
      print i

5. Rewrite the following for loop into while loop:

   a) for a in range(25,500,25):
      print a

   b) for a in range(90,9,-9):
      print a

6. Rewrite the following while loop into for loop:

   a) i = 10
   while i<250:
      print i
      i = i+50

   b) i=88
   while(i>=8):
      print i
      i- = 8

7. Which command is used to convert text into integer value?

8. Find the errors from the following code.

   a. T=[a,b,c]
      Print T

   b. for i in 1 to 100 :
         print I

   c. i=10 ;
      while [i<=n] :
         print i
        i+=10

   d. if (a>b)
         print a:
      else if (a<b)
       print b:
       else
       print "both are equal"

9. Find the output from the following code:

   L=[100,200,300,400,500]
   L1=L[2:4]
   print L1
   L2=L[1:5]
   print L2
   L2. .extend(L1)
   print L2

10. Write program to input any number and to print all factors of that number.

11. Write a program to input any number and to check whether given number is Armstrong or not. (Armstrong 1,153,etc. 13 =1 , 13+53 +33 =153)

12. Write a program to input employee no, name basic pay and to find HRA, DA and netpay.

Basic pay	Hra	Da
>100000	15%	8%
<=100000&>50000	10%	5%
<=50000	5%	3%

13. Write a program to find all prime numbers up to given number.
14. Write a program to convert decimal number to binary.
15. Write a program to convert binary to decimal.
16. Write a program to input two complex numbers and to find sum of the given complex numbers.
17. Write a program to input two complex numbers and to implement multiplication of the given complex numbers.
18. Write a program to find sum of two distances with feet and inches.
19. Write a program to find difference between two times with hours, minutes and seconds.
20. Write a program to find the sum of all digits of the given number.
21. Write a program to find the reverse of that number.
22. Write a program to input username and password and to check whether the given username and password are correct or not.
23. Which string method is used to implement the following:
    a) To count the number of characters in the string.
    b) To change the first character of the string in capital letter.
    c) To check whether given character is letter or a number.
    d) To change lower case to upper case letter.
    e) Change one character into another character.
24. Write a program to input any string and to find number of words in the string.
25. Write a program to input any two strings and to check whether given strings are equal are not.
26. Differentiate between tuple and list.
27. Write a program to input n numbers and to insert any number in a particular position.
28. Write a program to input n numbers and to search any number from the list.
29. Write a program to input n customer name and phone numbers.
30. Write a program to search input any customer name and display customer phone number if the customer name is exist in the list.
31. Explain in detail about cmp() function.
32. Write a program to input n numbers and to reverse the set of numbers without using functions.

Chapter-2: Concept of Object Oriented Programming

Learning Objectives:

At the end of this chapter the students will be able to:

- Understand about Object Oriented Programming(OOP) classes and objects
- Know the concepts related to OOP
  - Objects
  - Classes
  - Encapsulation
  - Data Hiding
  - Abstraction
  - Polymorphism
  - Inheritance
- Know about the advantages of OOP over earlier programming methodologies

An object-oriented programming (OOP) is a programming language model which is organized around "objects" rather than "actions" and data rather than logic. Before the introduction of the Object Oriented Programming paradigm, a program was viewed as a logical procedure that takes input data, processes it, and produces output. But in case of OOP a problem is viewed in terms of objects rather than procedure for doing it. Now the question arises what is an object?

An object can be anything that we notice around us. It can be a person (described by name, address, date of Birth etc, his typing speed), a cup (described by size , color , price etc.) , a car (described by model , color , engine etc., its mileage, speed) and so on. In fact it can be an identifiable entity. The whole idea behind an object oriented model is to make programming closer to they real world thereby making it a very natural way of programming. The core of pure object-oriented programming is to combine into a single unit both data and functions or methods that operate on that data.

Simula was the first object-oriented programming language. Java, Python, C++, Visual Basic, .NET and Ruby are the most popular OOP languages today.

Basic Concepts of Object Oriented Programming

The basic concepts related to OOP are as follows:

1. Objects
2. Classes

3. Encapsulation
4. Abstraction
5. Data Hiding
6. Polymorphism
7. Inheritance

Object

An object is the basic key concept of Object Oriented Programming. As mentioned before it can be anything around us - a person, place, any activity or any other identifiable entity. Every object is characterised by:

- ***Identity:*** This is the name that identifies an object. For example a Student is the name given to anybody who is pursuing a course. Or an i-phone is a mobile phone that has been launched by Apple Inc.
- ***Properties:*** These are the features or attributes of the object. For example a student will have his name age, class, date of birth etc. as his attributes or properties. A mobile phone has model, color, price as its properties.
- ***Behaviour:*** The behaviour of an object signifies what all functions an object can perform. For example a student can pass or fail the examination. A mobile phone can click and store photographs (behave like a camera).

So an object clearly defines an entity in terms of its properties and behaviour. Consider an example of an object - Windows mobile phone. This phone has certain properties and certain functions which are different from any other mobile phone- say an Android phone. Both are mobile phones and so possess common features that every mobile phone should have but yet they have their own properties and behaviours. The data of a particular object can be accessed by functions associated with that object only. The functions of one object cannot access the data of another object.

Classes

A class is group of objects with same attributes and common behaviours. It is basically a blueprint to create objects. An object is a basic key concept of OOP but classes provide an ability to generalize similar type of objects. Both data and functions operating on the data are bundled as a unit in a class for the same category of objects. Here to explain the term 'same category of object', let us take the example of mobile phone. A Windows phone, Android phone and i-phone, all fall into the category of mobile phones. All of these are instances of a class, say Mobile_phone and are called objects.

Similarly we can have another example where students named Rani and Ravish are objects. They have properties like name, date of birth, address, class, marks etc. and the behaviour can be giving examinations. Anybody pursuing any course, giving any type of examination will come into the category of students. So a student is said to be a class as they share common properties and behaviours. Although a

student can be a school student, a college student or a university student or a student pursuing a music course and so on, yet all of these have some properties and behaviours in common which will form a class. An analogy is that you can have variables of type int which translates to saying that variables that store integers are variables which are instances (objects) of the int class.

A real instance of a class is called an object and creating the new object is called instantiation. Objects can also have functionality by using functions that belong to a class. Such functions are called methods of the class. This terminology is important because it helps us to differentiate between functions and variables which are independent and those which belong to a class or object. Collectively, the fields and methods can be referred to as the attributes of that class. Let us take the example of the class Mobile_phone which is represented in the block diagram below:

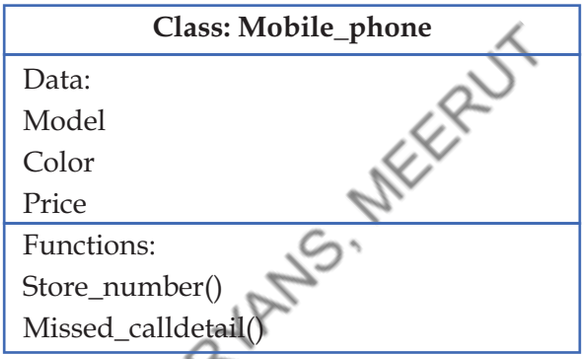


Fig 1: Class Mobile_phone

A class is defined before the creation of objects of its type. The objects are then created as instances of this class as shown in the figure below.

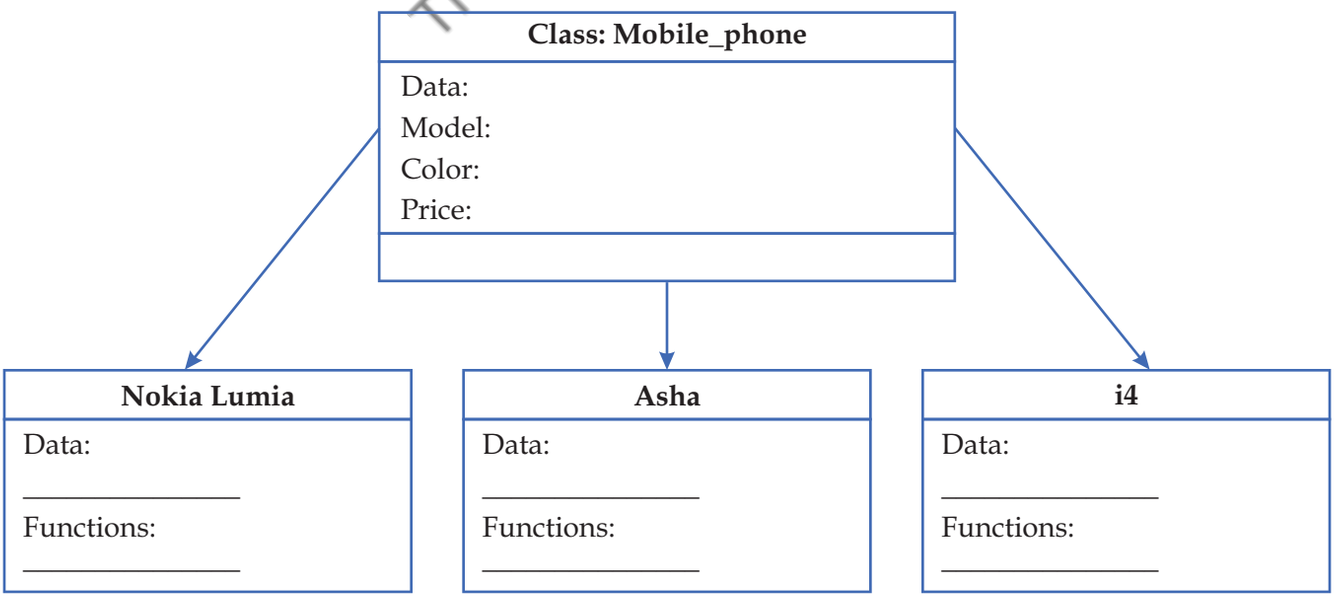


Fig 2: Class and Objects

In the above example, Nokia Lumia, Asha and i4 are all instances of the class Mobile_phone. All these instances are similar in the sense that all have basic features that a mobile phone should have. So all of these are objects of the class Mobile_phone

The general form of class definition in Python and creation of objects will be discussed in the next chapter.

Encapsulation

Encapsulation is the most basic concept of OOP. It is the combining of data and the functions associated with that data in a single unit. In most of the languages including python, this unit is called a class. In Fig -1 showing class Mobile_phone, given under the subtopic Classes, we see that the name of the class, its properties or attributes and behaviours are all enclosed under one independent unit. This is encapsulation, implemented through the unit named class.

In simple terms we can say that encapsulation is implemented through classes. In fact the data members of a class can be accessed through its member functions only. It keeps the data safe from any external interference and misuse. The only way to access the data is through the functions of the class. In the example of the class Mobile_phone, the class encapsulates the data (model, color, price) and the associated functions into a single independent unit.

Data Hiding

Data hiding can be defined as the mechanism of hiding the data of a class from the outside world or to be precise, from other classes. This is done to protect the data from any accidental or intentional access.

In most of the object oriented programming languages, encapsulation is implemented through classes. In a class, data may be made private or public. Private data or function of a class cannot be accessed from outside the class while public data or functions can be accessed from anywhere. So data hiding is achieved by making the members of the class private. Access to private members is restricted and is only available to the member functions of the same class. However the public part of the object is accessible outside the class. (You will study about private and public members in detail in the next chapter.)

Data Abstraction

Do you know the inner details of the monitor of your PC or your mobile phone? What happens when you switch ON the monitor or when any call is received by you on your phone? Does it really matter to you what is happening inside these devices? No, it does not. Right? Important thing for you is whether these devices are working as per your requirement or not? You are never concerned about their inner circuitry. This is what we call abstraction.

The process of identifying and separating the essential features without including the internal details is abstraction. Only the essential information is provided to the outside world while the background details are hidden. Classes use the concept of abstraction. A class encapsulates the relevant data and functions that operate on data by hiding the complex implementation details from the user. The user needs to focus on what a class does rather than how it does.

Let us have a look at the Mobile_phone class. The case or body of the mobile phone is abstraction. This case is the public interface through which the user interacts. Inside the case there are numerous components such as memory, processor, RAM etc. which are private and so are hidden behind the public interface called case/body. Thus this case/body is the abstraction which has separated the essential components from implementation details. So when you purchase a mobile, you are given information about only the functions and operations of the mobile. The inside mechanism of the working of the mobile is of no concern to you. As long as the mobile is functioning properly, you are not bothered about the inner circuitry of the mobile phone.

Abstraction and Encapsulation are complementary concepts. Through encapsulation only we are able to enclose the components of the object into a single unit and separate the private and public members. It is through abstraction that only the essential behaviours of the objects are made visible to the outside world. So we can say that encapsulation is the way to implement data abstraction. In another example of class Student, only the essential information like roll no, name, date of birth, course etc. of the student are visible. The secret information like calculation of grades, allotment of examiners etc. is hidden.

Inheritance

Inheritance is one of the most useful characteristic of object-oriented programming as it enforces reusability of code. Inheritance is the process of forming a new class (derived class) from an existing class (called the base class). The data members and the methods associated with the data are accessible in the inherited class.

Let us understand this characteristic with the help of the class Mobile_phone.

An i-phone is a class in itself. It is a type of mobile phone. So we can have Mobile_phone as the base class and i_phone as its derived class as shown in the figure below:

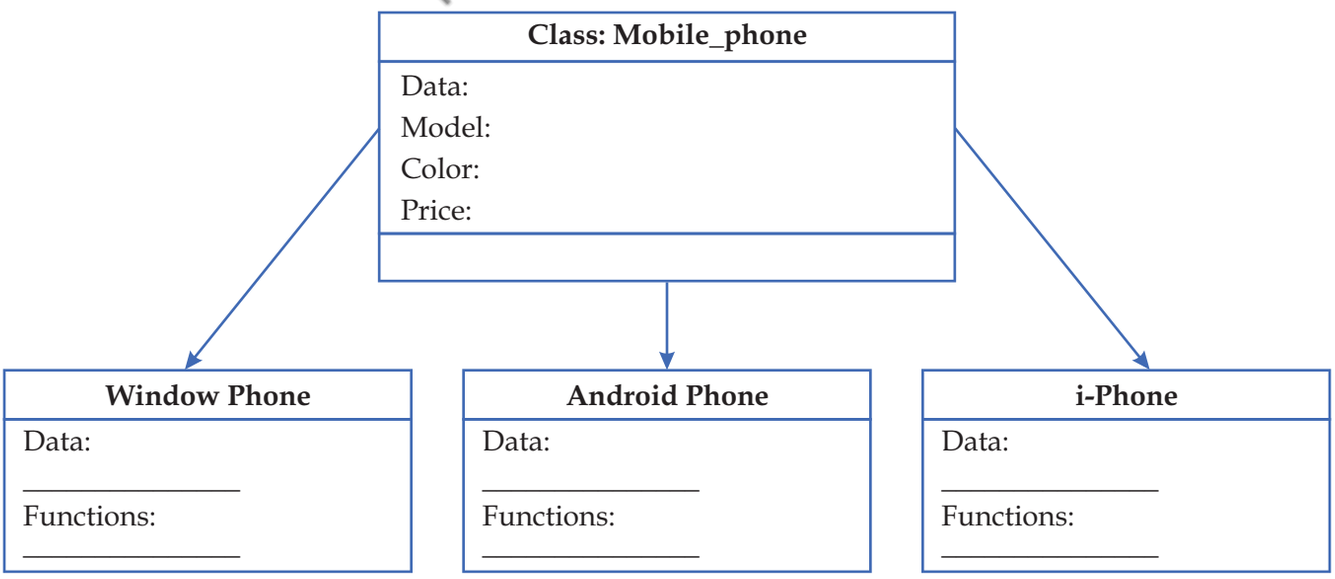


Fig 3: Inheritance

Such hierarchical classification helps to obtain a new class from an existing class. The derived class can also contain some new attributes of itself. So the derived class contains features of the base class as well as of itself. For example an i-phone will have all the features of a Mobile_phone class in addition to its own characteristics. Such a relationship between the two classes is known as "a kind of "relationship. For example an i-phone is a kind of mobile phone.

So we see that the base class can be reused again and again to define new classes. Another advantage of inheritance is its transitive nature. If a class i_phone inherits properties of another class Mobile_phone, then all derived classes of i_phone will inherit properties of the class Mobile_phone. All these factors make inheritance a very important characteristic of object oriented programming.

Polymorphism

The word Polymorphism is formed from two words - poly and morph where poly means many and morph means forms. So polymorphism is the ability to use an operator or function in various forms. That is a single function or an operator behaves differently depending upon the data provided to them. Polymorphism can be achieved in two ways:

1. **Operator Overloading**

   In class XI you have worked with '+ 'operator. You must have noticed that the '+' operator behaves differently with different data types. With integers it adds the two numbers and with strings it concatenates or joins two strings. For example:

   Print 8+9 will give 17 and

   Print "Python" + "programming" will give the output as Pythonprogramming.

   This feature where an operator can be used in different forms is known as Operator Overloading and is one of the methods to implement polymorphism.

2. **Function Overloading**

   Polymorphism in case of functions is a bit different. A named function can also vary depending on the parameters it is given. For example, we define multiple functions with same name but different argument list as shown below:

```
def test():                    #function 1
        print "hello"
def test(a, b):                #function 2
        return a+b
def test(a, b, c):             #function 3
    return a+b+c
```

   In the example above, three functions by the same name have been defined but with different number of arguments. Now if we give a function call with no argument, say test(), function 1 will be called. The

statement test(10,20) will lead to the execution of function 2 and if the statement test(10,20,30) is given Function 3 will be called. In either case, all the functions would be known in the program by the same name. This is another way to implement polymorphism and is known as Function Overloading.

As we see in the examples above, the function called will depend on the argument list - data types and number of arguments. These two i.e. data types and the number of arguments together form the function signature. Please note that the return types of the function are no where responsible for function overloading and that is why they are not part of function signature.

