

## Class - 11, Unit-I

## Physical World

## Good Workers work for Extended

Session.
Strength wise arrangement of fundamental forces in ascending order: Gravitation < Weak Nuclear force < Electromagnetism < Strong Nuclear force

## Class - 11, Unit-II

## Motion In A Straight Line



Delhi to Vadodara via Tundla Agra.
Displacement/time = Velocity
Velocity / time = acceleration

## Class - 11, Unit-III

1.(a) Newton's Laws of Motion

Newton, Newton don't kick cow
She may move ahead little bit now* Newton hears her MAAA sound** Cow gives Newton a kick rebound***

* Newton's 1st law. A body continues its state of rest or state of motion unless it is acted upon by an unbalanced force.
** Newton's 2nd law F = ma
*** Newton's 3rd law : Every action has its equal and opposite reaction
Interpretation :
1st two lines of the rhyme depicts the 1st law of motion
3rd line depicts the 2nd law of motion
i.e. $F=m \times l$

Lat the depicts the 3rd law of motion

## 1.(b) Motion In A Straight Line

A will be $\mathbf{I}$, when 0 is close to $\mathbf{T}$
Replace the " $\Delta$ " simply with " $d$ "
Average Velocity $=\Delta D / \Delta T$
$\lim _{\Delta T \rightarrow 0} \frac{\Delta \mathrm{D}}{\Delta \mathrm{T}}=$ Instantaneous velocity $=\mathrm{dD} / \mathrm{dT}$
Average Acceleration $=\Delta \mathrm{V} / \Delta \mathrm{T}$
$\lim _{\Delta \mathrm{T} \rightarrow 0} \frac{\Delta \mathrm{~V}}{\Delta \mathrm{~T}}=$ Instantaneous velocity $=\mathrm{dV} / \mathrm{dT}$

## Class - 11, Unit-IV

## Work, Energy And Power

Fernandez d'souza ordered noodles,
but was served pizza and pizza was a zest.
If force and Displacement are in opposite direction, then work done is negative.
If force and Displacement are in same direction, then work done is positive.
If force and Displacement are perpendicular to each other, then work done is zero.

## Class - 11, Unit-V

Motion Of System Of Particles \& Rigid Body
How rhino came swift? Since dino came slow.
Write $2 \mathrm{MR}^{2}$ under each figure and then divide by
2, 3, 4, 5 respectively.


Solid Disk


Solid
Cylinder


## Class - 11, Unit-VI

## Kelper's Laws of Planetary motion :



## Interpretation:

Letter E and F of Essential Food represents "Elliptical" and "Foci".
$\mathbf{1}^{\text {st }}$ Law : Planets move in elliptical orbits with Sun at one of the foci.
Letter E of the word Everyday represents "Equal":
$\mathbf{2}^{\text {nd }}$ Law : A planet covers the equal area space in equal interval of time no matter where it is in its orbit.
$2 / 3$ and T of the last two words represents the "power of Time Period" and "power of semi-major axis:

## $3^{\text {rd }}$ Law :

Square of the Time-period of the planet is proportional to the cube of the semi major axes of the orbit.
$\mathrm{T}^{2} \propto \mathrm{R}^{3}$.

## Class - 11, Unit-VII

## 1. Mechanical Properties Of Solid

## Young Ravi bought a pen.

(1) Relation between $\mathbf{Y}, \mathbf{B}$ and $\sigma$ : (write Y and $\mathrm{B}(1+$ $\sigma$ ) with coefficients and an equal sign in between. $1 Y=3 B(1+\sigma)$
To find the coefficient of $\sigma$, refer the anti-clock circle, subtract the coefficients of $B$ from
coefficient of $Y$ i.e. $1-3=-2$
So, the relation is $1 \mathbf{Y}=3 \mathbf{B}(1-2 \sigma)$ or, $\mathbf{Y}=3 \mathbf{B}(1-2 \sigma)$
(2) Relation between $\mathbf{Y}, \eta$ and $\sigma$ : (write $\mathbf{Y}$ and $\eta(1+$ $\sigma$ ) with coefficients and an equal sign in between.

$$
1 \mathbf{Y}=2 \eta(1+\sigma)
$$

To find the coefficient of $\sigma$, subtract the coefficient of $\mathbf{Y}$ from coefficient of $\eta$ i.e. $2-1=1$
So, the relation is $1 \mathbf{Y}=2 \eta(1+\sigma)$ or, $\mathbf{Y}=2 \eta(1+\sigma)$
Young Ravi bought a pen

(2 for $\eta$ )
Young's
Modulus
(1 for Y )

## 2. Thermal Properties of Matter

## Fingers we have five

Cats have nine lives.

## With $\mathbf{1 6 0}$ more

## Cat will help you sure!

Fingers we have five $\rightarrow 5 \mathrm{~F}$
Cats have nine lives. $\rightarrow 9 C$
With 160 more $\rightarrow 9 \mathrm{C}+160$
Cat will help you sure! $\rightarrow 5 \mathrm{~F}=9 \mathrm{C}+160$

## Class - 11, Unit-VIII

## Thermodynamics

Temperature, Volume, Pressure No Heat is transferred
Constant temperature $\rightarrow$ Isothermal process
Constant volume $\rightarrow$ Isochoric process
Constant pressure $\rightarrow$ Isobaric process
No heat transferred $\rightarrow$ Adiabatic process

## Class - 11, Unit-IX

## Behaviour of Perfect Gas \& Kinetic Theory

Degrees of freedom :
Baa Baa Black Sheep
Have you any wool?
Yes sir, Mom has $\mathbf{3}$ bags full.
Dadi needs $\mathbf{5}$ bags normally cool
Papa keeps 6 bags normal rule.
Papa, Dadi each needs $\mathbf{2}$ bags more High cold whenever, be very sure.
Mom has $\mathbf{3}$ bags full $\rightarrow$ Degrees of freedom of Monoatomic gas is 3 .
Dadi needs $\mathbf{5}$ bags normally cool
Degrees of freedom of diatomic gas at normal $\rightarrow$ (room) temperature is 5 .
Papa keeps 6 bags normal rule $\rightarrow$ Degrees of freedom of Polyatomic gas at normal (room) temperature is 6 .
Papa, Dadi each needs 2 bags more
$\rightarrow$ Degrees of freedom of Polyatomic gas at high temperature is $6+2=8$.
High cold whenever, be very sure $\rightarrow$ Degrees of freedom of Diatomic gas at high
temperature is $5+2=7$.

## Class - 11, Unit-X

## Waves

If Teacher Punished Lazy Dog.
Particle oscillation in Transverse wave $\rightarrow$ Perpendicular to the direction of propagation of wave
Particle oscillation in Longitudinal wave $\rightarrow$ In the direction of propagation of wave

## Class - 12, Unit-I

## Electric Charge \& Field

Equally divide cost per annum.
To find electric field, divide the charge (enclosed) by the free space permittivity and area of the Gaussian

## Class - 12, Unit-II

## Resistor colour code :

$\begin{array}{llllll}0 & 1 & 234 & 5 & 7 & 8\end{array} 9$
B B ROY GOES BERLIN VIA GOA WALTAIR.