Here it must be taken into consideration that Python does not support function overloading as shown above although languages like Java and C/C++ do. If you run the code of three test functions, the second test() definition will overwrite the first one. Subsequently the third test() definition will overwrite the second one. That means if you give the function call test(20,20) , it will flash an error stating, "Type Error: add() takes exactly 3 arguments (2 given)". This is because, Python understands the latest definition of the function test() which takes three arguments.

Static and Dynamic Binding

Binding is the process of linking the function call to the function definition. The body of the function is executed when the function call is made. Binding can be of two types:

Static Binding: In this type of binding, the linking of function call to the function definition is done during compilation of the program.

Dynamic Binding: In this type of binding, linking of a function call to the function definition is done at run time. That means the code of the function that is to be linked with function call is unknown until it is executed. Dynamic binding of functions makes the programs more flexible. You will learn more on dynamic binding in the next chapter.

Advantages of OOP

Object Oriented programming has following advantages:

- ***Simplicity:*** The objects in case of OOP are close to the real world objects, so the complexity of the program is reduced making the program structure very clear and simple. For example by looking at the class Mobile_phone, you can simply identify with the properties and behaviour of an actual mobile phone. This makes the class Mobile_phone very simple and easy to understand.
- ***Modifiability:*** It is easy to make minor changes in the data representation or the procedures in an OO program. Changes inside a class do not affect any other part of a program, since the only public interface that the external world has to a class is through the use of methods.
- ***Extensibility and Maintainability:*** It is quite easy to add new features and extend the program in case of object oriented programming. It can be simply done by introducing a few new objects and modifying some existing ones. The original base class need not be modified at all. Even objects can be

maintained separately. There by making locating and fixing problems easier. For example if a new version of i-phone is introduced, a new derived class of the class i_phone for the new version may be created and no other class in the class hierarchy need to be modified. Similarly if any behaviour of a Windows phone changes, maintenance has to be done only for the class Windows phone.

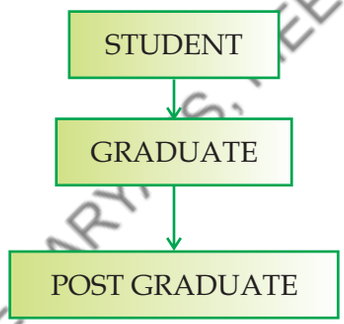
- ***Re-usability:*** Objects can be reused in different programs. The class definitions can be reused in various applications. Inheritance makes it possible to define subclasses of data objects that share some or all of the main class characteristics. It forces a more thorough data analysis, reduces development time, and ensures more accurate coding.
- ***Security:*** Since a class defines only the data it needs to be concerned with, when an instance of that class (an object) is run, the code will not be able to accidentally access other program data. This characteristic of data hiding provides greater system security and avoids unintended data corruption.

LET'S REVISE

- **Object:** clearly defines an entity in terms of its properties and behaviour.
- **Class:** a blueprint of an object.
- **Encapsulation:** combining of data and the functions associated with that data in a single unit
- **Data Hiding:** the mechanism of hiding the data of a class from the outside world
- **Abstraction:** providing only essential information to the outside world and hiding their background details
- **Inheritance:** forming a new class (derived class) from an existing class (called the base class).
- **Polymorphism:** ability to use an operator or function in various forms.
- **Static Binding:** the linking of function call to the function definition is done during compilation of the program.
- **Dynamic Binding:** the linking of function call to the function definition is done during the execution of the program.

EXCERCISE

- Fill in the blanks:
  a. Act of representing essential features without background detail is called _____.
  b. Wrapping up of data and associated functions in to a single unit is called_____.
  c. _____is called the instance of a class.
- What is Object Oriented Programming? List some of its advantages.
- Differentiate between an object and a class.
- What is inheritance? Explain with an example.
- List its three features that make it an important characteristic of OOP.
- Consider the figure given below and answer the questions that follow:



  a. Name the base class and the derived class.
  b. Which concept of OOP is implemented in the figure given above?
- How do abstraction and encapsulation complement each other?
- Explain polymorphism with an example.
- Explain Data Hiding with respect to OOP.
- Explain Function overloading with an example.
- Is function overloading supported by Python? Give reasons.
- Write the overloaded function definitions of add()- on adds two numbers and other concatenates two strings.
- Predict the output of the following program. Also state which concept of OOP is being implemented?

```
def sum(x,y,z):
```

```
        print "sum= ", x+y+z
def sum(a,b):
        print "sum= ", a+b
sum(10,20)
sum(10,20,30)
```

- State whether the following are function overloading or not. Explain why or why not.

a. def (a,b):
   def(x,y) :

b. def(x,y,z)
   def(e,f)

- Define binding.
- Differentiate between static and dynamic binding.
- Write a program to find area of following using function overloading.
- Area of circle (function with one parameter)
- Area of rectangle (function with two parameters)
- Area of triangle (function with three parameters)
- Write a program to find out volume of the following using function overloading.
- volume of cube
- volume of cuboid
- volume of cylinder

THE AARYANS

COMPUTER SCIENCE WITH PYTHON
CLASS-XII
UNIT-1
REVISION

SOME SOLVED QUESTION AND ANSWER

Question 1.
Name the Python Library modules which need to be imported to invoke the following functions :

1. load ()
2. pow () [CBSE Delhi 2016]

Answer:

1. pickle
2. math

Question 2.
Name the modules to which the following func-tions belong:

1. Uniform ()
2. fabs () [CBSE SQP 2016]

Answer:

1. random ()
2. math ()

Question 3.
Differentiate between the round() and floor() functions with the help of suitable example.
[CBSE Comptt. 2016]
Answer:
The function round() is used to convert a fractional number into whole as the nearest next whereas the function floor() is used convert to the nearest lower whole number, e.g.,
round (5.8) = 6, round (4.1) = 5 and floor (6.9) = 6, floor (5.01) = 5

Question 4.
Out of the following, find those identifiers, which cannot be used for naming Variables or functions in a Python program:
Total * Tax, While, Class, Switch, 3rd Row, finally, Column 31, Total. [CBSE Outside Delhi-2016]
Answer:
Total * Tax, class, 3rd Row, finally

Question 5.
Name the Python Library modules which need to be imported to invoke the follwing functions :

1. sqrt()
2. dump() (CBSE Outside Delhi-2016)

Answer:

1. math
2. pickle

Question 6.
Out of the following, find the identifiers, which cannot be used for naming Variable or Functions in a Python program: [CBSE Delhi 2016]
_Cost, Price*Qty, float, switch, Address one, Delete, Number12, do
Answer:
Price *Qty, float, Address one, do

Question 7.
Out of the following find those identifiers, which can not be used for naming Variable or Functions in a Python Program:
Days * Rent, For, A_price, Grand Total, do, 2Clients, Participantl, My city
Answer:
Illegal variables or functions name are as below: Days * Rent, do, 2Clients, For and Grant Total Because of being either keyword or including space or operator or starting with integar.

Question 8.
Name the function / method required for [CBSE SQP 2015]

1. Finding second occurrence of m in madam.
2. get the position of an item in the list.

Answer:

1. find
2. index

Question 9.
Which string method is used to implement the following:

1. To count the number of characters in the string.
2. To change the first character of the string in capital letter.
3. To check whether given character is letter or a number.
4. To change lowercase to uppercase letter.
5. Change one character into another character. [CBSE TextBook]

Answer:

1. len(str)
2. str.capitalize()
3. ch.isalnum()
4. str.upper()
5. str.replace(old,new)

Question 10.
What is the difference between input() and raw_input()?
Answer:
raw_input() takes the input as a string whereas input() basically looks at what the user enters, and automatically determines the correct type. We use the inputQ function when you are expecting an integer from the end-user, and raw_input when you are expecting a string.

Question 11.
What are the two ways of output using print()?
Answer:
Ordinarily, each print statement produces one line of output. You can end the print statement with a trailing ’ to combine the results of multiple print statements into a single line.

Question 12.
Why does the expression 2 + 3*4 result in the value 14 and not the value 24?
Answer:
Operator precedence rules* make the expression to be interpreted as 2 + (3*4) hence the result is 14.

Question 13.
How many times will Python execute the code inside the following while loop? You should answer the question without using the interpreter! Justify your answers.

```
i = 0
 while i < 0 and i > 2 :
 print “Hello ...”
 i = i+1
```

Answer:
0 times.

Question 14.
How many times will Python execute the code inside the following while loop?

```
i = 1
 while i < 10000 and i > 0 and 1:
 print “ Hello ...”
 i = 2 * i
```

Answer:
14.

Question 15.
Convert the following for loop into while loop, for i in range (1,100):

```
if i % 4 == 2 :
 print i, “mod”, 4 , “= 2”
```

Answer:

```
i=1
 while i < 100:
```

```
 if i % 4 == 2:
 print i, “mod”, 4 , “= 2”
 i = i +1
```

Question 16.
Convert the following for loop into while loop.

```
for i in range(10):
 for j in range(i):
 print '$',
 print"
```

Answer:

```
i=0
 while i < 10:
 j=0
 while j < i:
 print '$’
 print"
```

Question 17.
Rewrite the following for loop into while loop: [CBSE Text Book]

```
for a in range(25,500,25):
 print a
```

Answer:

```
a=25
 while a < 500:
 print a
 a = a + 25
```

Question 18.
Rewrite the following for loop into while loop: [CBSE Text Book]

```
for a in range(90, 9, -9):
 print a
```

Answer:

```
a = 90
 while a > 9:
 print a
 a = a-9
```

Question 19.
Convert the following while loop into for loop:

```
i = 0
 while i < 100:
 if i % 2 == 0:
 print i, “is even”
 else:
 print i, “is odd”
 i = i + 1
```

Answer:

```
for i in range(100):
 if i % 2 == 0:
 print i, “is even”
 else :
 print i, “is odd”
```

Question 20.

Convert the following while loop into for loop

```
char = ""
 print “Press Tab Enter to stop ...”
 iteration = 0
 while not char == “\t” and not iteration > 99:
 print “Continue?”
 char = raw_input()
 iteration+ = 1
```

Answer:

```
char = ""
 print “Press Tab Enter to stop ...”
 for iteration in range(99):
 if not char == ‘\t’:
 print “Continue?”
 char = raw_input()
```

Question 21.

Rewrite the following while loop into for loop:

```
i = 10
 while i<250:
 print i
 i = i+50
```

Answer:

```
for i in range(10, 250, 50):
 print i
```

Question 22.

Rewrite the following while loop into for loop:

```
i=88
 while(i>=8): print i
 i- = 8
```

Answer:

```
for i in range(88, 9, -8)
 print i
```

Question 23.

Write for statement to print the series 10,20,30, ……., 300

Answer:

```
for i in range(10, 301, 10):
 print i
```

Question 24.
Write for statement to print the series 105,98,91,… .7
Answer:

```
for i in range(105, 8, -7):
 print i
```

Question 25.
Write the while loop to print the series: 5,10,15,…100
Answer:

```
i=5
while i <= 100:
print i
i = i + 5
```

Question 26.
How many times is the following loop executed? [CBSE Text Book]
for a in range(100,10,-10):
print a
Answer:
9 times.

Question 27.
How many times is the following loop executed? [CBSE Text Book]

```
i = 100
 while (i<=200):
 print i
 i + =20
```

Answer:
6 times

Question 28.
State whether the statement is True or False? No matter the underlying data type if values are equal returns true,

```
char ch1, ch2;
 if (ch1==ch2)
 print "Equal"
```

Answer:
True. Two values of same data types can be equal.

Question 29.
What are the logical operators of Python?

Answer:
or, and, not

Question 30.
What is the difference between '/' and '//' ?
Answer:

// is Integer or Floor division whereas / is normal division
(eg) 7.0 // 2 → 3.0
7.0/2 → 3.5

Question 31.
What are the differences between arrays and lists?
Answer:
An array holds fixed number of values. List is of variable-length – elements can be dynamically added or removed
An array holds values of a single type. List in Python can hold values of mixed data type.

Question 32.
What is the difference between a tuple and a list?
Answer:
A tuple is immutable whereas a list is a mutable.
A tuple cannot be changed whereas a list can be changed internally.
A tuple uses parenthess (()) whereas a list uses square brackets ([]).
tuple initialization: a = (2, 4, 5)
list initialization: a = [2, 4, 5]

Question 33.
Carefully observe the following python code and answer the question that follows:

```
x=5
def func2():
x=3
global x
x=x+1
print x
print x
```

On execution the above code produces the following output.
6
3
Explain the output with respect to the scope of the variables.
Answer:
Names declared with global keyword have to be referred at the file level. This is because the global scope.
If no global statement is being used the variable with the local scope is accessed.
Hence, in the above code the statement succeeding the statement global x informs Python to increment
the global variable x
Hence, the output is 6 i.e. 5 + 1 which is also the value for global x.
When x is reassingned with the value 3 the local x hides the global x and hence 3 printed.
(2 marks for explaning the output) (Only 1 mark for explaining global and local namespace.)

Question 34.
Explain the two strategies employed by Python for memory allocation. [CBSE SQP 2016]
Answer:
Pythonuses two strategies for memory allocation-
(i) Reference counting
(ii) Automatic garbage collection
Reference Counting: works by counting the number of times an object is referenced

by other in the system.
When an object's reference count reaches zero, Python collects it automatically.
Automatic Garbage Collection: Python schedules garbage collection based upon a threshold of object allocations and object deallocations. When the number of allocations minus the number of deallocations are greater that the threshold number, the garbage collector is run and the unused blocks of memory is reclaimed.

Question 35.
Rewrite the following code in Python after removing all syntax errors(s). Underline each correction done in the code. [CBSE Delhi-2016]
for Name in [Amar, Shveta, Parag]
if Name [0] = 's':
Print (Name)
Answer:

```
for Name in [“_Amar”, ”_Shveta_” , "_Parag_”] :
 if Name [0] E == ‘S’ :
 Print (Name)
```

Question 36.
Give the output of following with justification. [CBSE SQP 2015]

```
x = 3
 x+ = x-x
 print x
```

Answer:
Output: 3
Working:

```
x = 3
 x = (x+ x-x ):x = 3 + 3 - 3 = 3
```

Question 37.
Write the output from the following code: [CBSE TextBook]

```
n = 50
 i = 5
 s = 0
 while i<n:
 s+ = i
 i+ = 10
 print “i=”,i
 print “sum=”,s
```

Answer:

```
i= 15
 i= 25
 i= 35
 i= 45
 i= 55
 sum= 125
```

Question 38.
Write the output from the following code:

```
t=('a','b','c','A','B')
 print max(t)
 print min(t)
```
Answer:
'c'
A'

Question 39.
Find the output from the following code:

```
T=(10,30,2,50,5,6,100,65)
 print max(T)
 print min(T)
```
Answer:
100
2

Question 40.
Write a program to calculate the area of a rectangle. The program should get the length and breadth ;
values from the user and print the area.
Answer:

```
length = input("Enter length")
 breadth = input("Enter breadth")
 print "Area of rectangle =",length*breadth
```
Question 41.
Write a program to calculate the roots of a quadratic equation.
Answer:

```
import math
 a = input("Enter co-efficient of x^2")
 b = input("Enter co-efficient of x")
 c = inputfEnter constant term")
 d = b*b - 4*a*c
 if d == 0:
 print "Roots are real and equal"
 root1 = root2 = -b / (2*a)
 elif d > 0:
 print "Roots are real and distinct"
 root1 = (- b + math.sqrt(d)) / (2*a)
 root2 = (-b - math.sqrt(d)) / (2*a)
 else:
 print "Roots are imaginary"
 print "Roots of the quadratic equation are",root1,"and",root2
```
Question 42.
Write a program to input any number and to print all the factors of that number.
Answer:

```
n = inputfEnter the number")
 for i in range(2,n):
 if n%i == 0:
 print i,"is a factor of'.n
```

Question 43.
Write a program to input ,.any number and to check whether given number is Armstrong or not.
(Armstrong 1,153,etc. 13 =1, 13+53 +33 =153)
Answer:

```
n = inputfEnter the number”)
 savedn = n
 sum=0
 while n > 0:
 a = n%10
 sum = sum + a*a*a
 n = n/10
 if savedn == sum:
 print savedn,“is an Armstrong Number”
 else:
 print savedn,”is not an Armstrong Number”
```

Question 44.
Write a program to find all the prime numbers up to a given number
Answer:

```
n = input("Enter the number”)
 i = 2
 flag = 0
 while (i < n):
 if (n%i)==0:
 flag = 1
 print n,“is composite”
 break
 i = i+ 1
 if flag ==0 :
 print n,“is prime”
```

Question 45.
Write a program to convert decimal number to binary.
Answer:

```
i=1
 s=0
 dec = int ( raw_input(“Enter the decimal to be converted:”))
 while dec>0:
 rem=dec%2
 s=s + (i*rem)
 dec=dec/2
 i=i*10
 print “The binary of the given number is:”,s raw_input()
```

Question 46.
Write a program to find the sum of all digits of the given number.
Answer:

```
n = inputfEnter the number”)
 rev=0
 while (n>0):
 a=n%10
 sum = sum + a
```

```
 n=n/10
 print "Sum of digits=",sum
```

Question 47.
Write a program to find the reverse of a number.
Answer:

```
n = input("Enter the number")
 rev=0
 while (n>0):
 a=n%10
 rev=(rev*10)+a
 n=n/10
 print "Reversed number=",rev
```

Question 48.
Write a program to input username and password and to check whether the given username and password are correct or not.
Answer:

```
import string
 usemame= raw_input("Enter username")
 password = raw_input("Enter password")
 if cmp(username.strip(),"XXX")== 0:
 if cmp(password,"123") == 0:
 print "Login successful"
 else:
 print "Password Incorrect"
 else:
 print "Username Incorrect"
```

Question 49.
Which string method is used to implement the following: [CBSE Text Book]

1. To count the number of characters in the string.
2. To change the first character of the string in capital letter.
3. To check whether given character is letter or a number.
4. To change lowercase to uppercase letter.
5. Change one character into another character.

Answer:

1. len(str)
2. str.title() or str.capitalize()
3. str.isalpha and str.isdigit()
4. lower(str[i])
5. str.replace(char, newchar)

Question 50.
Write a program to input n numbers and to search any number from the list.
Answer:

```
n=input("Enter no. of values")
 num=[]
 flag=0
```

```
for i in range (n):
number=input(“Enter the number”)
num. append(number)
search = input(“Enter number to be searched")
for i in range(n):
if num[i]==search:
print search,“found at position”,i
flag=1
if flag==0:
print search, “not found in list”
```

THE LAST LESSON

- Alphonse Daudet

NOTES

1. Franz's fears while going to school

a. Late for school

b. Dreaded a scolding

c. Had not learnt his lesson on participles

d. Thought of running away and spending the day out side because:

a1. The day was warm and bright with birds chirping

a2. He was tempted to watch the prussian soldiers drilling

d. Overcametemptations and hurried to school

2. Scene at the town hall

a. A crowd in front of the bulletin board

b. It was source of all bad news

c. Franz worried what the matter could be

d. astounded by the blacksmiths remark that there was plenty of time to reach School

3. Usual scene at school

a. Begin with a great bustle

b. Noise of opening and closing of desks

c. Lessons repeated loudly in unison

d. Teachers ruler striking against the table

4. Changed scenario that day

a. everything very still and as quite as Sunday morning

b. All classmates already in their places

c. M. Hamel pacing up and down with the ruler under his arm

d. Franz frightened to enter

5. The classroom surprises Franz

a. M. Hamel unexpectantly kind

b. had put on his beautiful green coat, frilled shirt and an embroidered black silk cap which he normally wore only on inspection and prize days

c. Whole School wore a strange and serious look

d. Backbenchers strangely occupied by the village people

6. M. Hamel's startling revelation

a. M. Hamel demanded full attention and announced that it was their last lesson in French

b. had received orders from Berlin to teach only German in schools of Alsace and Lorraine

c. New teacher to join the next day

7. A grim realisation dawns on the narrator

a. Realised that he had so much more yet to learn

b. Felt sorry for whiling away his time and skipping his lessons

c. now did not want to part with his books of grammar and history. Which he had earlier considered a nuisance

d. Deeply pained at the thought of M. Hamel going away

e. Forgot all about the teachers ruler and his cranky nature

f. realised that M. Hamel had worn his fine Sunday clothes in honour of the last lesson

8. A tribute by the villagers

a. Villages gathered in the classroom:

a1. As a sign of repentance for not having gone to school more often

a2. To thank their master for his meritorious service of 40 years

a3. As a mark of respect for the country which was no longer theirs

9. Narrater's failure and the teachers response

a. Franz asked to recite the rule for participle

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c. Feels guilty on getting everything mixed up

d. M. Hamel doesn't scold Franz

e. Comments upon Man's nature of postponing things thinking there's plenty of time

f. makes the audience realise the irony being Frenchman but not being able to speak or write their own language

10. Lack of learning: Hamel's view

a. Parents ignorant : not anxious to have their children learn

b. Children prefer to be put on the work on farms or mills

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11. M. Hamel teaches his last lesson

a. Eulogises French language

b. Call it the most beautiful Lang in the world

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g. Gives new copies to the students with 'France Alsace' written in beautiful writing

12. Students exhibit rare attention

a. Everyone set to work very quietly

b. There is a pin drop silence

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13. Franz recalls M. Hamels dedicated service

a. Hamel had served the school for 40 years

b. Nothing has changed: the garden outside window and his class in front of him

c. the walnut trees grown taller and the hopvine planted by him about the windows to the roof

14. M. Hamel keeps his courage

a. Hears every lesson to the last

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c. Everyone is roused to emotion when the lesson draws to it close

d. Tears rolled down their eyes

15. M. Hamel rouses the spirit of patriotism

a. as the church clock strikes 12, trumpets of the Prussians soldiers sound under the windows

b. Overwhelmed with emotions M. Hamel written 'VIVE LA FRANCE' on the black board

c. Dismisses School by making a gesture with the hand.

Question Paper Format

(2019-2020)

Class XII

ENGLISH

Time - 3 HRS

MARKS - 80

SECTION - A (READING)

Q.1 Comprehension passage (Prose OR Poem) 5 MCQ and 7 Short Answer Questions. 12 marks

Q.2 a-Comprehension passage (Note Making) (400-500 words). 04marks

b-Summary 04 marks

SECTION - B (WRITING)-30 marks

Q.3 Notice/Advertisements/Poster/Invitations (Formal/Informal) and replies (50 words)-4 marks

Q.4 Letter writing-06 marks

Q.5 Article/Report (180-200 words)-10 marks

Q.6 Speech/Debate (180-200 words)-10 marks

SECTION -C

(LITERATURE)-30 marks

Q.7 Two extract (One Poem and One From Prose) - 4+4=08 marks

Q.8 Five out of seven short answer type questions (above 40 words each) - 5×2=10 marks

Q.9 One out of two long answer type questions from flamingo (120-150 words)- 06 marks

Q.10 One out of two long answer type question from Vistas (120-150 words) - 06 marks

Q.11 ASL - Assessment of Speaking and Listening Skills - 20 marks

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CBSE Class 12 English Core
Revisoin Notes
Flamigo Poem-2
An Elementary School Classroom in a Slum

In this poem the poet focuses on the theme of social injustice and inequalities. He presents the pathetic and miserable picture of the elementary classroom in a slum. These children have pale and lifeless faces and some are even diseased.They are like rootless weeds which are uncared and unwanted with their disorderly hair torn around their faces.

They are depressed and oppressed with the burdens of life and keep their heads down. They have stunted growth. One of the girls is apparently burdened with the miseries of poverty. One of the boys has inherited his father's disease and has stunted growth. Another student is sitting unnoticed and he is yearning to play outdoors. A sweet young boy is sitting at the back of the dim classroom. He is dreaming of a squirrel's game in the trees and probably other interesting things.

The walls are dirty and creamy and on them are hung the donations given to the school in the form of pictures, paintings, Shakespeare's portrait and maps which are meaningless for the children. They exhibit the world of the elite and the privileged while the children in the slum have a future that is sealed and confined to the slum. Their future is dark and limited. The donations on the walls only add to the frustration of the children. They are tempted to attain what would be unattainable for them. The children studying in these schools do not have the means to go and explore the world. For them what they see through their classroom windows, the narrow street and the lead sky is the world.

Shakespeare is wicked for them as he has written only about the rich, beautiful world tempting them to steal.

The map is of no interest to them because it does not reflect the world they live in-cramped and dark lanes. Their lives start in darkness and ends in utter darkness. They are undernourished and their poverty has distorted their vision as they spend their whole time in foggy slums. The poet feels that the map which shows beautiful and exotic places should be replaced with slums as it is not the world they live in.

Unless the governor inspector and visitor play a vital role in bringing about a change, their lives will remain in dark. The slum children will be able to peep through the window only when the gap between the two worlds is bridged.

They should break the barriers till they come out of the dirty surroundings and their world should be extended into the green fields, golden sands and bright world. They should have the freedom of expression and their outlook be broadened. Thus, the children in the slum can progress only if they are given good education and the freedom to move into a world of opportunities and progress. The poet also states that history is made only by those people who have the power of knowledge. Hence, educating and letting the children into a free world of opportunities would release them from the suffocating, wretched life in a slum.

- In this poem the poet focuses on the theme of social injustice and inequalities.
- He presents the pathetic and miserable picture of the elementary classroom in a slum.
- These children have pale and lifeless faces.
- They are like rootless weeds which are uncared and unwanted with their disorderly hair torn around their faces.
- They are depressed and oppressed with the burdens of life and keep their heads down. They have stunted growth.
- They inherit the diseases of their father.
- Some of them do have dreams. A sweet young boy is sitting at the back of the dim classroom. He is dreaming of a squirrel‟s game in the trees and probably other interesting things.
- The walls are dirty and creamy and on them are hung the donations given by the rich and also Shakespeare‟s portrait.
- A civilized dome found in the cities and Tyrolese valleys with beautiful flowers are also put up.
- The map on the wall shows the children, the beautiful world outside; but for these children of the slum it is meaningless.
- The children studying in these schools do not have the means to go and explore the world. For them what they see through their classroom windows, the narrow street and the lead sky is the world.
- Shakespeare is wicked for them as he has written only about the rich, beautiful world tempting them to steal.62

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- between the two worlds is bridged.
- They should break the barriers till they come out of the dirty surroundings and their world should be extended into the green fields, golden sands and bright world.
- They should have the freedom of expression and their outlook be broadened.
- For, only the educated and learned people can create history whose language has strength and power.

Similes:

Like rootless weeds: the coarse, untidy and unkempt hair of the slum children is similarised to rootless weeds to bring forth the idea that the children were malnourished.

Like bottle bits on stones: the shining mended glasses of the spectacles is contrasted against the dark complexion of the malnourished slum children. The mental framed, broken glasses of the spectacles of the slum children is similarised to the shining bottle bits on stones.
The slum children settled on the waste heap is similarised to the splinters and pieces of broken bottle/glass against stones.
Like the broken glasses of the spectacles, the hopes , aspirations , ambitions lives of these slum children are completely shattered.

Like catacombs: The slum children are living in dark and dingy rooms which are similarised to catacombs in subterranean cemetery. The windows of these rooms look like the lids of catacombs. The future of the slum children is shut for ever like the dead bodies in the catacombs.

Slum as bid as doom: slum is similarised to hell of death. Living in slum is worse than death, rather it is a living hell.

Metaphors:

Rat's eyes: suggests the boy's curious, anxious and insecure nature. Like a rat always insecure, on the move, searching for food and safety, this small boy too shares the same condition.

Father's gnarled disease: the boy's father is handicapped with a crooked body. The boy has inherited his father's disease and the malnourished body of the paper seeming boy is no better than the crooked, disease-stricken body of his father.

Squirrel's game: Like the squirrel enjoys his freedom playing feely everywhere in nature, the boy also wants to play and enjoy his life with his endless curiosity. But he Is forced to be in the dark,dull and dreary classroom of the slum school.

Tree room: The hiding place of squirrel with great, comfort , security , curiosity and fun is contrasted with the gloomy and dull class room of the little boy.

Future painted with fog: Just as fog blocks, blurs or ruins vision, the slum children's future is vague and blurred with hopelessness, frustrations and lack of empathy and upliftment.

Lead sky: The normal bright and blue sky is described as lead sky, suggesting the dark and dull sky just as the base metal lead is . There is no blue and bright sky of life and future for the slum children.

Spectacles of steel: The poverty-stricken, skinny and skeletal bodies of the slum children look like wiry framework of steel just like that of a pair of spectacles. The expression also suggest the view of mass of students, visually impaired wearing low-cost and unhealthy spectacles with metal frames. These poor children are deprived of everything due to the callous attitude of the government officials.

THE AARYANS
SUB- ENTREPRENEURSHIP
CH-2 Entrepreneurial Planning

1. Entrepreneurial activities are of three major categories: Manufacturing, trading and service providing.
2. Business is 'A state of being busy or occupied'.
3. Activities undertaken to earn monetary benefits are called economic activities.
4. Activities done out of love and affection and not to earn monetary benefits are called non¬economic activities.
5. There are three main forms of enterprises: Public Sector, Private Sector, Joint Sector,etc.
6. Partnership: Two heads being better than one.
7. The Business Plan is a comprehensively written down document prepared by the entrepreneurship.
8. Business plane is sub-plans from diverse avenues of business, related to:
— Marketing — Finance
— Operations — Human — Legal
9. Business plan is prepared by an entrepreneur with the assistance of experts & professionals from diversified fields.
10. Four C's of credit are: Character, Cash Flow, Collateral and Contribution (equity)
11. Depending upon the entrepreneurs experience, knowledge and purpose, following are the basic components/parts of a Business Plan.
— Executive summary — Industrial analysis
— Description of venture — Production plan
— Operation plan — Organisational plan
— Financial plan — Marketing plan
— Manpower plan
12. Executive summary highlights in a concrete and convincing manner, the key provisions in the Business Plan, yet stimulating the potential investors that the entire plan is worth reading.
13. Objective of production plan is to plan the work in a manner that each step to be taken in the right place, right degree, right time and efficiently.
14. Operations plan is the soul of business plan.
15. Organizational plan is that part of business plan which describes to proposed venture's form of ownership.
16. Financial plan is a projection of the financial data about the potential investment commitment needed for the new venture and economic feasibility of the enterprise.
17. In order to build up loyal, efficient and dedicated personal, entrepreneurs needs to pay adequate and proper attention to human resource planning.
18. Marketing plan is a guideline regarding the marketing objectives, strategies and activities to be followed by any enterprise.
19. Formalities for starting a business:

— Obtain PAN Number from Income Tax Department — Open a Current Account
— Register a Limited Liability Partnership (LLP)
— Register Your Company (Pvt. Ltd/Public Limited Company)
— Register For Service Tax — Register for VAT/Sales Tax — Excise Duty (Check Applicability)
— Shop & Establishment Act — Customs Duty
— File Entrepreneurship Memorandum at DIC (Optional)
— Apply for TAN
— Find State Specific Guidelines & Procedures
— Permissions Required at the Construction Stage Employee's Provident Fund — Employees State Insurance (ESI) Scheme

IMPORTANT :

1. Business: Business is 'a state of being busy or occupied'.
2. Economic activities: Activities undertaken to earn monetary benefits are called economic activities.
3. Non-economic activities: Activities done out of love and affection and not to earn monetary benefits are called non-economic activities.
4. Organisational Plan: Organizational plan is that part of business plan that describes to proposed venture's form of ownership.
5. Financial Plan: Financial plan is a projection of the financial data about the potential investment.
6. Marketing plan: Marketing plan is a guideline regarding the marketing objectives, strategies & activities to be followed by any enterprise.
7. Proforma income statement: Proforma income statement is a projected net profit calculated from estimated revenue minus projected costs and expense.
8. Break even analysis: The Break even analysis is a process of determining a point where firm neither makes profit nor a loss.
9. Target market: Target market refers to the specific group of potential customers whose needs the enterprise aims to fulfil.
10. TAN: TAN or Tax Deduction and Collection Account Number is a 10 digit alpha numeric number required to be obtained by all persons who are responsible for deducting or collecting tax.
11. Elevator pitch: Elevator pitch is a three minute summary of the business plan's executive summary.
12. Production Plan: Production plan is the planning of industrial operations involves four considerations, namely, what work shall be done, how the work shall be done and lastly, when and by whom the work shall be done.
13. PAN: Permanent Account Number (PAN) is a ten-digit alphanumeric number, issued by the Income Tax Department.

The AARYANS

SUB-ENTREPRENEURSHIP
CLASS- XII
CH-1 Entrepreneurial Opportunity

Meaning of Business Opportunity: Business opportunity can be described as an economic idea which can be implemented to create a business enterprise and earn profits.

Elements of Business opportunity:

– Assured market scope,
– An attractive and acceptable rate of return on investment,
– Practicability of the entrepreneur to encash it,
– Competence of the entrepreneur to encash it,
– Potential of future growth.

2. Exploring opportunities in the environment

– Opportunity spotting by analyzing the needs and problems that exist in the environment,
– Evaluating the ideas received from different sources to find a creative solution,
– Identifying a product or service through innovation.

3. Factors involved in securing opportunities

– Ability to perceive and preserve basic ideas which could be used commercially,
– Ability to harness different sources of information,
– Vision and creativity.

Various sources which lead to the basic ideas

• Problem • Change • Inventions • Competition • Innovation Importance of environment
– Identification of opportunities to get first move advantage
– Formulation of strategies and policies
– Tapping useful resources
– Better performance
– Sensitization of entrepreneurs to cope up with rapid changes
– Image building.

Analysis of environment

– Verbal information from customers, wholesalers, retailers, distribution consultants, etc.
– Record of companies,
– Government publications,
– Publications by various financial institutions,
– Formal studies conducted by strategic planners.

4. Environmental Factors

– Internal Factors (Micro environment),
– External Factors (Macro environment).

PESTEL Model

• Political • Economic • Social • Technological • Ecological • Legal

Idea Generation: The process of creating, developing and communicating ideas which are abstract, concrete or visual.

Sources of business ideas

– Examine your own skill set for business ideas,
– Keep up with current events and be ready to take advantage of business opportunities, — Invent a new product or service,
– Add value to an existing product,
– Investigate other markets,
– Improve an existing product or service,
– Get on the band wagon.

Ideas fields

• Natural resources • Existing products • Market driven ideas • Funds related ideas • Service sector ideas • Creative effort of the entrepreneur Steps involved in idea and opportunity assessment:
– Product identification,
– Application and use,
– Level of operation,
– Cost,
– Competition,
– Technical complexity,
– Annual turnover and profit margin.

Factors to be kept in mind while assessing the market

• Demand • Supply and nature of competition • Cost and price of product • Project innovation and change

Ways to spot trends

• Read trends • Talk trends • Watch trends • Think trends

Creative process

• Idea germination • Preparation • Incubation • Illumination • Verification Innovation process
– Analytical planning,
– Organising resources,
– Implementation,
— Commercial application.

Words That Matter

1. Entrepreneur is one who always searches for an opportunity.
2. Cost advantage: Some entrepreneurs reduce the price using resources and capabilities to achieve either a lower cost like cheaper inputs, efficient processes, favourable location, skilled workforce, superior technology and waste reduction.
3. Resources: Anything that helps in the raising of goods and services.
4. Types of resources: Materials, technological, human or capital resources.
5. Business opportunity: Any economic idea which can be implemented to create a business enterprise and earn profits.
6. Scan literally means ‘to examine closely’.
7. Sensing entrepreneurial opportunities is a process of converting an idea into an opportunity and then into an enterprise.
8. Sources of information like magazines, journals, books, seminars, trade shows, family members, customers, friends, etc.
9. Creativity is defined as “the ability to bring something new into existence”.
10. Innovation refers to the process of doing new things.