Black
Interpretation :
Colour codes of carbon resistors :

| Colour | Corresponding <br> number |
| :---: | :---: |
| Black | 0 |
| Brown | 1 |
| Red | 2 |
| Orange | 3 |
| Yellow | 4 |
| Green | 5 |
| Berlin | 6 |
| Violet | 7 |
| Grey | 8 |
| White | 9 |

## Class-12, Unit-III

## Moving Charge And Magnetism

Fleming's left and right hand rule:


In Fleming's left hand rule, Thumb indicates FORCE.
In Fleming's left hand rule, Thumb indicates MOTION.
In both rules, first finger indicates FIELD and second finger indicates CURRENT

## Class - 12, Unit-IV

## Alternating Current

Calcutta City Very Lovely and Very Congested
For capacitive circuit $\rightarrow$ Current leads Voltage
For inductive circuit $\rightarrow$ voltage leads current

## Class - 12, Unit-V

## Electromagnetic Waves

R 5 Russian Magician showed an
Interesting Very Unusual X-ray eye
Game

Electromagnetic waves with increasing frequency (decreasing wavelength) is in the order of:
(a) Radio wave
(b) Microwave
(c) Infrared
(d) Visible light
(e) Ultraviolet
(f) $\mathbf{X}$-Rays
(g) Gamma Rays

## Class - 12, Unit-VI

(a). Ray Optics \& Optical Instruments

## M means MORE i.e

Mirror Formula
M means M
So, $\frac{1}{v}+\frac{1}{u}=\frac{1}{f}$
Magnification will be of opposite sign :
So, $m=-\frac{v}{u}$
Particle oscillation in Transverse wave $\rightarrow$ Perpendicular to the direction of propagation of wave

Particle oscillation in Longitudinal wave $\rightarrow$ In the direction of propagation of wave

## (b). Ray Optics \& Optical Instruments

## L means MORE i.e

Lens Formula


L means LESS i.e-
So, $\frac{1}{v}-\frac{1}{u}=\frac{1}{f}$
Magnification will be of opposite sign:
So, $m=+\frac{v}{u}$

Particle oscillation in Transverse wave $\rightarrow$ Perpendicular to the direction of propagation of wave

Particle oscillation in Longitudinal wave $\rightarrow$ In the direction of propagation of wave

## Class-12, Unit-VII

## Einstein's equation of Photoelectric

 effect :W E Unite to form People


Energy of electron emitted
Work Function
Energy of emitted electron + Work function $=$ Energy of incident Photon
Interpretation :
$E+\varphi=h f$
Or, $\mathrm{E}=\mathrm{hf}=\varphi$

## Class - 12, Unit-VIII

(a). Atom : Hydrogen Spectra

## Papa brings Pastry for Babu and Lal

When $\mathrm{ni}=1$, the series is Lyman
When ni $=2$, the series is Balmer
When ni $=3$, the series is Paschen
When ni $=4$, the series is Brackett
When $\mathrm{ni}=5$, the series is $\mathbf{p}$-fund
(b). Atom : Hydrogen Spectra

## $\mathbf{1}$ is Unimportant, $\mathbf{2}$ is Very important and rest are Important

If $n i=1$, i.e. Lyman series is in $\mathbf{U V}$ range.
If $\mathrm{ni}=2$, i.e. Balmer series is in VISIBLE range.
If ni $=3,4$ and 5 , i.e. Paschen series, Brackett
series and $p$-fund series are in IR range
(c). Isotope, Isobar, Isotone

## ISO Tope Bar Tone

TOPE (Pi.e numbers of PROTONs are same and numbers of NEUTRONs different
ISO-BAR No(PNo (Ni.e. both PROTONs and NEUTRONs differ in number (Total remains same.)
TONE ©i.e. numbers of NEUTRONs are same and numbers of PROTONs different

In isotopes, numbers of protons are same. Numbers of neutrons are different.
In isotones, numbers of neutrons are same. Numbers of protons are different. In isobars, numbers of neutrons are different. Numbers of protons are also different. But the total nucleons remain same.

## Class - 12, Unit-IX

## Electronic Devices

## II Truth table of AND and OR gate



For AND gate, when both the switches are ON, then only the bulb is ON.
i.e. When both the inputs are 1 , then only output is 1 . Otherwise the output is 0 .


For OR gate, when both the switches are OFF, then only the bulb is OFF.
i.e. When both the inputs are 0 , then only output is 0 . Otherwise the output is 1


## CHEMISTRY

## Chapter - 1 <br> Some Basic Concepts in Chemistry

## 1. Metric System

The Great Morning King Henry
Doesn't Usually Drink chocolate Milk
Mixed with Natural Powder
The $\rightarrow$ Tera $\left(\times 10^{12}\right)$
Great $\rightarrow$ Giga $\left(\times 10^{9}\right)$
Morning $\rightarrow$ Mega ( $\times 10^{6}$ )
King $\rightarrow$ Kilo ( $\times 10^{3}$ )
Henry $\rightarrow$ Hecto $\left(\times 10^{2}\right)$
Doesn't $\rightarrow$ Deca ( $\times 10$ )
Usually $\rightarrow$ Unit ( $\times 1$ )
Drink $\rightarrow$ Deci $\left(\times 10^{-1}\right)$
Chocolate $\rightarrow$ Centi $\left(\times 10^{-2}\right)$
Milk $\rightarrow$ Milli $\left(\times 10^{-3}\right)$
Mixed with $\rightarrow$ Micro $\left(\times 10^{-6}\right)$
Natural $\rightarrow$ Nano $\left(\times 10^{-9}\right)$
Powder $\rightarrow$ Pico $\left(\times 10^{-12}\right)$

## Chapter - 2 <br> States of Matter

1. Gas Law's

## PTV

(letters that touches are directly proportional \& letter don't are indirectly proportional)
$[P \propto T],[V \propto T],\left[P \propto \frac{1}{V}\right]$
2. Const terms in Gas Laws

## Paid TV Can Be Good

Const terms $\rightarrow$ Pressure (P) Temp (T) Volume (V)
Gas Law $\rightarrow$ Boyle's (Gay-Lussac's)

## 3. Ideal Gas Behavior

## PLIGHT

High temp \& Low pressure to achieve ideal Gas behavior
PL $\rightarrow$ Pressure Low
IG $\rightarrow$ Inert Gas
HT $\rightarrow$ High Temp
4. Kinetic Theory of Gas

Mother SPEAKS
$M \rightarrow$ Motion (Gas Particle are in Random Motion)
$S \rightarrow$ Size (negligible size of particle to total volume)
$\mathrm{P} \rightarrow$ Pressure (Pressure exerted due to Collision with walls of container)
$\mathrm{E} \rightarrow$ Elastic Collision
A $\rightarrow$ Attractive forces are not present
$K \rightarrow K . E \propto$ Temp
$S \rightarrow$ Speed (Distribution of speed of particles remain const.)