11. Environment scanning: Careful monitoring of an organization's internal and external environment.
12. The PESTEL Model—Political, Economic, Social, Technological, Ecological, Legal Competencies: Entrepreneurial competencies are the skills and ability necessary for an entrepreneur to venture into an enterprise organize, and manage an enterprise ably and competently realize the goal for which the enterprise is established.
13. Strategic Thinking: The entrepreneur understands and values the planning process, thinking and planning over a significant timescale; recognises external trends and opportunities; and is able to think through any complex implications for the business.
14. A problem is a roadblock in a situation.
15. Idea Fields means 'Convenient frames of reference for streamlining the process of generation of ideas.'
16. Market research is any organized effort to gather information about target markets or customers.
17. Target markets: Trade in simple terms is buying goods and services and selling them to consumers at a profit.
Annual turnover: Total sales of a year.
Profit margin: It indicates the market share of the product or service.
SWOT: Strengths, Weaknesses, Opportunities and Threats.
Illumination: The idea re-surfaces in realistic way and viable plan is converted to give practical knowledge.
Stakeholders: A person, group or organization that has interest or concern in an organization's investors, employees, customers and suppliers.
18. Trader: A person who is engaged in buying and selling of goods.
19. Business environment: Implies aggregate of all forces, factors and institutions, which are external to and beyond the control of business organizations and their management, size of the market, banking and credit facilities, transport and communication systems, Niche Blogging is the act of creating a blog with the intent of using it to market to a particular niche market.
Niche marketing is a marketing strategy, which can be intelligently used by a small entrepreneur. He can try and identify his own USP (Own Selling Proposition), which can be targeted towards some very specific market segments called a niche.
By providing personal service, convenience and value to the customers.
20. Consumerism: It involves protecting and informing consumers or an obsession with buying material goods or items.

CHAPTER – 2: INVERSE TRIGONOMETRIC FUNCTIONS

MARKS WEIGHTAGE – 03 marks

QUICK REVISION (Important Concepts & Formulae)

Inverse Trigonometrical Functions

A function $f : A \to B$ is invertible if it is a bijection. The inverse of f is denoted by f^{-1} and is defined as $f^{-1}(y) = x \Leftrightarrow f(x) = y$.

- Clearly, domain of f^{-1} = range of f and range of f^{-1} = domain of f.
- The inverse of sine function is defined as $\sin^{-1}x = \theta \Leftrightarrow \sin\theta = x$, where $\theta \in [-\pi/2, \pi/2]$ and $x \in [-1, 1]$.
- Thus, $\sin^{-1} x$ has infinitely many values for given $x \in [-1, 1]$
- There is one value among these values which lies in the interval $[-\pi/2, \pi/2]$. This value is called the principal value.

Domain and Range of Inverse Trigonometrical Functions

Function	Domain	Range
$\sin^{-1}x$	$[-1, 1]$	$[-\pi/2, \pi/2]$
$\cos^{-1}x$	$[-1, 1]$	$[0, \pi]$
$\tan^{-1}x$	$(-\infty, \infty)$	$(-\pi/2, \pi/2)$
$\cot^{-1}x$	$(-\infty, \infty)$	$(0, \pi)$
$\sec^{-1}x$	$(-\infty, -1] \cup [1, \infty)$	$[0, \pi/2) \cup (\pi/2, \pi]$
$\operatorname{cosec}^{-1}x$	$(-\infty, -1] \cup [1, \infty)$	$[-\pi/2, 0) \cup (0, \pi/2]$

Properties of Inverse Trigonometrical Functions

- $\sin^{-1}(\sin\theta) = \theta$ and $\sin(\sin^{-1}x) = x$, provided that $-1 \le x \le 1$ and $-\frac{\pi}{2} \le \theta \le \frac{\pi}{2}$
- $\cos^{-1}(\cos\theta) = \theta$ and $\cos(\cos^{-1}x) = x$, provided that $-1 \le x \le 1$ and $0 \le \theta \le \pi$
- $\tan^{-1}(\tan\theta) = \theta$ and $\tan(\tan^{-1}x) = x$, provided that $-\infty \le x \le \infty$ and $-\frac{\pi}{2} \le \theta \le \frac{\pi}{2}$
- $\cot^{-1}(\cot\theta) = \theta$ and $\cot(\cot^{-1}x) = x$, provided that $-\infty < x < \infty$ and $0 < \theta < \pi$.
- $\sec^{-1}(\sec\theta) = \theta$ and $\sec(\sec^{-1}x) = x$
- $\operatorname{cosec}^{-1}(\operatorname{cosec}\theta) = \theta$ and $\operatorname{cosec}(\operatorname{cosec}^{-1}x) = x$,
- $\sin^{-1}x = \operatorname{cosec}^{-1}\frac{1}{x}$ *or* $\operatorname{cosec}^{-1}x = \sin^{-1}\frac{1}{x}$

- $\cos^{-1}x = \sec^{-1}\frac{1}{x} \quad or \quad \sec^{-1}x = \cos^{-1}\frac{1}{x}$
- $\tan^{-1}x = \cot^{-1}\frac{1}{x} \quad or \quad \cot^{-1}x = \tan^{-1}\frac{1}{x}$
- $\sin^{-1}x = \cos^{-1}\sqrt{1-x^2} = \tan^{-1}\frac{x}{\sqrt{1-x^2}} = \cot^{-1}\frac{\sqrt{1-x^2}}{x} = \sec^{-1}\frac{1}{\sqrt{1-x^2}} = \cos ec^{-1}\frac{1}{x}$
- $\cos^{-1}x = \sin^{-1}\sqrt{1-x^2} = \tan^{-1}\frac{\sqrt{1-x^2}}{x} = \cot^{-1}\frac{x}{\sqrt{1-x^2}} = \cos ec^{-1}\frac{1}{\sqrt{1-x^2}} = \sec^{-1}\frac{1}{x}$
- $\tan^{-1}x = \sin^{-1}\frac{x}{\sqrt{1+x^2}} = \cos^{-1}\frac{1}{\sqrt{1+x^2}} = \cot^{-1}\frac{1}{x} = \sec^{-1}\sqrt{1+x^2} = \cos ec^{-1}\frac{\sqrt{1+x^2}}{x}$
- $\sin^{-1}x + \cos^{-1}x = \frac{\pi}{2}, where -1 \le x \le 1$
- $\tan^{-1}x + \cot^{-1}x = \frac{\pi}{2}, where -\infty \le x \le \infty$
- $\sec^{-1}x + \cos ec^{-1}x = \frac{\pi}{2}, where \quad x \le -1 \quad or \quad x \ge 1$
- $\tan^{-1}x + \tan^{-1}y = \tan^{-1}\left(\frac{x+y}{1-xy}\right), if \quad xy < 1$
- $\tan^{-1}x + \tan^{-1}y = \pi + \tan^{-1}\left(\frac{x+y}{1-xy}\right), if \quad xy > 1$
- $\tan^{-1}x - \tan^{-1}y = \tan^{-1}\left(\frac{x-y}{1+xy}\right)$
- $\sin^{-1}x + \sin^{-1}y = \sin^{-1}\left(x\sqrt{1-y^2} + y\sqrt{1-x^2}\right), if \quad x, y \ge 0, x^2 + y^2 \le 1$
- $\sin^{-1}x - \sin^{-1}y = \sin^{-1}\left(x\sqrt{1-y^2} - y\sqrt{1-x^2}\right), if \quad x, y \ge 0, x^2 + y^2 \le 1$
- $\sin^{-1}x + \sin^{-1}y = \pi - \sin^{-1}\left(x\sqrt{1-y^2} + y\sqrt{1-x^2}\right), if \quad x, y \ge 0, x^2 + y^2 > 1$
- $\sin^{-1}x - \sin^{-1}y = \pi - \sin^{-1}\left(x\sqrt{1-y^2} - y\sqrt{1-x^2}\right), if \quad x, y \ge 0, x^2 + y^2 > 1$
- $\cos^{-1}x + \cos^{-1}y = \cos^{-1}\left(xy - \sqrt{1-x^2}\sqrt{1-y^2}\right), if \quad x, y \ge 0, x^2 + y^2 \le 1$

- $\cos^{-1}x-\cos^{-1}y=\cos^{-1}\left(xy+\sqrt{1-x^2}\sqrt{1-y^2}\right), if \quad x,y\geq 0, x^2+y^2\leq 1$
- $\cos^{-1}x+\cos^{-1}y=\pi-\cos^{-1}\left(xy-\sqrt{1-x^2}\sqrt{1-y^2}\right), if \quad x,y\geq 0, x^2+y^2>1$
- $\cos^{-1}x-\cos^{-1}y=\pi-\cos^{-1}\left(xy+\sqrt{1-x^2}\sqrt{1-y^2}\right), if \quad x,y\geq 0, x^2+y^2>1$
- $\sin^{-1}(-x)=-\sin^{-1}x, \quad \cos^{-1}(-x)=\pi-\cos^{-1}x$
- $\tan^{-1}(-x)=-\tan^{-1}x, \quad \cot^{-1}(-x)=\pi-\cot^{-1}x$
- $2\sin^{-1}x=\sin^{-1}\left(2x\sqrt{1-x^2}\right), \qquad 2\cos^{-1}x=\cos^{-1}\left(2x^2-1\right)$
- $2\tan^{-1}x=\tan^{-1}\left(\frac{2x}{1-x^2}\right)=\sin^{-1}\left(\frac{2x}{1+x^2}\right)=\cos^{-1}\left(\frac{1-x^2}{1+x^2}\right)$
- $3\sin^{-1}x=\sin^{-1}\left(3x-4x^3\right), \quad 3\cos^{-1}x=\cos^{-1}\left(4x^3-3x\right)$
- $3\tan^{-1}x=\tan^{-1}\left(\frac{3x-x^3}{1-3x^2}\right)$

NCERT Important Questions & Answers

1. Find the values of $\tan^{-1}(1)+\cos^{-1}\left(-\frac{1}{2}\right)+\sin^{-1}\left(-\frac{1}{2}\right)$

Ans:

Let $\tan^{-1}(1)=x\Rightarrow\tan x=1=\tan\frac{\pi}{4}\Rightarrow x=\frac{\pi}{4}$ *where* $x\in\left[-\frac{\pi}{2},\frac{\pi}{2}\right]$

$\therefore\tan^{-1}(1)=\frac{\pi}{4}$

Let $\cos^{-1}\left(-\frac{1}{2}\right)=y\Rightarrow\cos y=-\frac{1}{2}=-\cos\frac{\pi}{3}=\cos\left(\pi-\frac{\pi}{3}\right)=\cos\frac{2\pi}{3}\quad(\because\cos(\pi-\theta)=-\cos\theta)$

$\Rightarrow y=\frac{2\pi}{3}$ *where* $y\in[0,\pi]$

Let $\sin^{-1}\left(\frac{1}{2}\right)=z\Rightarrow\sin z=\frac{1}{2}=\sin\frac{\pi}{6}=\sin\left(\frac{\pi}{6}\right)\Rightarrow z=\frac{\pi}{6}$ *where* $z\in\left[\frac{\pi}{2},\frac{\pi}{2}\right]$

$\therefore\sin^{-1}\left(-\frac{1}{2}\right)=-\frac{\pi}{6}$

$\therefore\tan^{-1}(1)+\cos^{-1}\left(-\frac{1}{2}\right)+\sin^{-1}\left(-\frac{1}{2}\right)=x+y+z=\frac{\pi}{4}+\frac{2\pi}{3}-\frac{\pi}{6}$

$$=\frac{3\pi+8\pi-2\pi}{12}=\frac{9\pi}{12}=\frac{3\pi}{4}$$

2. Prove that $3\sin^{-1}x=\sin^{-1}(3x-4x^3),x\in\left(-\frac{1}{2},\frac{1}{2}\right)$

Ans:

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

We know that $\sin3\theta=3\sin\theta-4\sin^3\theta$

$\therefore3\theta=\sin^{-1}(3\sin\theta-4\sin^3\theta)=\sin^{-1}(3x-4x^3)$

$\Rightarrow3\sin^{-1}x=\sin^{-1}(3x-4x^3)$

3. Prove that $\tan^{-1}\frac{2}{11}+\tan^{-1}\frac{7}{24}=\tan^{-1}\frac{1}{2}$

Ans:

Given $\tan^{-1}\frac{2}{11}+\tan^{-1}\frac{7}{24}=\tan^{-1}\frac{1}{2}$

$LHS=\tan^{-1}\frac{2}{11}+\tan^{-1}\frac{7}{24}=\tan^{-1}\left(\frac{\frac{2}{11}+\frac{7}{24}}{1-\frac{2}{11}\cdot\frac{7}{24}}\right)\qquad\left(\because\tan^{-1}x+\tan^{-1}y=\tan^{-1}\left(\frac{x+y}{1-x.y}\right)\right)$

$$=\tan^{-1}\left(\frac{\frac{48+77}{264}}{1-\frac{14}{264}}\right)=\tan^{-1}\left(\frac{\frac{125}{264}}{\frac{264-14}{264}}\right)=\tan^{-1}\left(\frac{\frac{125}{264}}{\frac{250}{264}}\right)=\tan^{-1}\frac{125}{250}=\tan^{-1}\frac{1}{2}=RHS$$

4. Prove that $2\tan^{-1}\frac{1}{2}+\tan^{-1}\frac{1}{7}=\tan^{-1}\frac{31}{17}$

Ans:

Given $2\tan^{-1}\frac{1}{2}+\tan^{-1}\frac{1}{7}=\tan^{-1}\frac{31}{17}$

$$LHS=2\tan^{-1}\frac{1}{2}+\tan^{-1}\frac{1}{7}=\tan^{-1}\left(\frac{2\times\frac{1}{2}}{1-\left(\frac{1}{2}\right)^2}\right)+\tan^{-1}\frac{1}{7} \qquad \left(\because 2\tan^{-1}x=\tan^{-1}\left(\frac{2x}{1-x^2}\right)\right)$$

$$=\tan^{-1}\frac{1}{1-\frac{1}{4}}+\tan^{-1}\frac{1}{7}=\tan^{-1}\frac{4}{3}+\tan^{-1}\frac{1}{7}$$

$$=\tan^{-1}\left(\frac{\frac{4}{3}+\frac{1}{7}}{1-\frac{4}{3}.\frac{1}{7}}\right) \qquad \left(\because \tan^{-1}x+\tan^{-1}y=\tan^{-1}\left(\frac{x+y}{1-x.y}\right)\right)$$

$$=\tan^{-1}\left(\frac{\frac{28+3}{21}}{1-\frac{4}{21}}\right)=\tan^{-1}\left(\frac{\frac{31}{21}}{\frac{17}{21}}\right)=\tan^{-1}\frac{31}{17}=RHS$$

5. Simplify : $\tan^{-1}\frac{\sqrt{1+x^2}-1}{x}, x\neq 0$

Ans:

Let $x = \tan\theta$, then $\theta = \tan^{-1}x$ ..... (i)

$$\tan^{-1}\frac{\sqrt{1+x^2}-1}{2}=\tan^{-1}\frac{\sqrt{1+\tan^2\theta}-1}{\tan\theta}=\tan^{-1}\frac{\sqrt{\sec^2\theta}-1}{\tan\theta}$$

$$=\tan^{-1}\frac{\sec\theta-1}{\tan\theta}=\tan^{-1}\left(\frac{\frac{1}{\cos\theta}-1}{\frac{\sin\theta}{\cos\theta}}\right)=\tan^{-1}\left(\frac{\frac{1-\cos\theta}{\cos\theta}}{\frac{\sin\theta}{\cos\theta}}\right)$$

$$=\tan^{-1}\left(\frac{1-\cos\theta}{\sin\theta}\right)=\tan^{-1}\left(\frac{2\sin^2\frac{\theta}{2}}{2\sin\frac{\theta}{2}\cos\frac{\theta}{2}}\right) \qquad \left[\because 1-\cos\theta=2\sin^2\frac{\theta}{2} \;\; and \;\; \sin\theta=2\sin\frac{\theta}{2}\cos\frac{\theta}{2}\right]$$

$$=\tan^{-1}\left(\frac{\sin\frac{\theta}{2}}{\cos\frac{\theta}{2}}\right)=\tan^{-1}\tan\frac{\theta}{2}=\frac{\theta}{2}=\frac{1}{2}\tan^{-1}x \quad [\text{using (i)}]$$

6. Simplify : $\tan^{-1}\frac{1}{\sqrt{x^2-1}}, |x|>1$

Ans:

Let $x = \sec\theta$, then $\theta = \sec^{-1}x$ ..... (i)

$$\tan^{-1}\frac{1}{\sqrt{x^2-1}}=\tan^{-1}\frac{1}{\sqrt{\sec^2\theta-1}}=\tan^{-1}\frac{1}{\sqrt{\tan^2\theta}}$$

$$=\tan^{-1}\frac{1}{\tan\theta}=\tan^{-1}(\cot\theta)=\tan^{-1}\left(\tan\left(\frac{\pi}{2}-\theta\right)\right)\left(\because \tan\left(\frac{\pi}{2}-\theta\right)=\cot\theta\right)$$

$$= \frac{\pi}{2} - \theta = \frac{\pi}{2} - \sec^{-1} x \qquad \text{[using (i)]}$$

7. Simplify : $\tan^{-1}\left(\frac{\cos x - \sin x}{\cos x + \sin x}\right), 0 < x < \pi$

Ans:

$$\tan^{-1}\left(\frac{\cos x - \sin x}{\cos x + \sin x}\right) = \tan^{-1}\left(\frac{\frac{\cos x}{\cos x} - \frac{\sin x}{\cos x}}{\frac{\cos x}{\cos x} + \frac{\sin x}{\cos x}}\right)$$

(inside the bracket divide numerator and denominator by $\cos x$)

$$= \tan^{-1}\left(\frac{1-\tan x}{1+\tan x}\right) = \tan^{-1}\left(\tan\left(\frac{\pi}{4} - x\right)\right) \qquad \left(\because \tan\left(\frac{\pi}{4} - x\right) = \frac{1-\tan x}{1+\tan x}\right)$$

$$= \frac{\pi}{4} - x$$

8. Simplify : $\tan\frac{1}{2}\left[\sin^{-1}\frac{2x}{1+x^2} + \cos^{-1}\frac{1-y^2}{1+y^2}\right], |x| < 1, y > 0 \ \ and \ \ xy < 1$

Ans:

$$\tan\frac{1}{2}\left[\sin^{-1}\frac{2x}{1+x^2} + \cos^{-1}\frac{1-y^2}{1+y^2}\right], |x| < 1, y > 0 \ \ and \ \ xy < 1$$

$$\left[\because 2\tan^{-1} x = \sin^{-1}\frac{2x}{1+x^2} \ \ and \ \ 2\tan^{-1} y = \cos^{-1}\frac{1-y^2}{1+y^2}\right]$$

$$= \tan\frac{1}{2}\left[(2\tan^{-1} x + 2\tan^{-1} y)\right] = \tan\left[\frac{1}{2}.2(\tan^{-1} x + \tan^{-1} y)\right] = \tan(\tan^{-1} x + \tan^{-1} y)$$

$$= \tan\left(\tan^{-1}\left(\frac{x+y}{1-x.y}\right)\right) \qquad \left(\because \tan^{-1} x + \tan^{-1} y = \tan^{-1}\left(\frac{x+y}{1-x.y}\right)\right)$$

$$= \frac{x+y}{1-x.y}$$

9. If $\tan^{-1}\frac{x-1}{x-2} + \tan^{-1}\frac{x+1}{x+2} = \frac{\pi}{4}$**, find the value of x.**

Ans:

Given that $\tan^{-1}\frac{x-1}{x-2} + \tan^{-1}\frac{x+1}{x+2} = \frac{\pi}{4}$

$$\Rightarrow \tan^{-1}\left(\frac{\frac{x-1}{x-2} + \frac{x+1}{x+2}}{1 - \left(\frac{x-1}{x-2}\right)\left(\frac{x+1}{x+2}\right)}\right) = \frac{\pi}{4} \qquad \left(\because \tan^{-1} x + \tan^{-1} y = \tan^{-1}\left(\frac{x+y}{1-x.y}\right)\right)$$

$$\Rightarrow \tan^{-1}\left(\frac{\frac{(x-1)(x+2)+(x+1)(x-2)}{(x-2)(x+2)}}{1 - \left(\frac{x^2-1}{x^2-4}\right)}\right) = \frac{\pi}{4}$$

$$\Rightarrow \left(\frac{\frac{(x^2+2x-x-2)+(x^2-2x+x-2)}{x^2-4}}{\left(\frac{x^2-4-x^2+1}{x^2-4}\right)}\right) = \tan\frac{\pi}{4}$$

$$\Rightarrow\left(\frac{2x^2-4}{-3}\right)=1\Rightarrow\ 2x^2-4=-3\Rightarrow 2x^2=1\Rightarrow x^2=\frac{1}{2}$$

$$\Rightarrow x=\pm\frac{1}{\sqrt{2}}$$

10. Find the value of $\cos^{-1}\left(\cos\frac{7\pi}{6}\right)$.

Ans:

$$\cos^{-1}\left(\cos\frac{7\pi}{6}\right)=\cos^{-1}\left(\cos\left(2\pi-\frac{5\pi}{6}\right)\right)\ where,\frac{5\pi}{6}\in[0,\pi]$$

$$\therefore\cos^{-1}\left(\cos\frac{7\pi}{6}\right)=\cos^{-1}\left(\cos\left(\frac{5\pi}{6}\right)\right)=\frac{5\pi}{6}\quad\left(\because\cos(2\pi-\theta)=\cos\theta\right)$$

11. Prove that $\cos^{-1}\frac{12}{13}+\sin^{-1}\frac{3}{5}=\sin^{-1}\frac{56}{65}$

Ans:

Given $\cos^{-1}\frac{12}{13}+\sin^{-1}\frac{3}{5}=\sin^{-1}\frac{56}{65}$

Let $\cos^{-1}\frac{12}{13}=x\Rightarrow\cos x=\frac{12}{13}$

$$\therefore\sin x-\sqrt{1-\cos^2 x}-\sqrt{1-\left(\frac{12}{13}\right)^2}-\sqrt{\frac{25}{169}}-\frac{5}{13}$$

$$\Rightarrow x=\sin^{-1}\frac{5}{13}$$

$$LHS=\cos^{-1}\frac{12}{13}+\sin^{-1}\frac{3}{5}=\sin^{-1}\frac{5}{13}+\sin^{-1}\frac{3}{5}$$

$$=\sin^{-1}\left(\frac{5}{13}\sqrt{1-\left(\frac{3}{5}\right)^2}+\frac{3}{5}\sqrt{1-\left(\frac{5}{13}\right)^2}\right)\quad\left[\because\sin^{-1}x+\sin^{-1}y=\sin^{-1}\left(x\sqrt{1-y^2}+y\sqrt{1-x^2}\right)\right]$$

$$=\sin^{-1}\left(\frac{5}{13}\sqrt{\frac{16}{25}}+\frac{3}{5}\sqrt{\frac{144}{169}}\right)=\sin^{-1}\left(\frac{5}{13}\times\frac{4}{5}+\frac{3}{5}\times\frac{12}{13}\right)$$

$$=\sin^{-1}\left(\frac{20}{65}+\frac{36}{65}\right)=\sin^{-1}\frac{56}{65}=RHS$$

12. Prove that $\tan^{-1}\frac{63}{16}=\sin^{-1}\frac{5}{13}+\cos^{-1}\frac{3}{5}$

Ans:

$$RHS=\sin^{-1}\frac{5}{13}+\cos^{-1}\frac{3}{5}$$

$$Let\ \sin^{-1}\frac{5}{13}=x\Rightarrow\sin x=\frac{5}{13}$$

$$\therefore\cos x=\sqrt{1-\sin^2 x}=\sqrt{1-\left(\frac{5}{13}\right)^2}=\sqrt{\frac{144}{169}}=\frac{12}{13}$$

$$\Rightarrow\tan x=\frac{\sin x}{\cos x}=\frac{\frac{5}{13}}{\frac{12}{13}}=\frac{5}{12}\Rightarrow x=\tan^{-1}\frac{5}{12}$$

$$Let\ \cos^{-1}\frac{3}{5}=y\Rightarrow\cos y=\frac{3}{5}$$

$$\therefore\sin y=\sqrt{1-\cos^2 y}=\sqrt{1-\left(\frac{3}{5}\right)^2}=\sqrt{\frac{16}{25}}=\frac{4}{5}$$

$$\Rightarrow\tan y=\frac{\sin x}{\cos x}=\frac{\frac{4}{5}}{\frac{3}{5}}=\frac{4}{3}\Rightarrow y=\tan^{-1}\frac{4}{3}$$

then the equation becomes $\tan^{-1}\frac{63}{16}=x+y$

$$\Rightarrow\tan^{-1}\frac{63}{16}=\tan^{-1}\frac{5}{12}+\tan^{-1}\frac{4}{3}$$

$$RHS=\tan^{-1}\frac{5}{12}+\tan^{-1}\frac{4}{3}=\tan^{-1}\left(\frac{\frac{5}{12}+\frac{4}{3}}{1-\frac{5}{12}.\frac{4}{3}}\right)\qquad\left(\because\tan^{-1}x+\tan^{-1}y=\tan^{-1}\left(\frac{x+y}{1-x.y}\right)\right)$$

$$=\tan^{-1}\left(\frac{\frac{15+48}{36}}{1-\frac{20}{36}}\right)=\tan^{-1}\left(\frac{\frac{63}{36}}{\frac{16}{36}}\right)=\tan^{-1}\left(\frac{63}{16}\right)=LHS$$

13. Prove that $\tan^{-1}\frac{1}{5}+\tan^{-1}\frac{1}{7}+\tan^{-1}\frac{1}{3}+\tan^{-1}\frac{1}{8}=\frac{\pi}{4}$

Ans:

$$LHS=\left(\tan^{-1}\frac{1}{5}+\tan^{-1}\frac{1}{7}\right)+\left(\tan^{-1}\frac{1}{3}+\tan^{-1}\frac{1}{8}\right)$$

$$=\tan^{-1}\left(\frac{\frac{1}{5}+\frac{1}{7}}{1-\frac{1}{5}.\frac{1}{7}}\right)+\tan^{-1}\left(\frac{\frac{1}{3}+\frac{1}{8}}{1-\frac{1}{3}.\frac{1}{8}}\right)\qquad\left(\because\tan^{-1}x+\tan^{-1}y=\tan^{-1}\left(\frac{x+y}{1-x.y}\right)\right)$$

$$=\tan^{-1}\left(\frac{\frac{7+5}{35}}{1-\frac{1}{35}}\right)+\tan^{-1}\left(\frac{\frac{8+3}{24}}{1-\frac{1}{24}}\right)=\tan^{-1}\left(\frac{\frac{12}{35}}{\frac{30}{35}}\right)+\tan^{-1}\left(\frac{\frac{11}{24}}{\frac{23}{24}}\right)$$

$$=\tan^{-1}\left(\frac{12}{34}\right)+\tan^{-1}\left(\frac{11}{23}\right)=\tan^{-1}\left(\frac{6}{17}\right)+\tan^{-1}\left(\frac{11}{23}\right)$$

$$=\tan^{-1}\left(\frac{\frac{6}{17}+\frac{11}{23}}{1-\frac{6}{17}.\frac{11}{23}}\right)=\tan^{-1}\left(\frac{\frac{138+187}{391}}{1-\frac{66}{391}}\right)=\tan^{-1}\left(\frac{\frac{325}{391}}{\frac{325}{391}}\right)=\tan^{-1}(1)=\frac{\pi}{4}=RHS$$

14. Prove that $\cot^{-1}\left(\frac{\sqrt{1+\sin x}+\sqrt{1-\sin x}}{\sqrt{1+\sin x}-\sqrt{1-\sin x}}\right)=\frac{x}{2},x\in\left(0,\frac{\pi}{4}\right)$

Ans:

Given $\cot^{-1}\left(\frac{\sqrt{1+\sin x}+\sqrt{1-\sin x}}{\sqrt{1+\sin x}-\sqrt{1-\sin x}}\right)=\frac{x}{2},x\in\left(0,\frac{\pi}{4}\right)$

$$LHS=\cot^{-1}\left(\frac{\sqrt{1+\sin x}+\sqrt{1-\sin x}}{\sqrt{1+\sin x}-\sqrt{1-\sin x}}\right)$$

$$= \cot^{-1}\left(\frac{\sqrt{1+\sin x}+\sqrt{1-\sin x}}{\sqrt{1+\sin x}-\sqrt{1-\sin x}} \times \frac{\sqrt{1+\sin x}+\sqrt{1-\sin x}}{\sqrt{1+\sin x}+\sqrt{1-\sin x}}\right) \text{ (by rationalizing the denominator)}$$

$$= \cot^{-1}\left(\frac{\left(\sqrt{1+\sin x}+\sqrt{1-\sin x}\right)^2}{\left(\sqrt{1+\sin x}\right)^2-\left(\sqrt{1-\sin x}\right)^2}\right) = \cot^{-1}\left(\frac{1+\sin x+1-\sin x+2\sqrt{1-\sin^2 x}}{1+\sin x-1+\sin x}\right)$$

$$= \cot^{-1}\left(\frac{2+2\cos x}{\sin x}\right) = \cot^{-1}\left(\frac{2(1+\cos x)}{2\sin x}\right) = \cot^{-1}\left(\frac{1+\cos x}{\sin x}\right)$$

$$= \cot^{-1}\left(\frac{2\cos^2\frac{x}{2}}{2\sin\frac{x}{2}\cos\frac{x}{2}}\right) \quad \left(\because 1+\cos x = 2\cos^2\frac{x}{2} \text{ and } \sin x = 2\sin\frac{x}{2}\cos\frac{x}{2}\right)$$

$$= \cot^{-1}\left(\frac{\cos\frac{x}{2}}{\sin\frac{x}{2}}\right) == \cot^{-1}\left(\cot\frac{x}{2}\right) = \frac{x}{2} = RHS$$

15. Prove that $\tan^{-1}\left(\frac{\sqrt{1+x}-\sqrt{1-x}}{\sqrt{1+x}+\sqrt{1-x}}\right) = \frac{\pi}{4}-\frac{1}{2}\cos^{-1}x$

Ans:

Let $x = \cos y \Rightarrow y = \cos^{-1}x$

$$LHS = \tan^{-1}\left(\frac{\sqrt{1+\cos y}-\sqrt{1-\cos y}}{\sqrt{1+\cos y}+\sqrt{1-\cos y}}\right) = \tan^{-1}\left(\frac{2\cos\frac{y}{2}-2\sin\frac{y}{2}}{2\cos\frac{y}{2}+2\sin\frac{y}{2}}\right)$$

$$\left(\because 1+\cos y = 2\cos^2\frac{y}{2} \text{ and } 1-\cos y = 2\sin^2\frac{y}{2}\right)$$

$$= \tan^{-1}\left(\frac{\cos\frac{y}{2}-\sin\frac{y}{2}}{\cos\frac{y}{2}+\sin\frac{y}{2}}\right) = \tan^{-1}\left(\frac{1-\tan\frac{y}{2}}{1+\tan\frac{y}{2}}\right) = \tan^{-1}\tan\left(\frac{\pi}{4}-\frac{y}{2}\right) = \frac{\pi}{4}-\frac{1}{2}\cos^{-1}x$$

$$\left(\because \tan\left(\frac{\pi}{4}-x\right) = \frac{1-\tan x}{1+\tan x}\right)$$

16. Solve for x: $\tan^{-1}\frac{1-x}{1+x} = \frac{1}{2}\tan^{-1}x, (x>0)$

Ans:

Given $\tan^{-1}\frac{1-x}{1+x} = \frac{1}{2}\tan^{-1}x, (x>0)$

$$\Rightarrow 2\tan^{-1}\frac{1-x}{1+x} = \tan^{-1}x$$

$$\Rightarrow \tan^{-1}\left(\frac{2\left(\frac{1-x}{1+x}\right)}{1-\left(\frac{1-x}{1+x}\right)^2}\right) = \tan^{-1}x \quad \left[\because 2\tan^{-1}x = \tan^{-1}\left(\frac{2x}{1-x^2}\right)\right]$$

$$\Rightarrow \tan^{-1}\left(\frac{2\left(\frac{1-x}{1+x}\right)}{\frac{(1+x)^2-(1-x)^2}{(1+x)^2}}\right)=\tan^{-1}x$$

$$\Rightarrow \tan^{-1}\left(\frac{2(1-x)(1+x)}{(1+x)^2-(1-x)^2}\right)=\tan^{-1}x$$

$$\Rightarrow \tan^{-1}\left(\frac{2(1-x^2)}{1+2x+x^2-1+2x-x^2}\right)=\tan^{-1}x$$

$$\Rightarrow \tan^{-1}\left(\frac{2(1-x^2)}{4x}\right)=\tan^{-1}x \Rightarrow \tan^{-1}\left(\frac{1-x^2}{2x}\right)=\tan^{-1}x$$

$$\Rightarrow \frac{1-x^2}{2x}=x \Rightarrow 1-x^2=2x^2 \Rightarrow 1=3x^2 \Rightarrow x^2=\frac{1}{3} \Rightarrow x=\pm\frac{1}{\sqrt{3}}$$

$$\left[\because x>0 \text{ given, so we do not take } x=-\frac{1}{\sqrt{3}}\right]$$

$$\Rightarrow x=\frac{1}{\sqrt{3}}$$

17. Solve for x: $2\tan^{-1}(\cos x)=\tan^{-1}(2\cos ecx)$

Ans:

Given $2\tan^{-1}(\cos x)=\tan^{-1}(2\cos ecx)$

$$\Rightarrow \tan^{-1}\left(\frac{2\cos x}{1-\cos^2 x}\right)=\tan^{-1}(2\cos ecx) \qquad \left[\because 2\tan^{-1}x=\tan^{-1}\left(\frac{2x}{1-x^2}\right)\right]$$

$$\Rightarrow \tan^{-1}\left(\frac{2\cos x}{\sin^2 x}\right)=\tan^{-1}\left(\frac{2}{\sin x}\right)$$

$$\Rightarrow \frac{2\cos x}{\sin^2 x}=\frac{2}{\sin x} \Rightarrow \frac{\cos x}{\sin x}=1$$

$$\Rightarrow \cot x=1 \Rightarrow \cot x=\cot\frac{\pi}{4} \Rightarrow x=\frac{\pi}{4}$$

18. Solve for x: $\sin^{-1}(1-x)-2\sin^{-1}x=\frac{\pi}{2}$

Ans:

Given $\sin^{-1}(1-x)-2\sin^{-1}x=\frac{\pi}{2}$

$$\Rightarrow -2\sin^{-1}x=\frac{\pi}{2}-\sin^{-1}(1-x) \Rightarrow -2\sin^{-1}x=\cos^{-1}(1-x)$$

$$\left[\because \sin^{-1}(1-x)+\cos^{-1}(1-x)=\frac{\pi}{2}\right]$$

$$\Rightarrow \cos\left(-2\sin^{-1}x\right)=1-x$$

$$\Rightarrow \cos\left(2\sin^{-1}x\right)=1-x \qquad [\because \cos(-x)=\cos x]$$

$$\Rightarrow 1-2\sin^2\left(\sin^{-1}x\right)=1-x \qquad [\because \cos 2x=1-2\sin^2 x]$$

$$\Rightarrow 1-2\left[\sin\left(\sin^{-1}x\right)\right]^2=1-x$$

$$\Rightarrow 1-2x^2=1-x \Rightarrow 2x^2-x=0$$

$$\Rightarrow x(2x-1)=0 \Rightarrow x=0 \text{ or } 2x-1=0$$

$\Rightarrow x = 0 \ \ or \ \ x = \frac{1}{2}$

But $x = \frac{1}{2}$ does not satisfy the given equation, so $x = 0$.