## 5. Crystal System

## Cu Te MOTHe R 3224

Unit Cell - Cubic, Tetragonal, Monoclinic, Orthorhombic, Triclinic, Hexagonal, Rhombohetral
Edge Length - $a=b=c, a=b \neq c, a \neq b \neq c, a \neq b \neq c$, $a \neq b \neq c, a=b \neq c, a=b=c$
Axial Length - $\alpha=\beta=\gamma, \alpha=\beta=\gamma, \alpha=\beta \neq \gamma, \propto=\beta=\gamma$, $\alpha \neq \beta \neq \gamma, \alpha=\beta \neq \gamma, \alpha=\beta=\gamma$
No. of Bravias Lattice - 3, 2, 2, 4, 1, 1, 1
6. Edge Length
Ii. TOM Handpicked Tag (HT) of Class Representative (CR)
Triclinic, Orthorhombic, Monoclinic ( $a \neq b \neq c$ )
Hexagonal, Tetragonal ( $a=b \neq c$ )
Cubic, Rhombohetral ( $a=b=c$ )

## 7. Axial Angles

## TORC Has More (HM) Twists (T)

Tetragonal, Orthorhombic, Rhombohedral, Cubic ( $\alpha=\beta=\gamma$ )
Hexagonal, Monoclinic ( $\alpha=\beta \neq \gamma$ )
Triclinic ( $\propto \neq \beta \neq \gamma$ )

## Chapter - 3 <br> Atomic Structure

## 1. Atomic No. \& Mass No.

## APEMAN

Atomic No. $=$ No. of Protons
= No. of Electrons

Mass No. $=$ Atomic No. + No. of neutrons

## 2. Isotopes, Isobars \& Isotones

## Bring Top Talented MAN (BTT MAN)

```
Atoms having same
Isobars }->\mathrm{ Mass Number
Isotopes }->\mathrm{ Atomic Number
Isotones }->\mathrm{ Neutrons
```


## 3. Electromagnetic Spectrum

$\stackrel{\pi}{6}$
Roman Men Invented Very Unusual
X-ray Gun
Roman $\rightarrow$ Radiowaves
Men $\rightarrow$ Microwaves
Invented $\rightarrow$ IR waves
Very $\rightarrow$ Visible rays
Unusual $\rightarrow$ UV waves
X-ray $\rightarrow$ X-rays
Gun $\rightarrow \gamma$-rays (Gamma rays)
4. Visible Region of EMR

VIBGYOR

Visible
(a) Violet
(b) Indigo
(c) Blue
(d) Green
(e) Yellow
(f) Orange
(g) Red

## 5. Planck's Quantum theory

Employee's Provident Fund (EPF)
Energy $=$ Planck's constant $\times$ Frequency
$[\mathrm{E} \quad=\quad \mathrm{hr}]$
6. H-atom spectral lines

Myan Mer Pasta Bread Fund
Lyman ( $\mathrm{n}_{1}=1$ )
Balmer ( $\mathrm{n}_{1}=2$ )
Paschen ( $n_{1}=3$ )
Brackett ( $n_{1}=4$ )
Pfund ( $\mathrm{n}_{1}=5$ )
7. Bohr Model of an atom

Electronic video Recording (EVR)
Energy $(E) \propto \frac{z^{2}}{n^{2}}$
Velocity $\propto \frac{z}{n}$
Radius $\propto \frac{\mathrm{n}^{2}}{\mathrm{z}^{2}}$

## 8. Quantum Numbers

## SPAM

$S \rightarrow$ Spin Quantum no. $\left(m_{s}\right)$
$\mathrm{P} \rightarrow$ Principal Quantum no. ( n )
A $\rightarrow$ Azimuthal Quantum no. (l)
$M \rightarrow$ Magnetic Quantum no. $\left(m_{2}\right)$
9. Sequence of orbitals

Sober Physicists Don't Find Giraffes
Hiding In Kitchen
s,p,d,f,g,h,i,k

## Chapter-4 <br> Chemical Bonding \& Molecular

## Structure

## 1. Formal Charge

For Very Lovely Son!
[Formal Charge (F.C) = Valence $\mathrm{e}^{-}$in free state (V.E) - Lone pair (L.p) $-1 / 2 \times$ Shared $\left.e^{-}(S . E)\right]$
2. H-bonding

## H-bonding is FON (Fun)!

Fluorine, Oxygen, Nitrogen
3. Diatomic Molecules

Have No Fear of Ice Cold Beer
$\mathrm{H}_{2^{\prime}} \mathrm{N}_{2^{\prime}} \mathrm{F}_{2^{\prime}} \mathrm{O}_{2^{\prime}} \mathrm{I}_{2^{\prime}} \mathrm{Cl}_{2^{\prime}} \mathrm{Br}_{2}$
4. Chemical Bond Strength

I can't Handle Dirty Vans
Ionic > Covalent $>$ H-bonds $>$ Dipole $>$ Vanderwaal

## 5. Bond Polarity

## SNAP

Symmetrical $\rightarrow$ Non Polar
Asymmetrical $\rightarrow$ Polar
6. Hybridisation
(VMCA)

Steric No. $=1 / 2[\mathrm{~V}+\mathrm{M}-\mathrm{C}+\mathrm{A}]$
$\mathrm{V} \rightarrow$ Valence $\mathrm{e}^{-}$of central atom
M $\rightarrow$ Monovalent atoms (H/X)
C $\rightarrow$ Cationic Charge
A $\rightarrow$ Anionic Charge

## Chapter - 5

Chemical Thermodynamics

1. Process Boring ACT

## Peer's Hard Verified Test

Process ISO Bar Adiabatic ISO Choric ISO Therm Const $\rightarrow$ Pressure (P) Heat (q) Volume (V) Temp (T)
2. State Function

PVT HUGS
Pressure, Volume, Temp, Enthalpy (H), Internal Energy (U), Gibbs free energy (G) Entropy (S)
3. First law of Thermodynamics

I Work Hard
Change in internal energy $(U)=$ Work $(w)+$ Heat $(q)$
4. Heat Capacity

PVR Cinemas
$C_{p}-C_{V}=R$
5. Criteria of Spontaneity


Good Physicists Have Studied Under Very Ambitious Teachers
(dH) $)_{s, p}<0$
$(\mathrm{dU})_{s, c}<0$
$(d G)_{P, T}<0$
$(\mathrm{dA})_{V, T}<0$
$(\mathrm{dS})_{\mathrm{H}, \mathrm{P}}>0$
(dS) $)_{U, \mathrm{~V}}>0$

6. Gibb's Free Energy

## ii) <br> Get High Test Scores

$\Delta \mathrm{G}=\Delta \mathrm{H}-\mathrm{T} \Delta \mathrm{S}$

## Chapter - 6 Solutions

Ideal \& Non ideal Solutions
HIV

|  | Ideal | Non-Ideal |
| :--- | :---: | :---: |
| Enthalpy $(\Delta H)$ | $\Delta H=0$ | $\Delta H \neq 0$ |
| Intermolecular | $A-A \& B-B$ is | $A-A \& B-B$ is not |
| Forces | same as A-B | same as A-B |
| Volume $(\Delta V)$ | $\Delta V=0$ | $\Delta V \neq 0$ |

## Chapter-7 Equilibrium

Bronsted Acid-Base Concept
Strong Army, Lost to Carelessly
Weak Bandits
Strong Acid gives Weak Conjugate Base

## Chapter - 8

Redox Reactions and Electrochemistry

1. Redox Reaction

## Leo Say Ger !

Loss of $\mathrm{e}^{-}$is oxidation
Gain of $e^{-}$is reduction
2. Redox Reaction

Red Cat

Reduction at Cathode
3. Redox Reaction

An Ox
Anode for Oxidation
4. Metal Activity Series

Please Stop Calling Me A Zebra
Crab. I Like Calling Her Smart Goat
Potassium > Sodium > Calcium > Magnesium > Aluminium > Zinc > Chromium > Iron > Lead > Copper $>$ Mercury $(\mathrm{Hg})>$ Silver $>$ Gold
5. Metal activity series