19. Simplify: $\tan^{-1}\left(\frac{x}{y}\right) - \tan^{-1}\left(\frac{x-y}{x+y}\right)$

Ans:

Given $\tan^{-1}\left(\frac{x}{y}\right) - \tan^{-1}\left(\frac{x-y}{x+y}\right) = \tan^{-1}\left(\frac{x}{y}\right) - \tan^{-1}\left(\frac{\frac{x}{y}-1}{\frac{x}{y}+1}\right)$

$= \tan^{-1}\left(\frac{x}{y}\right) - \left(\tan^{-1}\left(\frac{x}{y}\right) - \tan^{-1}1\right) \qquad \left(\because \tan^{-1}x - \tan^{-1}y = \tan^{-1}\left(\frac{x-y}{1+x.y}\right)\right)$

$\Rightarrow \tan^{-1}1 = \frac{\pi}{4}$

20. Express $\tan^{-1}\left(\frac{\cos x}{1-\sin x}\right), -\frac{\pi}{2} < x < \frac{\pi}{2}$ **in the simplest form.**

Ans:

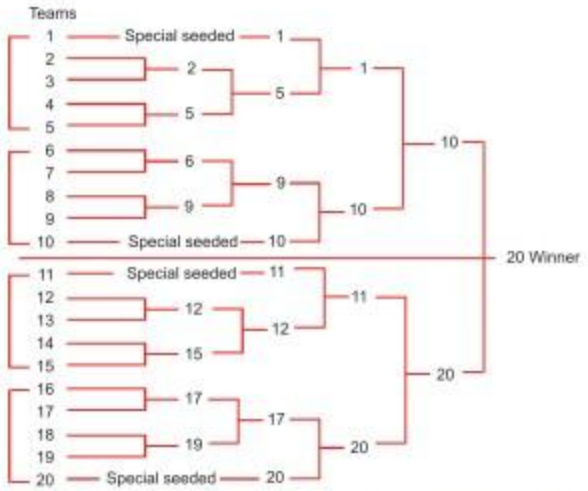
Given $\tan^{-1}\left(\frac{\cos x}{1-\sin x}\right), -\frac{\pi}{2} < x < \frac{\pi}{2}$

$= \tan^{-1}\left(\frac{\cos^2\frac{x}{2} - \sin^2\frac{x}{2}}{\cos^2\frac{x}{2} + \sin^2\frac{x}{2} - 2\cos\frac{x}{2}\sin\frac{x}{2}}\right) = \tan^{-1}\left(\frac{\left(\cos\frac{x}{2} + \sin\frac{x}{2}\right)\left(\cos\frac{x}{2} - \sin\frac{x}{2}\right)}{\left(\cos\frac{x}{2} - \sin\frac{x}{2}\right)^2}\right)$

$\left(\because 1 - \cos x - \cos^2\frac{x}{2} - \sin^2\frac{x}{2}, \sin^2\frac{x}{2} + \cos^2\frac{x}{2} - 1 \ \ and \ \ \sin x - 2\sin\frac{x}{2}\cos\frac{x}{2}\right)$

$= \tan^{-1}\left(\frac{\cos\frac{x}{2} + \sin\frac{x}{2}}{\cos\frac{x}{2} - \sin\frac{x}{2}}\right) = \tan^{-1}\left(\frac{1 + \tan\frac{x}{2}}{1 - \tan\frac{x}{2}}\right) = \tan^{-1}\tan\left(\frac{\pi}{4} + \frac{x}{2}\right) = \frac{\pi}{4} + \frac{x}{2}$

For *eg.*,



Consolation Tournament: In knock out tournament, good teams exit at earlier stages which does not give them a chance to showcase their skill. So in this tournament, the teams who got early exit get a chance to compete again and chance to win.

First Type

Example: A team knockout basis consolation tournament.

Note: Circled one are the one who lost in early.

POINTS to Remember

1. Teams for upper half and lower half

   [Teams of upper half = $\frac{N+1}{2} = \frac{9+1}{2}$ = 5 teams, Teams of lower half = $\frac{N-1}{2} = \frac{9-1}{2}$ = 4 Teams]

2. No. of Byes = $2 \times 2 \times 2 \times 2 = 16 - 9 = 7$

Decision of Winner in League Tournament

Points are awarded for each team, on draw or loss. The team whoever credit maximum points is declared winner.

eg. Win = 2 Point, Draw = 1 Point, Loss = 0 Points.

Tie breaker. If two teams scores equal points then they compete once cyclic and team which won the match will be declared winner or in league earlier whoever have won will be declared winner.

Practice Questions 1.4

I. Short–I Question Answers (3 Marks, 100 Words)

Q.1. What is staircase method?

Q.2. Explain cyclic method in league tournament.

Q.3. What is procedure to allocate seeding?

II. Short–II Question Answers (5 Marks, 200 Words)

Q.1. Make a fixture of 9 teams on league basis?

Q.2. Draw a fixture of 20 teams providing 4 special seeding in a knockout tournament?

Q.3. On knock basis, draw a fixutre of 27 teams dividing them into quarters?

1.5 Intramural and Extramural–Meaning, Objective, Significance

Origin of Intramurals

In year 1864, Base ball intramurals were organised for first time in USA. After that, in early part of 20 century physical education teachers showed keen interest in intramural. In 1925, each high school in USA established intramural department. It was made an integral part of successful mission of implement physical education programme. But in India, we still lack in intramural as parents still prefer their kids to get interest in academics only.

Meaning of Intramural

The word intramural is made of latin word *i.e.* Intra-means inside and murals means a campus established by its boundary. that sums up – inside campus.

Those activities of physical native conducted inside a school, college or campus.

Major Games	:	Volleyball, Hockey, Cricket, Basket ball.
Minor Games	:	Kho-Kho, Lemon race, Sakrace.
Rhythmic Games	:	Dumble, Marching, Group Dance.
Orlation Activities	:	Drawing, Sculpture making, Model making.
Combative activities	:	Boxing, Judo, Taekwondo, Karate.
Athletic	:	Shuttle run, Long race, Short race.

Need/Significance of Intramurals

1. Intramurals are required to attain all round development of children.
2. Intramural activities help in maintaining good health of children.
3. These activities channelize the surplus energy of children.
4. These activities re energises and refresh children.
5. Intramurals provide recreation and break boredom.
6. Intramurals instill leadership qualities among children.
7. Intramurals provide opportunity for all.
8. It create more awareness, keep healthy and fit.
9. It inculcate the organisation skills and management.

Objectives of Intramurals

1. **To provide opportunity to develop personality:** To develop personality and a... of child, the opportunities are created.
2. **To find out talented sports person:** Intramural activities help to select, the real talent and make sure maximum participation.
3. **To provide opportunity to every student to participate in games and sports:** Intramurals encourage mass participation and ensure equal and fair opportunity to each student.
4. **To develop feeling of co-operation:** It is impossible to get sucess without co-operation. Intramural creates the feel of co-operation among students.
5. **To develop leadership:** Intramural included the leadership qualities in student because the student are required in conducting all activities.
6. **To provide recreation to all:** One of the main objective of intramurals is to provide fun and recreation to all students.
7. **To develop feeling of sportsmanship among students:** Intramurals induces respect, prestige, discipline among students.
8. **To provide opportunity to learn a variety of skills and rules of games:** Intramural help to develop new skills and enhance knowledge of rules of games.
9. **Provide opportunity to get experience of organisation of competition among students:** While conducting intramurals, the students get experience of organising and managing human and other resources.

General Principles of Intramurals

1. **Local circumstances:** While conducting intramurals, we always keep local circumstances in mind like place, weather, environment, resources.
2. **Good quality of sports equipment:** Sports equipment should be safe and of high quality which ensures the safety of children.
3. **Interest:** The activities shall be recreation and child centred.
4. **Budget:** It is one of the foremost and basic requirement which decide the scale and level of competition.
5. **Time:** For conducting intramurals, time management shall be according to local–conductions, children and resources.
6. **Emphasis on winning:** In intramurals, performance and excilent in results shall be more encouraged rather than just focus on winning.
7. **Medical examination and first aid:** The children shall be examined medically before participation. And also first aid facility shall be provided on the venue in case of injury.
8. **Classification of Students:** The students shall be divided into groups mentioning age, skills and fitness level.

Extramurals Competition

It consist of two latin word *i.e.* Extra mean outside, murals means wall. These are the activities which are organised outside of campus. It is a competition when two or more organisation participate.

Significance of Extramurals

1. **Provide opportunity to school to exhibit their sporting talent:** During extramural, schools gets a chance to showcase the talent and skill of their children at highest level.
2. **Enhance sports performance:** Through extramurals, there is a sharp increase in level and skill of performance of students.
3. **Knowledge of latest techniques:** Extramural activities keep updated about latest rules, skills and technique of games.
4. **More opportunities to take part in sports:** Extramural competition provide plaftform and create more chance for students to play.

Objectives of Extramurals

1. **To improve standard of sports:** It is one of the most objectives of extramural to raise the level and standard of sports. Students get more exposure and more skillful in extramurals.
2. **Provide experience to students:** In any field, experience is required. Extramurals provide that experience of performing at highest level.
3. **To develop sportsmanship and fraternity:** Extramurals helps to create bond and friendship among students. It encourages students to learn and accept defeat and humble on winning.
4. **To broaden base of sports :** Extramurals have a wide spread range and scope. It helps to populorise the game and helps to reach at maximum places.
5. **To provide knowledge of new rules and advanced techniques:** New rule, skills, techniques and technical skills are displayed during extramurals.

Practice Questions 1.5

I. Short–I Question Answers (3 Marks, 100 Words)

Q.1. Write down three objectives of Intramurals.

Q.2. Explain various activities involved during Extramurals.

Q.3. What is need/importance of Extramurals?

Q.4. Differentiate between Intramural and Extramurals?

II. Short–II Question Answers (5 Marks, 200 Words)

Q.1. What do you mean by Intramurals and explain their objectives in detail.

Q.2. Explain the various objective of Extramurals.

Q.3. Write down importance/need of Extramurals.

1.6 Specific Sports programme

Specific sports programmes are those which always display and carry a social message like unity, health awareness or cultural or religious donations and spread of love.

1. Sports Day

Modern day challenges and needs of today is education emphasis on other aspects rather than academics. For all round development of students. For that objective, all over India, each school celebrates sports day a mark of focus on physical and mental health awareness. It encourages leadership, management and co-ordinators among students.

Sports Day

Importance of sports day:

(*i*) The leadership and ethic values are developed.
(*ii*) Recreation is being provided to students.
(*iii*) Participation makes students fit healthy.
(*iv*) Children learn co-operation, unity, respect for each other.

2. Health Run

These are conducted by various social organisation, health department or sports department to create awareness about level of health fitness. For this we need so many registration, venue, officials and other resources. Advantages of Health Run:

1. Helps in respiratory system.
2. Less chance of heart ailment.
3. Helps to reduce obesity.
4. Increase flexibilities endurance.
5. Reduces stress and provide recreation.

Health Run

3. Run for Fun

Whenever a person runs for recreation he/she gets physical and mentally healthy. Run for fun is a mass participation programme which promotes fun, frolic. It involves road running or cross country. It focus on fun and recreation rather than competition. For this, we need to sponser and other resources to conduct this activity. It reaches to all age group, promote harmony and it is not gender based.

4. Run for Specific Causes

Usually these are organised by NGO and Social organisations which focus on raise funds for social causes like girl education, sex education, envioronment, sanitation. According to age groups, different races are conducted like 2008 Half Marathan Mumbai.

5. Run for Unity

This run promotes harmony, inclusion in society and maintaining peace. It promotes national integration. Various individual with different back grounds and fields come together. It includes all age, group, all economic groups. This inculcate a sense of togetherness.

Practice Questions 1.6

I. Short–I Question Answers (3 Marks, 100 Words)

Q.1. Write down two objectives of specific sports programme.

Q.2. What are advantages of race for health?

Q.3. Explain run for fun and run for unity races.

Q.4. Explain sports day preparations.

II. Short–II Question Answers (5 Marks, 200 Words)

Q.1. What do you understand by specific sports programmes. Explain their need and importance.

Questions Asked in Examination in Previous Years

1. How various committees are formed for tournaments? Write briefly. [*A.I. 2016*]
2. Draw a fixture of 11 football teams participations in a tournament on the basis of the knock out. [*A.I. 2016*]
3. Enlist two objectives of Intramurals? Write formula for giving 'bye'. [*Delhi 2016*]
4. Draw a fixture of 6 teams on the league basis following the cyclic method. [*Delhi 2016*]
5. Your school is organising "Run for Unity", explain the responsibilities of accreditation, technical and finance committee. [*Delhi 2016*]
6. What do you mean by Tournament? Draw a fixture of 09 teams using round robin method. [*CBSE Sample Paper 2016*]
7. What does the school intend by stating that "only such students shall participate in the basketball intramurals who have not represented the school in basket ball in the past and minimum 10 substitutions shall be compulsory?" [*A.I. 2015*]
8. In which conditions knock out tournaments are better than round robin? [*CBSE Sample Paper 2015*]
9. What does the organisers intend by stating that, "only such students shall participate in the intramulars who have not represented the school in any football championship in the past and minimum 10 substitutions shall be compulsory in a 90 minutes game." [*CBSE Sample Paper 2015*]
10. Once upon a time, during an athletic meet in stadium, 8 girls were on the starting line, ready for the race. With the sound of pistol, all the 8 girls started running. Hardly they had covered 10 to 15 metres, when accidentally one girl slipped and fell. Due to pain the girl started crying. As soon as the other 7 girls heard her cry; all of them stopped running, stood for a while, turned back, and ran towards her. Suddenly, the girls returned, pacified her, joined their hands together, lifted her, walked together and reached the finishing line. The officials were shocked to see such scene and unity. Quite a many eyes were filled with tears. [*CBSE Sample paper 2015*]

Based on the above passage, answer the following questions:

1. What values do they teach?
2. What quality the girls have shown by running together?
3. What was so special about the race?

11. Draw a knock-out fixture of 21 teams mentioning all the steps involved. [*A.I. 2015*]
12. Being captain of the school, prepare five important committees with their responsibilities to conduct one day run for health race. [*Delhi 2015*]
13. Elucidate the committees and their responsibilities of inter school CBSE Basket Ball Tournament. [*A.I. 2015*]
14. What is the meaning of Tournament? Draw knock-out fixture for 27 teams. [*A.I. 2012*]
15. What do you mean by specific sports programmes? Explain any three. [*Delhi 2012*]
16. What is a league tournament? Draw a fixture of six teams using round robin method. [*A.I. 2012*]
17. What is seeding? [*A.I. 2011*]
18. What is bye? [*Delhi 2011*]
19. What do you meant by bye? [*Delhi 2011*]
20. Explain the procedure for giving 'bye'. [*Delhi 2012*]
21. Discuss in detail about sports day. [*Delhi 2012*]

OR

Explain different steps to be followed for organising a health run in four school. [*A.I. 2011*]

22. Draw a knockout fixture for 23 teams. [*C.B.S.E. SQP 2019*]
23. Draw a fixture for 9 teams by Round Robin Method. [*C.B.S.E. SQP 2019*]

Multiple Choice Type Questions

Q.1. First Step in sports management is :

(*a*) Planning (*b*) Organising
(*c*) Execution (*d*) Co-ordination

Q.2. Another meaning of Planning is

(*a*) Arrangement of financial resources (*b*) Blue Print of all aspects
(*c*) Arrangement of technical support (*d*) Invitation of participations

Q.3. Aim of Planning is :

(*a*) Complete the event (*b*) Co-ordinate the event
(*c*) To make event Successful (*d*) Enjoyment

Q.4. Which of the following is against the principles of organization?

(*a*) Delegation of power (*b*) Proper communicationa
(*c*) Proper decentralization (*d*) Overlapping of authorities

Q.5. The Intramural Programme is :

(*a*) Achievement (*b*) Enjoyment
(*c*) Humor (*d*) Involvement

Q.6. What is the aim of Physical Education?

(*a*) Physical development (*b*) Growth development
(*c*) Social development (*d*) All Round development

Q.7. To Provide First Aid which committee is responsible :

(a) Reception (b) Refreshment

(c) Medical (d) Recreation

Q.8. The Head of Organising committee is :

(a) Administrative Director (b) Chief Technical Official

(c) Excutive Director (d) Marshal

Q.9. Providing Informations of competition in advance to all is the work of :

(a) Transport Committee (b) Announcement Committee

(c) Publicity Committee (d) Ground or Equipment Committee

Q.10. Which Committee is responsible for maintaining decorum of tournaments and moral values:

(a) Transport Committee (b) Discipline Committee

(c) Decoration Committee (d) Official Committee

Q.11. Financial arrangement for any tournament can be through:

(a) Alumni Associations (b) Donations

(c) Funds from Government and Private Agencies (d) All of the above

Q.12. Planning is :

(a) An Art (b) A Science

(c) Both (a) & (b) (d) None of the above

Q.13. The first step in planning is :

(a) Identification of target group (b) Determination of goals

(c) Mobiliation of Resources (d) Provision of facilities

Q.14. Once the team is defeated, and eliminated out of the tournament is called :

(a) League tournament (b) Knock out tournament

(c) Combination tournament (d) Challenge tournament

Q.15. The Winner is decided on the "point basis" only at the end of all matchese in :

(a) League tournament (b) Challenge tournament

(c) Combination tournament (d) Knockout tournament

Q.16. Allotment of bye is on basis of

(a) Performance (b) Random draws

(c) First came first serve (d) Pre-decided sequence

Q.17. Seeding is an advantage to a team given on the basis of

(a) Draws (b) First come first sever

(c) Performance (d) All of the above

Q.18. If there are Seven total matches in Single Knockout tournament. The total number of teams are:

(a) 8 (b) 7

(c) 7 (d) 6

Q.19. What is the another name of league matches :

(a) Knock out (b) Challenge

(c) Combination (d) Round Robin

Q.20. If 8 teams are participating in Single league tournaments. What would be the total number of matches :

(a) 24 (b) 26

(c) 28 (d) 30

Q.21. If total 24 teams are participating in Single Knock out tournament, then how many team gets Bye.