## FAT CAT

[^0]6. Metal activity series
D. Amount of Hundred Ceins

Balancing Half Cell
Steps: (1) Atoms
(2) Oxygen
(3) Hydrogen
(4) Charge
7. Electro Chemical Series

Priyanka Chopra Sees Movie About
Zebra In The Libya Hiring Cobra Studying Algebra

Potassium < Calcium < Sodium < Magnesium < Aluminium < Zinc < Iron < Tin < Lead < Hydrogen < Copper < Silver < Gold (Au)
8. For Galvanic Cell

LOAN

Loss of $\mathrm{e}^{-}$
Oxidation
Anode
Negative
9. Electrolytic Cell

## LOAP

Loss of $e^{-}$
Oxidation
Anode
Positive

## Chapter - 9 <br> Chemical Kinetics and Surface Chemistry

1. Mechanism of Heterogeneous Catalysis

## RAID Program

(a) Reactant diffusion on surface
(b) Adsorption of Reactant
(c) Intermediate formation
(d) Desorption of product
(e) Product leaves the surface
2. Types of Colloids

Soft SAGE And Shredded Face (SSAGEASF)

| Dispersed | Dispersion | Type of Colloids |
| :--- | :---: | :---: |
| Phase | Medium | Solid Sol |
| Solid | Solid | Solid Sol |
| Solid | Liquid | Sol |
| Solid | Gas | Aerosol |
| Liquid | Solid | Gel |
| Liquid | Liquid | Emulsion |
| Liquid | Gas | Aerosol |
| Gas | Solid | Solid Sol |
| Gas | Liquid | Foam |

## Chapter - 10

Classification of Elements and Periodicity in Properties

1. Elements of Atomic No (1-18)

Happy Harry Listen BBC Network
Over French Network. Native
Magpies Always Sit Peacefully
Searching Clear Areas
H, He, Li, Be, B, C, N, O, F, Ne, Na, Al, Si, P, S, Cl, Ar
2. Group I Elements

## Little Nasty Kids Rub Cats Fur

Lithium (Li), Sodium (Na), Potassium (K), Rubidium (Rb) Caesium (Cs), Francium (Fr)

## 3. Group II Elements

Beer Mugs Can Snap Bar's
Reputation
Beryllium (Be), Magnesium (Mg), Calcium (Ca), Strontium (Sr), Barium (Ba), Radium (Ra)
4. Group III Elements

## BAGIT

Boron (B), Aluminium (Al), Gallium (Ga), Indium ( In ), Thallium ( Tl )
5. Group IV B Elements

## 21 Can Simple Germans Surprise Public

Carbon (C), Silicon (Si), Germanium (Ge), Tin (Sn), Lead (Pb)
6. Group V B Elements

New Police Assign Subordinate
Bikram on Duty

Nitrogen (N), Phosphorus (P), Arsenic (As),
Antimony (Sb), Bismuth (Bi)

## 7. Group VI B Elements

Old Sahranpur Seems Terribly
Polluted
Oxygen (O), Sulphur (S), Selenium (Se), Tellurium (Te), Polonium (Po)

## 8. Group VII B Elements

First Class Biryani In Australia
Fluorine (F), Chlorine (Cl), Bromine (Br), lodine (I), Astatine (Al)
9. Group VIII B/18 Elements

He never Arrived; Karan exited with

- Rohan

Helium (He), Neon (Ne), Argon (Ar), Krypton (Kr), Xenon (Ex), Radon (Rn)
10. 3d-Series
2. Scary Tiny Vicious Creatures are

Mean females come to Night Club Zen
$\mathrm{Sc}, \mathrm{Ti}, \mathrm{V}, \mathrm{Cr}, \mathrm{Mn}, \mathrm{Fe}, \mathrm{Co}, \mathrm{Ni}, \mathrm{Cu}, \mathrm{Zn}$,
11. 4d-Series

11 Yes S(z)sir Nob. Most Technicians Rub Rod's Pale Silver Cadillac Y, Zr, Nb>Mo, Tc, Ru, Rh, Pd, Ag, Cd
12. 5d-Series

IT Late Harry Took Walk, Reached Office In Pajamas After an Hour
La......., Hf, Ta, W, Re, OS, Ir, Pt, Au, Hg
13. Lanthanides

Ladies Can't Put Needles Properly in Slot-machnies. Every Girl Tries Daily However, Every Time You'd be lose La, Ce, Pr, Nd, Pm, Sm, Eu Gd, Tb, Dy, Ho, Er, Tm, Yb, Lu

## Chapter - 11

## General Principles and Process of Isolation of Metal

1. Process of Metallurgy CIP (Read opp PIC)
(a) Concentration of Ore
(b) Isolation
(c) Purification
2. Concentration of Ore

## Honest Man Feeling Low (HMFL)

(a) Hydraulic Washing
(b) Magnetic Separation
(c) Froath Floatation Method
(d) Leaching

## 3. Conversion to Oxide

CRAP

Calcination $\rightarrow$ Absence of $\mathrm{O}_{2}$
Roasting $\rightarrow$ Presence of $\mathrm{O}_{2}$
4. Ores

MISH
Prime Minister Going China
Iron ores $\rightarrow$ Magnetite, Iron pyrites, Siderite, Haematite
Copper ores $\rightarrow$ Copper pyrites, Malachite, Copper Glance, Cuprite

## Chapter-12

Hydrogen, s \& p-Block Elements
Hydrogen

1. Isotopes of Hydrogen

## Pro-Diabetic Treatment PDT)

Protium $\binom{1_{H}}{1^{H}}$
Deuterium $\binom{2}{1^{2}}$
Tritium $\quad\binom{3}{1^{3}}$
2. H-Bonding

## iso FON! (Say Fun)

Fluorine, Oxygen, Nitrogen

## 3. Hardness of Water

CM is temporarily hard with Head
Clerks (HC) but permanently Temporary hardness due to $\mathrm{Mg}\left(\mathrm{HCO}_{3}\right)_{2^{\prime}} \mathrm{Ca}\left(\mathrm{HCO}_{3}\right)_{2}$ Permanent hardness due to $\mathrm{MgCl} 2, \mathrm{CaCl}_{2^{\prime}} \mathrm{MgSO}_{4^{\prime}}$ $\mathrm{CaSO}_{4}$ Hard with civil servants (CS) $\mathrm{Cl}^{-}, \mathrm{SO}^{2-}$ hydrogen Carbonate $\left(\mathrm{HCO}_{3}{ }^{-}\right)$

## s-block elements

## 4. Group I Elements

## Little Nasty Kids Ruts Cats Far

Lithium (Li), Sodium (Na), Potassium (K), Rubidium (Rb), Caesium (Cs), Francium (Fr)

## 5. Group II Elements

## Beer Mug Can Snape Bar's

Reputation
Beryllium (Be), Magnesium (Mg), Calcium (Ca), Strontium (Sr), Barium (Ba), Radium (Ra)
6. Castner Kellnar Cell

Cement Modified Soil (CMS)
Oxidised
Cathode Mercury (Hg) on which
Sodium ion $(\mathrm{Na}+)$ is oxidised
ACC $\rightarrow$ reduced $\rightarrow$ Anode of carbon on which $\mathrm{Cl}^{-}$is reduced
7. Properties of Birch Reagent

## Roman People Can Commute (RPCC)

$\left(\mathrm{Na} / \mathrm{Li}+\right.$ liq. $\left.\mathrm{NH}_{3}\right)-$
(Reducing in nature, Paramagnetic, conducting, Coloured)

## p-block elements

8. Group 13 Elements

## BAGIT

Boron (B), Aluminium (Al), Gallium (Ga), Indium (In), Thallium (Tl)
9. Group 14 Elements

10. Borax bead Test

Multiple Program Combined (MPC) for Your Growth (FYG). New Boys Get (NBG) Common Boys Room (CBR) for Combining Desktop Drawing (CDD)

| Ion | Oxidising Flame | Reducing Flame |  |  |
| :--- | :---: | :---: | :---: | :---: |
| $\mathrm{Mn}_{2}+$ | Pink | Colour less | $\rightarrow$ | MPC |
| $\mathrm{Fe}_{2}+/ \mathrm{Fe}_{3}+$ | Yellow | Green | $\rightarrow$ | FYG |
| $\mathrm{Ni}_{2}+$ | Brown | Grey | $\rightarrow$ | NBG |
| $\mathrm{Cu}_{2}+$ | Blue | Red | $\rightarrow$ | CBR |
| $\mathrm{Co}_{2}+$ | Deep Blue | Deep Blue | $\rightarrow$ | CDD |

p-block elements
11. Group 15 Elements

New Police Assigns Subordinate Bikram on duty
Nitrogen (N)
Phosphorus (P)
Arsenic (As)
Antimony (Sb)
Bismuth (Bi)
12. Group 16 Elements

Old Sahranpur Seems Terribly Polluted
Oxygen (O)
Sulphur (S)
Selenium (Se)
Tellurium (Te)
Polonium (Pu)
13. Group 17 Elements

First Class Biryani In Australia
Fluorine (F)
Chlorine (Cl)
Bronine (Br)
lodine (I)
Astatine (At)
14. Group 18 Elements

He Never Arrived; Karan exited with Rohan

Helium (He)
Neon (Ne)
Argon (Ar)
Krypton (Kr)
Xenon (Xe)

$$
\begin{aligned}
& \text { Chapter - } 13 \\
& \text { d \& f block elements and } \\
& \text { Coordination Compounds }
\end{aligned}
$$

1. 3d-Series
(i) Scary Tiny Vicious Creatures are Mean; Females Come to Night Club Zen
$\mathrm{Sc}, \mathrm{Ti}, \mathrm{V}, \mathrm{Cr}, \mathrm{Mn}, \mathrm{Fe}, \mathrm{Co}, \mathrm{Ni}, \mathrm{Cu}, \mathrm{Zn}$
2. 4d-Series


Yes S(z)ir, Nob Most Technicians Rub
Rod's Pale Silver Cadillac
$\mathrm{Y}, \mathrm{Zr}, \mathrm{Nb}, \mathrm{Mo}, \mathrm{Tc}, \mathrm{Ru}, \mathrm{Rh}, \mathrm{Pd}, \mathrm{Ag}, \mathrm{Cd}$
3. 5d-Series

Late Harry Took Walk, Reached Office In Pajamas After an Hour
La....... Hf, Ta, W, Re, Os, Ir, Pt, Au, Hg

## 4. Lanthanides

Ladies Can't Put Needles Properly is Slot-machines. Every Girl Tries Daily, However, Every Time You'd be Lose
La, Ce, Pr, Nd, Pm, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm, Yb, Lu

## 5. Spectrochemical Series

I Bought Some Copies to Study Fundamental of Chemistry. He Nurtured Excellence in Necessary Coordination Compound

```
I < Br < SCN- < Cl- < S2- < OH- < C C OO4 }\mp@subsup{}{}{2-}<\mp@subsup{\textrm{H}}{2}{}\textrm{O}
NC5- < EDTA4}< < NH3 < CN- < CO
```

6. Pairing of $\mathbf{e}^{-}$Octahedral Complexes

Common League People win Hearts
CFSE $\left(\Delta_{0}\right)$ < Pairing Energy
Ligand $\rightarrow$ Weak field
Type of complex $\rightarrow$ High spin
Pairing of $e^{-}$in $t_{2} g$ orbital

## 7. Werner's theory

## Plcturesque SNow

Primary valency $\rightarrow$ Ionisable (Charge on Ionisation sphere)
Secondary valency $\rightarrow$ Non Ionisable (Coordination Number)
8. Spectrochemical series

I Bought Some Copies to Study
Fundamental of Chemistry
He Nutured Excellence in Necessary Coordination Compounds
$\mathrm{I}^{-}<\mathrm{Br}^{-}<\mathrm{SCN}^{-}<\mathrm{Cl}^{-}<\mathrm{S}^{2-}<\mathrm{OH}^{-}<\mathrm{C}_{2} \mathrm{O}_{4}{ }^{2-}<\mathrm{H}_{2} \mathrm{O}<$ NCS $^{-}<$EDTA $^{4-}<\mathrm{NH}_{3}<\mathrm{CN}^{-}<\mathrm{CO}$
$r^{-}=1$
$\mathrm{Br}=$ Brought
$\mathrm{SCN}^{-}=$Some
$\mathrm{Cl}^{-}=$Copies to
$\mathrm{S}^{2-}=$ Study
F = Fundamental
$\mathrm{OH}^{-}=\mathrm{Of}$
$\mathrm{C}_{2} \mathrm{O}_{4}{ }^{2-}=$ Chemistry
$\mathrm{H}_{2} \mathrm{O}=\mathrm{He}$
NCS ${ }^{-}=$Nutured
EDTA ${ }^{4}=$ Excellence in
$\mathrm{NH}_{3}=$ Necessary
$\mathrm{CN}^{-}=$Coordination
CO = Compounds
9. Pairing of $e^{-}$Octahedral Complexes

Common League People win Hearts Vice-Versa
(i) CFSE $\left(\Delta_{0}\right)$ < Pairing Energy (P.E)

Ligand $\rightarrow$ Weak field ligand
Type of complex $\rightarrow$ High spin Complex
Pairing of $e^{-}$in t 2 g orbital
(ii) CFSE $\left(\Delta_{0}\right)$ < Pairing Energy (P.E)
10. Werner's theory

Plcturesque SNow
Primary valency $\rightarrow$ Ionisable i.e., Charge on Ionisation sphere (Plcturesque)
Secondary valency $\rightarrow$ Non Ionisable i.e., Coordination number (SNow)

## Chapter - 14

Environmental Chemistry

## 1. Gases air Pollutants

## HOSCN

Hydrocarbons, Oxides of Sulphur $\left(\mathrm{SO}_{2}, \mathrm{SO}_{3}\right)$, Carbon ( $\mathrm{CO}, \mathrm{CO}_{2}$ ), Nitrogen ( $\mathrm{NO}, \mathrm{NO}_{2}$ )
2. Components of Photochemical Smog