(a) 4 (b) 6
(c) 8 (d) 10

Q.22. Which among following is not a method of League tournament

(a) Round Robin (b) Cyclic Method
(c) Swiss system (d) Stair Case Method

Q.23. Health Run are conducted with the objective

(a) Ethical Values development (b) Reduce Obesity
(c) Provide awareness about disease (d) All of the above

Q.24. Run for Fun Programme is for

(a) Time Pass (b) Enjoyment
(c) Recreation (d) None of the above

Q.25. The main objective of Extramural Programme is

(a) Achievement (b) Enjoyment
(c) Time Pass (d) Involvement

Q. 26. "A plan is a trap laid to capture the future" statement given by

(a) Mitchell (b) Allen
(c) Rikli (d) Dr Harold

Q. 27. Which is the odd one in term of various causes?

(a) Knock-out (b) League
(c) Combination of tournament (d) Challenging tournament.

Q.28. Auditing of the tournament is part of responsibility of committee.

(a) Pre Tournament (b) During Tournament
(c) After Tournament (d) None of these

Q.29. Senior National tournament of any sport organized by –

(a) I O A (b) I O C
(c) SGFI (d) Federation

Q.30. TP X 100 is a formula of-

(a) American Methods (b) British Method
(c) VO2 Max (d) BMI

Q.31. Which committee is responsible for welcoming the guest in opening ceremony

(a) Reception committee (b) Decoration and ceremony committee
(c) Publicity committee (d) Technical committee

Q.32. _____ committee is responsible for various expenditures.

(a) Technical committee (b) Planning committee
(c) Finance committee (d) Reception committee

Q.33. Formula for calculation of no. of Matches of Knock-out system—

(a) N+1 (b) N-1
(c) N×2 (d) N/2

Q.34. Formula for calculation of no. of Matches of Round robin system—

(a) N (N+1) (b) N (N-1)
(c) N (N/1) (d) N (N×1)

Q.35. Formula for calculation no. of Matches of league system.

(a) $\frac{N(N+1)}{2}$ (b) $\frac{N(N-1)}{2}$

(c) $N\frac{\left(\frac{N}{2}\right)}{2}$ (d) $\frac{N(N\times1)}{2}$

Q. 36. How many quarter finals will be in a tournament if of 32 teams are participating as per knock-out system?

(a) 2 (b) 6

(c) 4 (d) 8

Q.37. How many byes will be placed in a tournament if of 25 teams are participating as per knock-out system?

(a) 3 (b) 4

(c) 7 (d) None of these

Q.38. How many byes will be placed in a tournament if of 42 teams are participating as per Round Robin system?

(a) 10 (b) 9

(c) 17 (d) None of these

Q.39. Doping test sample is collected _____.

(a) During the tournament (b) Before the tournament

(c) After the tournament (d) All above

Q.40 In a single knock-out fixture for 18 teams, the number of byes to be given:-

(a) 16 (b) 14

(c) 12 (d) 10

Q.41. What makes administration and organization of Physical Education most efficient?

(a) Technical knowledge and skill (b) Teachers personality

(c) Highly qualified (d) Qualified and experienced

Q.42. Sports and Physical Education facilities can be provided to all the people at:

(a) Community level (b) School level

(c) Pre School level (d) College Level

Q.43. If total no. of teams are 11 in a league tournament, then total no. of rounds are _____.

(a) 11 (b) 10

(c) 09 (d) 12

CLASS XII
ELECTRIC CHARGES AND FIELDS

ELECTRIC CHARGE

Electric Charge is an intrinsic property of elementary particles of matter which gives rise to the electric force between various objects.

Electric charge is a scalar quantity. Its SI unit is *coulomb* (C). A proton has a positive charge (+ e) and an electron has a negative charge (- e), where $e = 1.6 \times 10^{-19}$ coulomb

The cgs unit of charge is electrostatic unit of charge (e.s.u. of charge) or stat coulomb (stat C).

1 coulomb = 3×10^9 stat coulomb

ELECTROSTATICS

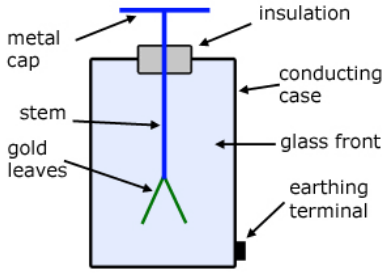
Electrostatics is the study of electric charges at rest.

Positive and negative charges

1. The charge developed on a glass rod when rubbed with silk is called **positive charge**.
2. The charge developed on a plastic rod when rubbed with wool is called **negative charge**.

Electrostatic induction is the phenomenon of polarisation of a conductor in which opposite charges appear at its closer end and similar charges appear at its farther end in the presence of a nearby charged body.

Gold-leaf electroscope. It is a device used for detecting an electric charge and identifying its polarity. The degree of divergence of the leaves gives a measure of the amount of charge.



BASIC PROPERTIES OF ELECTRIC CHARGE

1. **Additivity** 2. **Quantisation** 3. **Conservation**

ADDITIVITY OF ELECTRIC CHARGE

The total charge of a system is the algebraic sum of all the individual charges located at different points inside the system.

For example: The total charge of a system containing four charges $2\,\mu C, -3\,\mu C, 4\,\mu C$ and $-5\,\mu C$ is $q = 2\,\mu C - 3\,\mu C + 4\,\mu C - 5\,\mu C = -2\,\mu C$

QUANTIZATION OF ELECTRIC CHARGE. The total charge (q) of a body is always an integral multiple of a basic quantum of charge (e), i.e.,

$q = ne, \quad where \quad n = 0, \pm 1, \pm 2, \pm 3, ...$

CONSERVATION OF CHARGE

The law of conservation of charge states:

1. The total charge of an isolated system remains constant.
2. The electric charges can neither be created nor destroyed they can only be transferred from one body to another.

COULOMB'S LAW OF ELECTRIC FORCE

Coulomb's law states that the force of attraction or repulsion between two stationary point charges is
(i) directly proportional to the product of the magnitudes of the two charges and
(ii) inversely proportional to the square of the distance between them.

This force acts along the line joining the two charges.

$$F \ \alpha \ \frac{q_1 q_2}{r^2} \qquad or \qquad F = \frac{1}{4\pi\varepsilon_0}\frac{q_1 q_2}{r^2}$$

$$\frac{1}{4\pi\varepsilon_0} = 9\times10^9 \ N\ m^2\ C^{-2}$$

Permittivity of free space,

$$\varepsilon_0 = 8.85\times10^{-12}\ C^2\ N^{-1}\ m^{-2}$$

COULOMB'S LAW IN VECTOR FORM

In vector form, Coulomb's law may be expressed as

$\vec{F}_{21}$ = force on charge q_2 due to q_1

$$= \frac{1}{4\pi\varepsilon_0} \cdot \frac{q_1 q_2}{r^2}\hat{r}_{12}$$

where $\hat{r}_{12} = \frac{\vec{r}_{12}}{r}$, is a unit vector in the direction from q_1 to q_2

DIELECTRIC CONSTANT : RELATIVE PERMITTIVITY

The ratio $(\varepsilon/\varepsilon_0)$ of the permittivity (ε) of the medium to the permittivity (ε_0) of free space is called relative permittivity (ε_r) or dielectric constant (κ) of the given medium.

$$\varepsilon_r \ or \ \kappa = \frac{\varepsilon}{\varepsilon_0}$$

Thus,

$$F_m = \frac{F_{vac}}{\kappa}$$

FORCES BETWEEN MULTIPLE CHARGES: THE SUPERPOSITION PRINCIPLE

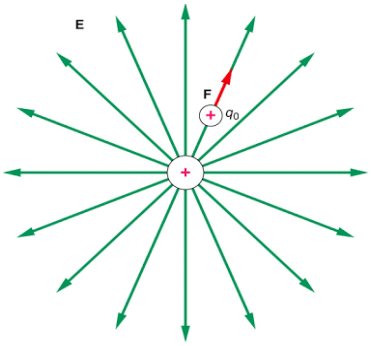
The principle of superposition states that when many charges are present, the total force on a given charge is the vector sum of all the forces due to other charges.

$$\vec{F}_1 = \vec{F}_{12} + \vec{F}_{13} + ... + \vec{F}_{1N}$$

ELECTRIC FIELD

It is assumed that the charge q produces an electrical environment in the surrounding space, called electric field. The electric field strength $\vec{E}$ at a point is defined as the force experienced by a unit positive test charge placed at that point.

$$\vec{E} = \frac{\vec{F}}{q_0}$$



The electric field at a point is defined as the electrostatic force per unit test charge acting on a vanishingly small positive test charge placed at that point

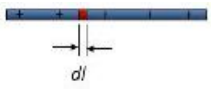
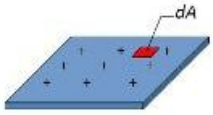
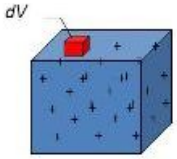
$$\vec{E} = \lim_{q_0 \to 0} \frac{\vec{F}}{q_0}$$

Units and dimensions of electric field. Its SI unit is newton pre coulomb $\left(NC^{-1}\right)$. It is equivalent to volt per metre $\left(Vm^{-1}\right)$.

ELECTRIC FIELD DUE TO A POINT CHARGE

$$E = \frac{1}{4\pi\varepsilon_0} \cdot \frac{q}{r^2}$$

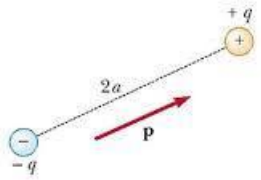
CONTINUOUS CHARGE DISTRIBUTION

Line charge distribution	Surface charge distribution	Volume charge distribution
		
Line charge density $\lambda = \frac{Q}{L}$ The SI unit for λ *is* Cm^{-1}	**Surface charge density** $\sigma = \frac{Q}{A}$ The SI unit for σ *is* Cm^{-2}	**Volume charge density** $\rho = \frac{Q}{V}$ The SI unit for ρ is Cm^{-3}

ELECTRIC DIPOLE

Electric dipole. A pair of equal and opposite charges separated by a small distance is called an electric dipole.

Dipole moment. The dipole moment of an electric dipole is a vector whose magnitude is equal to the product of " charge (q) and the separation (2a) between the two charges".

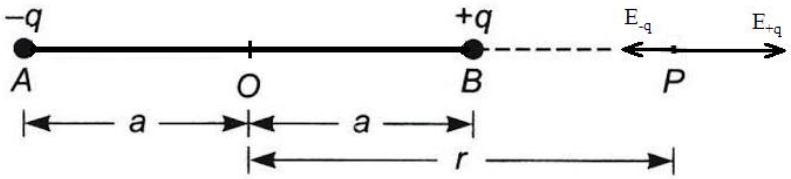


$$\vec{p} = q \times 2\vec{a}$$

Magnitude of dipole moment is given by: $p = 2\,q\,a$

The dipole moment $\vec{p}$ is a vector quantity. Its direction is along the dipole axis from $-q \ to \ +q$

ELECTRIC FIELD AT AN AXIAL POINT OF A DIPOLE



Electric field due to charge $-q$ at point P is

$$\vec{E}_{-q} = \frac{q}{4\pi\varepsilon_0 (r+a)^2} \qquad \text{(towards left)}$$

Electric field due to charge $+q$ at point P is

$$\vec{E}_{+q} = \frac{q}{4\pi\varepsilon_0 (r-a)^2} \qquad \text{(towards right)}$$

where $\hat{p}$ is a unit vector along the dipole axis from -q to +q

Hence the resultant electric field at point P is

$$E_{axial} = E_{+q} - E_{-q}$$

$$= \frac{q}{4\pi\varepsilon_0}\left[\frac{1}{(r-a)^2} - \frac{1}{(r+a)^2}\right] = \frac{q}{4\pi\varepsilon_0} \cdot \frac{4ar}{\left(r^2 - a^2\right)^2}$$

or $$E_{axial} = \frac{1}{4\pi\varepsilon_0} \cdot \frac{2pr}{\left(r^2 - a^2\right)^2}$$

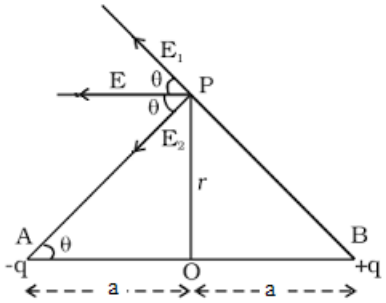
Here $p = q \times 2a =$ dipole moment

For $r >> a, a^2$ can be neglected compared to r^2 .

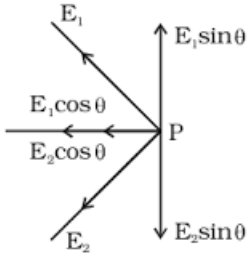
$\therefore$ $$E_{axial} = \frac{1}{4\pi\varepsilon_0} \cdot \frac{2p}{r^3} \qquad \text{(towards right)}$$

in vector form, $\vec{E}_{axial} = \frac{1}{4\pi\varepsilon_0} \cdot \frac{2p}{r^3} \hat{p}$

ELECTRIC FIELD AT AN EQUATORIAL POINT OF A DIPOLE



(a) Electric field at a point on equatorial line



(b) The components of the electric field

Electric field at point P due to $+q$ charge is

$$\vec{E}_{+q} = \frac{1}{4\pi\varepsilon_0} \cdot \frac{q}{r^2 + a^2}$$, directed along BP

Electric field at point P due to $-q$ charge is

$$\vec{E}_{-q} = \frac{1}{4\pi\varepsilon_0} \cdot \frac{q}{r^2 + a^2}$$, directed along PA

Thus the magnitude of $\vec{E}_{-q}$ *and* $\vec{E}_{+q}$ are equal i.e.,

$$E_{-q} = E_{+q} = \frac{1}{4\pi\varepsilon_0} \cdot \frac{q}{r^2 + a^2}$$

Clearly, the components of $\vec{E}_{-q}$ *and* $\vec{E}_{+q}$ normal to the dipole axis will cancel out. The components parallel to the dipole axis add up. The total electric field $\vec{E}_{equa}$ to opposite to $\vec{p}$.

$$\therefore \quad \vec{E}_{equa} = \left(E_{-q}\cos\theta + E_{+q}\cos\theta\right)$$

$$= 2E_{-q}\cos\theta \qquad \left[E_{-q} = E_{+q}\right]$$

$$= 2 \cdot \frac{1}{4\pi\varepsilon_0} \frac{q}{r^2 + a^2} \cdot \frac{a}{\sqrt{r^2 + a^2}}$$

$$\left[\because \cos\theta = \frac{a}{\sqrt{r^2 + a^2}}\right]$$

or $$E_{equa} = \frac{1}{4\pi\varepsilon_0} \cdot \frac{p}{\left(r^2 + a^2\right)^{3/2}}$$

where $p = 2qa$, is the electric dipole moment

If the point P is located far away from the dipole $r >> a$ then

$$E_{equa} = \frac{1}{4\pi\varepsilon_0} \cdot \frac{p}{r^3}$$

in vector form, $\vec{E}_{equa} = -\frac{1}{4\pi\varepsilon_0}.\frac{p}{r^3}\hat{p}$

TORQUE ON A DIPOLE IN A UNIFORM ELECTRIC FIELD

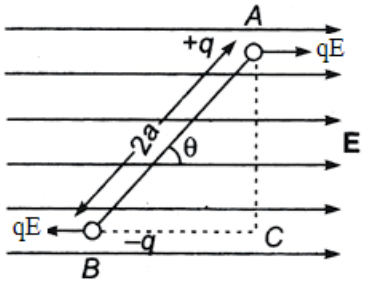
Force exerted on charge $+q$ by field

$F = qE$ (along $\vec{E}$)

Force exerted on charge $-q$ by field

$F = qE$ (opposite to $\vec{E}$)

$F_{net} = +qE - qE = 0$



Hence the net translating force on a dipole in a uniform electric field is zero. But the two equal and opposite forces act at different points of the dipole. They form a couple which exerts a torque.

Torque = Either force × Perpendicular distance between the two forces

$\tau = qE \times 2a \sin\theta = (q \times 2a) E \sin\theta$

or $\tau = pE \sin\theta \qquad (p = q \times 2a)$

As the direction of torque $\vec{\tau}$ is perpendicular to both $\vec{p}$ *and* $\vec{E}$, so we can write

$\vec{\tau} = \vec{p} \times \vec{E}$

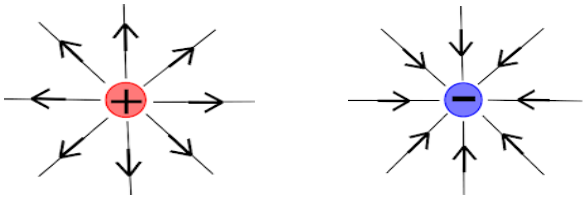
ELECTRIC FIELD LINES

An electric line of force may be defined as the curve along which a small positive charge would tend to move when free to do so in an electric field.

Properties of Electric lines of force

(1) The lines of force are continuous smooth curves without any breaks.

(2) The lines of force start at positive charges and end at negative charges.



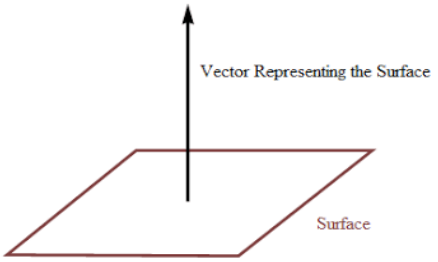
(3) The tangent to a line of force gives the direction of the electric field at that point.

(4) No two lines of force can cross each other.

(5) The lines of force are always normal to the surface of a conductor.

AREA VECTOR

The direction of a planar area vector is specified by the normal to the plane.



ELECTRIC FLUX

The electric flux through a given area held inside an electric field is the measure of the total number of electric lines of force passing normally through that area.

$$\Delta\phi_E = \vec{E}\cdot\vec{\Delta S} \quad \text{or} \quad d\phi_E = \vec{E}\cdot\vec{dS}$$

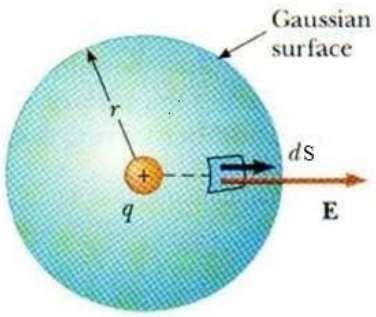
***** Electric flux is a scalar quantity. It's SI unit is $Nm^2\ C^{-1}$

GAUSS'S THEOREM

Gauss theorem states that the total flux through a closed surface is $\frac{1}{\varepsilon_0}$ times the net charge enclosed by the closed surface.

Mathematically, it can be expressed as

$$\phi_E = \frac{q}{\varepsilon_0}$$



Proof:

We know that $\phi_E = \oint_S \vec{E}\,.\,\vec{dS}$

Electric field at any point on the surface 'S' is

$$E = \frac{1}{4\pi\varepsilon_0}\,.\,\frac{q}{r^2}$$

This field points radially outward at all points on the surface. Also, any area element points radially outwards, so it is parallel to $\vec{E}$, i.e., $\theta = 0^0$.

$\therefore$ Flux through area $\vec{dS}$ is

$$d\phi_E = \vec{E}\,.\,d\vec{S} = E\,dS\cos 0^0 = E\,dS$$

Total flux through surface S is

$$\phi_E = \oint_S d\phi_E = \oint_S E\,dS = E\oint_S dS$$

$$= E \times Total\ area\ of\ sphere$$

$$= \frac{1}{4\pi\varepsilon_0}\,.\,\frac{q}{r^2}\,.\,4\pi r^2$$

or $\phi_E = \dfrac{q}{\varepsilon_0}$

COULUMB'S LAW FROM GAUSS'S THEOREM

Flux through area $\vec{dS}$ is

$$d\,\phi_E = \vec{E}\,.\,\vec{dS} = E\,d\,S\cos 0^0 = EdS$$

Net flux through closed surface S is

$$\phi_E = \oint_S \vec{E}\,.\,\vec{dS} = \oint_S E\,dS = E\oint_S dS$$

$$= E \times \text{ total surface area of } \quad S = E \times 4\,\pi r^2$$

Using Gauss's theorem,

$$\phi_E = \frac{q}{\varepsilon_o}$$

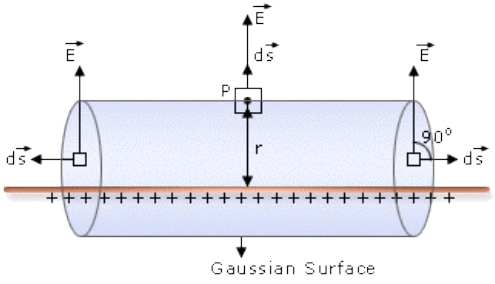
or $E \times 4\pi r^2 = \dfrac{q}{\varepsilon_0} \quad or \quad E = \dfrac{1}{4\pi\varepsilon_0}\,.\,\dfrac{q}{r^2}$

The force on the point charge q_0 if placed on surface S will be

$$F = q_0\,E = \frac{1}{4\pi\varepsilon_0}\,\frac{qq_0}{r^2}$$

This proves the Coulomb's law

FIELD DUE TO AN INFINITELY LONG CHARGED WIRE



Obviously, $\vec{dS_1} \| \vec{E}$, $\vec{dS_2} \perp \vec{E}$ and $\vec{dS_3} \perp \vec{E}$.

So only the curved surface contributes towards the total flux

$$\phi_E = \oint_S \vec{E}\,.\,\vec{dS}$$

$$= \int_{S_1} \vec{E}\,.\,\vec{dS_1} + \int_{S_2} \vec{E}\,.\,\vec{dS_2} + \int_{S_3} \vec{E}\,.\,\vec{dS_3}$$

$$= \int_{S_1} E\,dS_1\cos 0^0 + \int_{S_2} E\,dS_2\cos 90^0 + \int_{S_3} EdS_3\cos 90^0$$

$$= E\int dS_1 + 0 + 0$$

$$= E \times \text{ area of the curved surface}$$

or $\phi_E = E \times 2\,\pi\,r\,l$

Using Gauss's theorem,

$\phi_E = q / \varepsilon_0$, we get

or $E \cdot 2\pi rl = \dfrac{\lambda l}{\varepsilon_0}$ (Charge enclosed by the Gaussian surface $q = \lambda l$)

or $E = \dfrac{\lambda}{2\,\pi\,\varepsilon_0 r}$

ELECTRIC FIELD DUE TO A UNIFORMLY CHARGED INFINITE PLANE SHEET

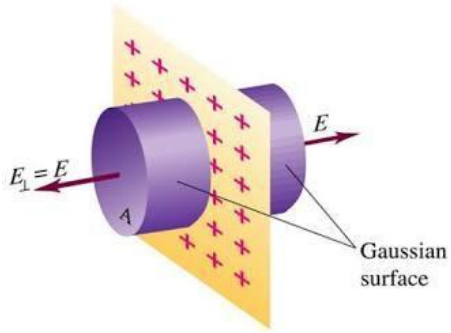
As the lines of force are parallel to the curved surface of the cylinder, the flux through the curved surface is zero. The flux through the plane-end faces of the cylinder is

$\phi_E = EA + EA = 2\,EA$

According the Gauss's theorem,

$\phi_E = \dfrac{q}{\varepsilon_0}$

$\therefore\ 2\,EA = \dfrac{q}{\varepsilon_0}$



as the charge enclosed by the Guassian surface is:

$q = \sigma A$

so, $E = \dfrac{\sigma A}{2A\varepsilon_0}$

$\therefore\quad E = \dfrac{\sigma}{2\varepsilon_0}$

(i) If the sheet is positively charged $(\sigma > 0)$, the field is directed away from it.

(ii) If the sheet is negatively charged $(\sigma < 0)$, the field is directed towards it.

FIELD DUE TO A UNIFORMLY CHARGED THIN SPHERICAL SHELL

(a) When point *P* lies outside the spherical shell.

The total charge q inside the Gaussian surface is the charge on the shell of radius *R* and area $4\,\pi\,R^2$.

$\therefore\qquad q = 4\,\pi\,R^2\,\sigma$

Flux through the Gaussian surface,

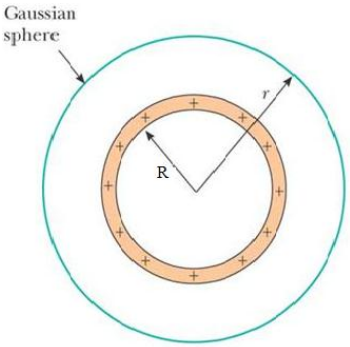
$\phi_E = E \times 4\pi r^2$

By Gauss's theorem,

$$\phi_E = \frac{q}{\varepsilon_0}$$

$$\therefore \quad E \times 4\pi r^2 = \frac{q}{\varepsilon_0}$$

$$\text{or} \quad E = \frac{1}{4\pi\varepsilon_0} \cdot \frac{q}{r^2}$$



(b) When point *P* lies on the spherical shell. The Gaussian surface just enclose the charged spherical shell.

Applying Gauss's theorem,

$$E \times 4\pi R^2 = \frac{q}{\varepsilon_0}$$

$$\text{or} \quad E = \frac{1}{4\pi\varepsilon_0} \cdot \frac{q}{R^2} \qquad [For \ r = R]$$

In terms of surface charge density: $E = \frac{\sigma}{\varepsilon_0} \qquad \left[\because \ q = 4\pi R^2 \sigma\right]$

(c) When point *P* lies inside the spherical shell. The charge enclosed by the Gaussian surface is zero. i.e.,

Flux through the Gaussian surface,

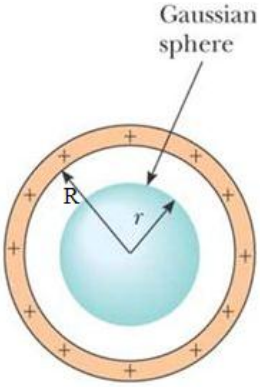
$$\phi_E = E \times 4\pi r^2$$

Applying Gauss's theorem,

$$\phi_E = \frac{q}{\varepsilon_0}$$

$$E \times 4\pi r^2 = 0$$

$$\text{or} \quad E = 0 \qquad [For \ r < R]$$



SUBJECT: POLITICAL SCIENCE

CLASS: XII [028]

BOOK: CONTEMPORARY WORLD POLITICS

CHAPTER: THE COLD WAR ERA

☺ **TOPICS COVERED IN THE LESSON:-**

- Short introduction to Cold war and causes behind the Cold war.
- Cuban Missile Crisis and the emergence of power blocs.
- NAM and NIEO, India's response to cold war.

➢ Read the chapter thoroughly.

1] CUBAN MISSILE CRISIS:-

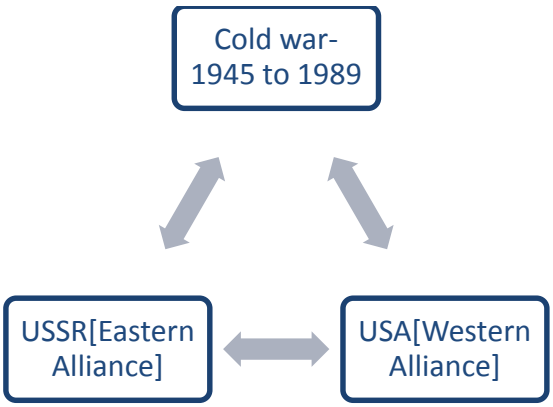
Cuban Missile Crisis

USSR — 1961 — USA

(Nikita Khrushehev) — leaders involved — (John F. Kennedy)

- ➢ Cuba a small Island communist country led by Fidel Castro.
- ➢ In 1962, USSR installed Missiles in Cuba.
- ➢ Nikita Khrushehev and John F. Kennedy were the two leaders played a major role.
- ➢ The US was feared of developing nuclear weapons on part of the USSR.
- ➢ It divided the world into two power blocs.

2] COLD WAR:-

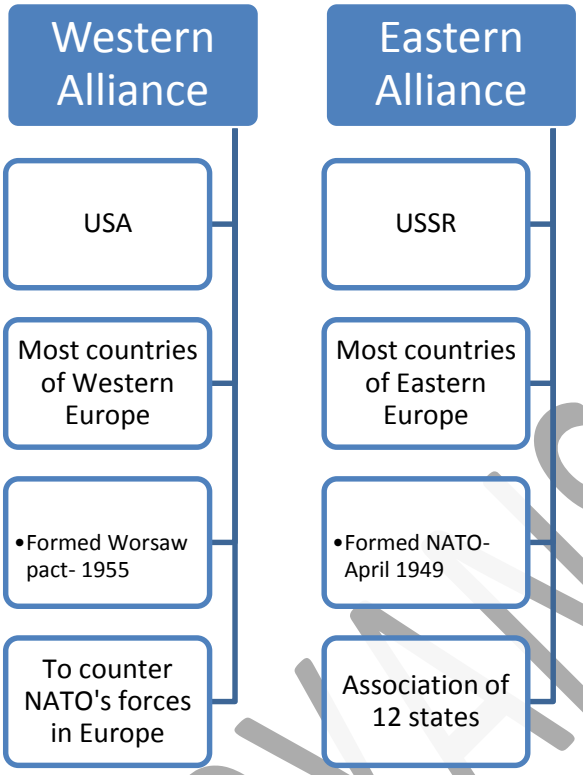


Socialism & communism ☜IDEOLOGY☞ Liberal democracy & Capitalism

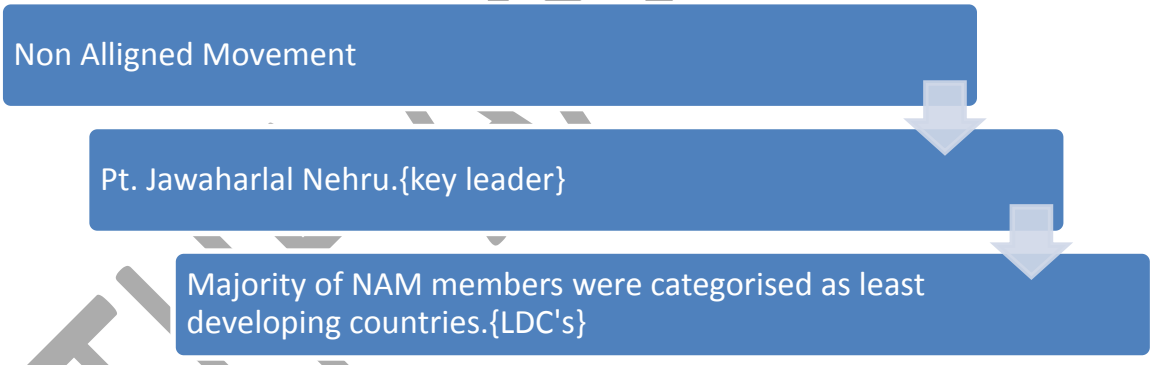
- The cold war referred to the competition, the tensions and a series of confrontations between the US and Soviet Union.
- But it never escalated into a hot war.
- It was not simply a matter of power rivalries but was accompanied by real ideological conflicts as well.

3] THE EMERGENCE OF TWO POWER BLOCS:-

- For the first time the two superpowers threatened to divide the entire world into two camps.



➢ **NAM:-**

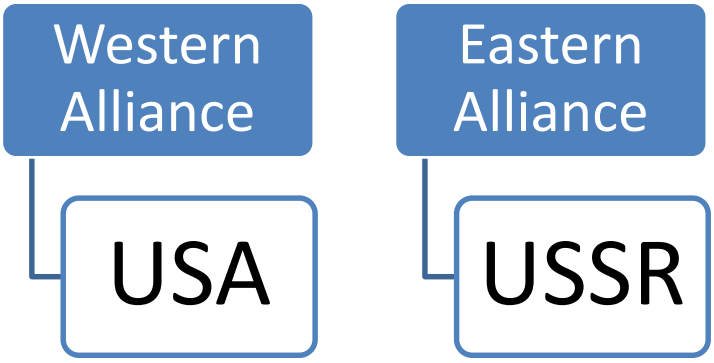


4] ARENAS {areas} OF THE COLD WAR:-

- When we talk about arenas of the cold war, where crisis and war occurred or threatened to occur between the alliances systems but did not cross certain limit.
- For example- Korea, Vietnam and Afghanistan where many lives were lost but world was spared from nuclear war.

5] CHALLENGES TO BIPOLARITY:-

- The two superpowers expanded their own spheres of influence in different parts of the world. It divided the world into two-



- India played an active role in mediating between two rival alliances for the sake of peace and stability.
- India did not join either of the two blocs.
- It's strength based on unity of NAM members.
- Five founder members of NAM:-

- These five leaders came to be known as the five founders of NAM.

6] NIEO (New International Economic Order):-

- The main objective of New International Economic Order was to develop more to least Economic developed countries of NAM & to lift them out of poverty by their Sustainable development.
- But by late 1980s, the NIEO initiative had faded mainly because of the Stiff opposition from the developed countries & non –aligned

countries struggled to maintain their unity in the face of this opposition.

7] INDIA AND THE COLD WAR:-

- India's foreign policy during the cold war towards the US & USSR was neither negative nor passive.
- India was in favour of actively intervening in world affairs to soften Cold war rivalries.
- During the Cold war, India repeatedly tried to activate those regional and international organisation, which were not a part of the alliances led by the US & USSR.
- Nam served India's interests also to participate in international decisions and maintained balance between two superpowers.

NOTE: 1. Leave first two pages for PA-1 syllabus and index.

NOTE: 2. Write all the answers in your political science notebook.

TEST YOUR SKILLS

✶OBJECTIVE TYPE QUESTIONS:-

✶ONE MARK QUESTIONS:-

1. Name the two international personalities who played an important role in the Cuban missile crisis?
2. What do you mean by Cold war?
3. How did the second war end?
4. Name the two superpowers responsible for Cold war Era.
5. When did the world become Unipolar?
6. Name the Allied and Axis powers during the Second World War.
7. When did the NATO and WARSAW PACT come into existence?
8. Name the leaders who played a crucial role in Cuban Missile Crisis.
9. Write the full form of the following: - NIEO, SEATO, CENTO, LDCs & USSR

10. Give the time duration of the First World War and the Second World War?
11. Why were nuclear missiles placed in Cuba by USSR?
12. What was the result of the Cuban Missile Crisis?
13. Differentiate between Cold war and a hot war.
14. Which movement proved to be challenge to superpower?
15. Fill in the blanks:-
    a. The Cuban Missile Crisis was a high point of what came to be known as the _____.
    b. The US dropped _____ atomic bombs on the Japanese cities of _____ and _____ in August _____.
16. What is deterrence?
17. What are NATO and WARSAW Pact?
18. What is called arms race?
19. When was the first NAMs summit held?
20. Name the five founders of NAM.
21. Differentiate between non- alignment, isolationism and Neutrality.
22. Name the countries who had signed LTBT.
23. Write True/False:-
    a. The use of nuclear weapons in the cold war was highly appreciated.
    b. India was not an ally of the US during the cold war period.
    c. START & SALT-1 were names of nuclear weapons developed by the US.
    d. George H.W.Bush was the president of us at the time of the end of Cold war period.
    e. American president Harry Truman gave a doctrine about the containment of communism.
    f. India's non alignment was criticized because it was unprincipled and inconsistent.
24. Correct the following statement and re write in your notebook:-
    a. NATO came into existence in June 1949 and it was an association of 11 states.

✶VERY SHORT ANSWER TYPE QUESTIONS:-

✶TWO MARK QUESTIONS:-

1. Describe Cuban Missile Crisis.
2. Why the superpower did needed support from smaller states?
3. Why the smaller states were formed alliances with the superpowers?
4. Why is non-alignment not considered as isolationism?

_____ x_____