O FAN PAN

Ozone, Formaldehyde, Acrolein, Nitric oxide, PAN

## Chapter - 15 <br> Purification, Basic Principles and Characteristics of Organic Compounds

1. Functional group preference order

ASEHA NAKAA Delhi Training Camp
Carboxylic Acid $>$ Sulphonic Acid $>$ Ester $>$ Acid Halides > Acid Amides >Nitrile > Aldehyde >
Ketone $>$ Alcohol $>$ Amnes $=>=$
2. No Preference Functional Group

NAHE
Nitro, Alkyl / Aryl, Halo, Ethers
3. Carbon Chain

Monkey Eat Peeled Bananas
Meth, Eth, Prop, But
4. 3-D Representation

So towards Do away
Solid $\rightarrow$ Towards observer ( $(\mathrm{dII})$
Dashed $\rightarrow$ Away from observer (IIIII)
5. Types of Organic Reaction

EARS
(a) Elimination
(b) Addition
(c) Rearrangement
(d) Substitution
6. Structural Isomerism

Poor Farmer Managing Crops
(PFMC)
(a) Position
(b) Functional Group
(c) Metamerism
(d) Chair
7. Optical Isomerism

GO
(a) Geometrical
(b) Optical

## Chapter - 16 <br> Hydrocarbons and their Halogen Derivatives

1. m-directing Group

Queen Elizabeth Second's Navy
Commands, Controls
Qiatonary
2. o, p-directing

## AHA AHA P

Alkyl (-R)
Halogen (-X)
Alkoxyl (-OR)
Amino $\left(-\mathrm{NH}_{2}, \mathrm{NHR}^{2}, \mathrm{NR}_{2}\right)$
Hydroxyl (-OH)
Amide (-NHCl)
Phenyl $\left(\mathrm{C}_{6} \mathrm{H}_{5}\right)$
3. SN1 reaction

## CURT-I

Carbocation Intermediate
Unimolecular Reaction
Racemic mixture is obtained
Two step process
Ist order kinetics
4. Chirality

## CANS

Chiral $\rightarrow$ Non-Super imposable mirror Images
Achiral $\rightarrow$ Super imposable Mirror Images

## Chapter - 17 <br> Organic Compound Containing <br> Oxygen

## 1. Detection test

## TASte FAAR IMLy

TASte $\rightarrow$ Tollen's test, Aldehyde group, Silver Mirror
FAAR $\rightarrow$ Fehling's test, Aliphatic Aldehyde, RedBrown ppt
IMLY $\rightarrow$ lodoform test, Methyl group linked to
-
2. Common Names of Carboxylic Acid

IT Frog Are Polite, Being Very

## Courteous

Formic, Acetic, Propionic, Butyric, Valeric, Caproic
3. Dicarboxylic Acid

Oh My, Such Good Apple Pie, Sweet As Sugar
Oxalic, Malonic, Succinic, Glutaric, Adipic, Pimelie, Subric, Azelaic, Sebacic
4. Clemmenson and wolf Reaction
II. Can Zebra Woo Nightingale

Reaction to convert -C- to alkane
(to remember regents of reaction)
Clemmen $\rightarrow$ son $\rightarrow \mathrm{Zn}-\mathrm{Hg} / \mathrm{HCl}$
Wolf $\rightarrow$ Reaction $\rightarrow \mathrm{NH}_{2}-\mathrm{NH}_{2} / \mathrm{OH}^{-}$

## Chapter-18 <br> Organic Compounds Containing Nitrogen

1. Carbylamine test

PAFSI (Say Pepsi)
Primary amine gives Foul smell of Isocyanicle with $\mathrm{CHCl}_{3}+\mathrm{KOH}$ Amine Smell
$\mathrm{RNH}_{2}+\mathrm{CHCl}_{3}+\mathrm{KOH} \quad \mathrm{RNC}+\mathrm{KCl}+\mathrm{H}_{2} \mathrm{O}$
2. Coupling Reaction

1. DSPO DAY (Say, DeSPO DAY)


## Chapter - 19 <br> Polymers and Biomolecules

1. Disaccharides

## Non-reducing SGF

Sucrose $\rightarrow$ Glucose + Fructose
Non-Reducing Sugar
2. Essential Amino Acids

PVT TIM HALL
(Phenylalanine, Valine, Threonine, Tryptophan, Isoleucine, Methionine, Histidine, Arginine, Leucine, Lysine)
3. Fatsoluble Vitamins $\rightarrow$ Vitamin K, E, D, A KEDA

Rest all Vitamins are water Soluble

## 4. DNA \& RNA

## G3Cinema AT 2PM

DNA A $=T, G=C$
(2 H -bonds $\mathrm{b} / \mathrm{w}$ Adenine \& Thymine
3 H -bonds b/w Guanine \& Cytosine)
$G \equiv C A=T$
Also, GCAT

## Chapter - 20

Analytical Chemistry and Chemistry in Everyday life

1. Artificial Sweetening Agents

## ASSA

Aspartame, Saccharin, Sucrolose, Alitame Also, Assac Sue Ali

## 2. Antiseptic \& Disinfectants

Bitter Chlor
Bithionol, Terpineol, Chloroxylenol

## 3. Antacids

His Interaction Presented by lime Ran (Say Simran) Interaction of Histamine prevented by limetidine,
Ranitidine


## MATHEMATICS

## Chapter - 1

Sets, Relations and Functions

## Sets And Representations (a)

Today's Scenario, Equally Talented
Singers Find Infinite New Songs To
Sing.
$\left.\right|_{\text {Types }} ^{\text {Today's }} \underset{\text { Sets }}{\text { Scenario, }} \underset{\text { Equivalent }}{\text { Equally talented }}$ Singers Find Infinite New
Null Songs to sing.
Sets

## Interpretation :

Types of Sets :

1. Empty or Null Set - A set which has no element.
2. Finite Set - A set having finite number of elements.
3. Infinite Set - A set having infinite number of elements.
4. Equivalent Set - Two finite sets $A$ and $B$ are said to be equivalent if $n(A)=n(B)$.
5. Equal Set - Two sets $A$ and $B$ are equal if every element of $A$ is in $B$.
6. Singleton Set - A sets having one element is called singleton set.

## Sets And Representations (b)

Laws of Algebra of Statements :
lacd and Icai are friends

## Interpretation :

1. Idempotent Law -
(i) $(A \wedge A) \Leftrightarrow A$
(ii) $\quad(A \vee A) \Leftrightarrow A$
2. Associative Law -
(i) $\quad(A \wedge B) \wedge C \Leftrightarrow A \wedge(B \wedge C)$
(ii) $\quad(A \vee B) \vee C \Leftrightarrow A \vee(B \vee C)$
3. Commutative Law -
(i) $A \vee B \Leftrightarrow B \vee A$
(ii) $\mathrm{A} \wedge \mathrm{B} \Leftrightarrow \mathrm{B} \wedge \mathrm{A}$
4. Distributive Law -
(i) $\quad \mathrm{A} \vee(\mathrm{B} \wedge \mathrm{C}) \Leftrightarrow(\mathrm{A} \vee \mathrm{B}) \wedge(\mathrm{A} \vee \mathrm{C})$
(ii) $\quad A \wedge(B \vee C) \Leftrightarrow(A \wedge B) \vee(A \wedge C)$
5. Identity Laws -
(i) $\mathrm{A} \vee \mathrm{T} \Leftrightarrow \mathrm{A}$
(ii) $A \wedge F \Leftrightarrow F$
(iii) $A \vee T \Leftrightarrow T$
(iv) $A \vee F \Leftrightarrow A$
6. Complement Laws -
(i) $A \vee(\sim A) \Leftrightarrow T$
(ii) $\mathrm{A} \wedge(\sim \mathrm{A}) \Leftrightarrow \mathrm{F}$
(iii) $\sim T \Leftrightarrow F$
(iv) $\sim F \Leftrightarrow T$
7. Absorption Law -
(i) $\quad \mathrm{A} \vee(\mathrm{A} \wedge \mathrm{B}) \Leftrightarrow \mathrm{A}$
(ii) $A \wedge(A \vee B) \Leftrightarrow A$
(iii) $\sim(A \wedge B) \Leftrightarrow(-A) \vee(-B)$
8. Involution Law -
(i) $\sim(\sim A) \Leftrightarrow A$

## Chapter - 2

Complex Numbers and Quadratic Equations


Interpretation: Complex numbers are expressed in the form of $a+i b$ where ' $i$ ' is an imaginary number called 'iota' and the value of iota is $\sqrt{-1}$

Types of Linear Inequalities


## Interpretation :

1. Numerical Inequality $-3<5,8>4$
2. Literal or Variable Inequalities $-x<5, y>8$
3. Double Inequality- $5<x<9,3<y<10$
4. Strict Inequality- $x<9,5<10$
5. Slack Inequality- $x \geq 7, y \leq 9$
6. linear Inequality in One Variable- $x<9, y>12$
7. linear Inequality in Two Variable $-5 x+7 y<12$
8. Quadratic Inequality- $x^{2}+5 x \leq 10$

## Chapter - 3

Matrices and Determinants

## Identity Matrix-

$$
A=\left(\begin{array}{lll}
1 & 0 & 0 \\
0 & 1 & 0 \\
0 & 0 & 1
\end{array}\right) \quad, \quad \begin{aligned}
& a_{i j}=0 \text { when } \mathrm{i} \\
& \mathrm{j}
\end{aligned}
$$

## iㅏ <br> Zero Matrix- <br> $A=\left(\begin{array}{lll}0 & 0 & 0 \\ 0 & 0 & 0 \\ 0 & 0 & 0\end{array}\right)$

## Singular Matrix

A square matrix is said to be singular matrix if determinant of matrix denoted by $|A|$ is zero otherwise it is non zero matrix


## Inverse Of a Matrix



## Interpretation :

## Singular \& Non Singular Matrix -

if $|A|=0$, then $A$ is singular. Otherwise $A$ is nonsingular

## Inverse of a Matrix -

Inverse of a Matrix exists if $A$ is non- singular i.e $|A| \# 0$, and is given by
$A^{-1}=\frac{1}{|A|} \operatorname{adj} \mathrm{A}$

## Properties Of $|\mathbf{A}|$



Action

(3) Circle 1 Wale Circle 2 Se Jaye and Circle 2 Wale Circle 1 Se to Distance same Nahi rahegi $\stackrel{\downarrow}{\downarrow}(-\mathrm{ve})$
(4) Distance $=0$ if $R_{1}=R_{2}$ (Route $1=$ Route 2)
$\downarrow \quad|A|=0$ if $R_{1}=R_{2}$
(5) Distance $=0$ if $\mathrm{C}_{1}=\mathrm{C}_{2}$ (Circle 1=Circle 2)

## Interpretation : Properties of $|\mathbf{A}|$ -

(i) $|A|$ remains unchanged, if the rows and columns of $A$ are interchanged i.e. $|A|=\left|A^{\prime}\right|$
(ii) If any two rows (or columns) of A are interchanged, then the sign of $|\mathrm{A}|$ changes.
(iii) If any two rows (or Columns) of A are identical then $|\mathrm{A}|=\mathrm{a}$

## Chapter - 5 <br> Principle of Mathematical Induction

San Francis Principal OM Invited Parents

## SFPOMIP

Principle of Mathematical Induction (B)
Provided Test Paper of $\mathbf{1}^{\text {st }} \mathbf{T e r m}$ PTP(1)T

Principle of Mathematical Induction (C)
Also Test Paper of $\mathbf{K}^{\text {th }} \mathbf{T e r m}$

## ATP(K)T

Principle of Mathematical Induction (D)
Then Test Paper of $(\mathbf{K + 1})$ th Term
TPTP(K+1)T
Principle of Mathematical Induction (E)
Hence Paper of nth is Trustworthy
For All Necessary Numbers

## HP(n)TFANN

Principle of Mathematical Induction (F)
SFPOMIP-Steps for Principle of Mathematical Induction Proof

## Interpretation :

Step1: Let $P(n)$ be a result or statement formulated in terms of $n$ in a given equation.

Principle of Mathematical Induction (G)
PTP(1)T-Prove that $P(1)$ is true.

## Interpretation :

Step2: Prove that $P(1)$ is true.
Principle of Mathematical Induction (H)
ATP(K)T-Assume that $\mathrm{P}(K)$ is true.

## Interpretation :

Step3: Assume that $\mathrm{P}(k)$ is true.

Principle of Mathematical Induction (I)
TPTP(K+1)T-prove that $\mathrm{P}(k+1)$ is true.

## Interpretation :

Step4: Using step 3, prove that $\mathrm{P}(k+1)$ is true.

Principle of Mathematical Induction (J)
HP(n)TFANN - Hence, by the principle of mathematical induction, $P(n)$ is true for all natural numbers $n$

## Interpretation :

Step5: Thus, $P(1)$ is true and $P(k+1)$ is true whenever $\mathrm{P}(k)$ is true. Hence, by the principle of mathematical induction, $\mathrm{P}(n)$ is true for all natural numbers $n$.

## Chapter-7 <br> Sequence and Series

Relationship between AM, GM and HM
Area Of House in Square Gigameter


Arithmetic Progression (AP)
(a) $\mathrm{N}^{\text {th }}$ Term of Arithmetic Progression -


Nokia Offers Additional Programmers in


## Chapter-8 <br> Limits Continuity and Differentiability

L' Hospital's Rule for Evaluating
Limits
Numerator fights with Denominator,

## Interpretation :

$$
\text { if } \lim _{x \rightarrow a} \frac{f(x)}{\mathrm{g}(\mathrm{x})} \text { takes } \frac{0}{0} \text { or } \frac{\infty}{\infty} \text { form }
$$

$$
\text { then } \lim _{x \rightarrow a} \frac{f(\mathrm{x})}{g(\mathrm{x})}=\lim _{x \rightarrow a} \frac{f^{\prime}(\mathrm{x})}{\mathrm{g}^{\prime}(\mathrm{x})}
$$

$$
\text { where } f^{\prime}(x)=\frac{d f(x)}{d x} \text { and } g^{\prime}(x)=\frac{d g(x)}{d x}
$$

## Sandwich Theorem for Evaluating Limits

Likhil always uses Samesize (L) Middle bread to make Three layer Sandwich


## Interpretation :

If $f(x) \leq g(x) \leq h(x) \forall x \in(\alpha, \beta)-\{a\}$
and $\lim _{x \rightarrow a} f(x)=\mathrm{L}=\lim _{x \rightarrow a} h(x)$ then $\lim _{x \rightarrow a} g(x)=\mathrm{L}$
where $a \in(\alpha, \beta)$


## Mean Value Theorem \& Rolle's Theorem



## Interpretation :

Mean Value Theorem -
if $f:[a, b] \rightarrow R$ Continuous on $[a, b]$ and differential on $(a, b)$, then $\exists$ some $c$ in $(a, b)$ such that-
$f^{\prime}(c)=\frac{f(b)-f(a)}{b-a}$

## Rolle's Theorem -

If $\mathrm{f}:[\mathrm{a}, \mathrm{b}] \rightarrow \mathrm{R}$ continuous on $[\mathrm{a}, \mathrm{b}]$ and differentiable on $[a, b]$ and $f(a)=f(b)$ then $\exists$ some $c$ in $(a, b)$ s.t. $f^{\prime}(c)=0$

## Chapter - 9 Integral Calculus

SeCond FundAmental Theorem of


You can also remember
fcc is small fashionable Clothes


## Interpretation :

Let $f$ be a continuous function defined on a closed interval $[a, b]$ and $F$ be an anti derivative of f . Then $\int_{a}^{b} f(x) d x=[F(x)]_{a}^{b}=F(b)-F(a)$ where $a$ and $b$ are called limit of Integration.

## Chapter - 10 Differential Equations



SOLDE-YIF-EIQ-IFC
Son Of Liladhar Dixit Eklavya (SOLDE)


S-Solution
D - Differential
O-Of
E - Equation

L - Linear

## Interpretation :

Differential equation is of the form $\frac{d y}{d x}+p y=Q$, where $P$ and $Q$ are constants or the function of ' $x$ ' is called a first order linear differential equations. Its solution is given as

$$
\mathrm{Y} . \mathrm{IF}=\equiv \mathrm{Q} . \mathrm{IF}+\mathrm{C}
$$

Homogeneous Differential Equation


## Interpretation :

Differential equation can be expressed in the

$$
\text { form } \frac{d y}{d x}=f(x, y) \text { or } \frac{d x}{d y}=g(x, y)
$$

where $f(x, y)$ and $g(x, y)$ are homogeneous functions of sum is called a homogeneous Differential equation. These equations can be solved by substituting $y=v x$ so that dependent variable $y$ is changed to another variable $v$, where $v$ is some unknown function.

Chapter - 11 Coordinate Geometry
Equation of Straight Line in Various forms :


## Interpretation :

(1) Point Slope form :- $y-y_{1}=m\left(x-x_{1}\right)$
(2) Slope intercept form :- $y=m x+c$
(3) Two point form :- $y-y_{1}=\frac{y_{2}-y_{1}}{x_{2}-x_{1}}\left(x-x_{1}\right)$
(4) Intercept form:- $\frac{x}{a}+\frac{y}{b}=1$
(5) Normal / Perpendicular form :$x \cos \alpha+y \sin \alpha=P$
(6) General Form :- $a x+b x+c=0$

## Area of Triangle



Area $=\frac{1}{2}\left[x_{1}\left(y_{2}-y_{3}\right)+x_{2}\left(y_{3}-y_{1}\right)+x_{3}\left(y_{1}-y_{3}\right)\right]$

## Eccentricity of conic Sections

English alphabet Counting Sequence


Highest ECcentricity i.e. $\mathbf{e}>1$

## Interpretation :

Eccentricity of Conic Sections-
(a) If $e=1$, the conic is called parabola.
(b) If $0<e<1$, the conic is called ellipse.
(c) If $e>1$, the conic is called hyperbola.
(d) If $\mathrm{e}=0$, the conic is called circle.

## Chapter - 12

Three Dimensional Geometry

## Direction Cosines

Dance Choreographer Prefer Dieting

$\mathbf{1}$ glass $\mathbf{L}$ e $\mathbf{M}$ o $\mathbf{N}$ juice


## Direction Ratios





## Interpretation :

Direction cosines of a line are the cosines of the angles made by the line with the positive directions of the co. ordinate axes. If $\mathrm{l}, \mathrm{m}, \mathrm{n}$ are the $D$. cs of a line, then $l^{2}+m^{2}+n^{2}=1$

## Chapter - 13 <br> Vector Algebra

## Types Of Vectors (A)



## Interpretation :

## Types of Vectors-

1. Zero Vector - Initial and terminal points coincide
2. Unit Vector - Magnitude is unity
3. Coinitial Vectors - Same initial points
4. Collinear vectors - Parallel to the same Line
5. Equal Vectors - Same magnitude and direction
6. Negative of a vector- Same magnitude, opp. direction

## Properties Of Vectors(B)

"Neither choose East nor choose north, always choose North-East and save your time". North


## Interpretation :

The vector sum of two coinitial vectors is given by the diagonal of the parallelogram whose adjacent sides are given vectors.

$\overrightarrow{A B}+\overrightarrow{A C}=\overrightarrow{A D}$

Properties Of Vectors(C)

Aao Bnaye Circle Tirahe par


## Interpretation:

The vector sum of the three sides of a triangle taken in order is $\overrightarrow{\mathrm{O}}$ i.e

$$
\overrightarrow{\mathrm{AB}}+\overrightarrow{\mathrm{BC}}+\overrightarrow{\mathrm{CA}}=\overrightarrow{\mathrm{O}}
$$

## Chapter - 14 <br> Statistics \& Probability

Mutually Exclusive Events


## Interpretation :

Events A \& B are called mutually exclusive events if occurrence of any one of them excludes occurrence of other event, i.e. they cannot occur simultaneously.
eg: A die is thrown. Event $A=A l l$ even outcomes \& events $B=A l l$ odd outcomes. then, $A \& B$ are mutually exclusive events, they cannot occur simultaneously

## Poisson Distribution

DPD - Directions for Pure Dishes



Here LemoN Quinoa Is Costliest Pure Dish


## Normal Distribution

DND - Do Not Disturb


## Variance and standard deviation for ungrouped data-

(a) Standard deviation for ungrouped data-


Variance for ungrouped data
"Vedic Fundamentals Under Graduates
lagaao Square me Distinction

number Paao"

$$
\text { Variance }=(\text { Standard deviation })^{2}
$$

## Interpretation :

Standard deviation of ungrouped data :
S.D. of ungrouped data is the square root of squared deviation from the mean of data. It is denoted by the symbol " 6 "
Variance for ungrouped data :
Variance for ungrouped data is defined as the square of S.D. It is denoted by " 6 "

## Chapter-15

Sum and Difference of two Angles



Same Sian as inside the bracket in the expansion


## Interpretation :

* $\sin (A \pm B)=\sin A \cos B \pm \cos A \sin B$
${ }^{*} \cos (A \pm B)=\cos A \cos B \mp \sin A \sin B$
$* \tan (A \pm B)=\frac{\tan A \pm \tan B}{1 \mp \tan A \tan B}$


## Standard General Solution of Trigonometric Ratios




## Interpretation :

The solution consisting of all possible solutions of a trigonometric equation is called its general solution.

* $\sin \theta=0 \Leftrightarrow \theta=n \pi$
* $\cos \theta=0 \Leftrightarrow \theta=(2 n+1) \frac{p}{2}$
* $\tan \theta=0 \Leftrightarrow \theta=\mathrm{n} \pi$


## Chapter-16

Mathematical Reasoning
Algebra of statements -


## AND




[^0]:    Flow of $\mathrm{e}^{-}$from anode to cathode

