

PHYSICS

Class - 11, Unit-I

Physical World

Good Workers work for Extended Session.

Strength wise arrangement of fundamental forces in ascending order : **G**ravitation < **W**eak Nuclear force < **E**lectromagnetism < **S**trong Nuclear force

Class - 11, Unit-II

Motion In A Straight Line

Delhi to Vadodara via Tundla Agra.

Displacement/**t**ime = **V**elocity **V**elocity / **t**ime = **a**cceleration

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 × l

Lat the depicts the 3rd law of motion

1.(b) Motion In A Straight Line

A will be I, when 0 is close to T

Replace the " Δ " simply with "d"

Average Velocity = $\Delta D/\Delta T$

 $\lim_{\Delta T \to 0} \frac{\Delta D}{\Delta T} = \text{Instantaneous velocity} = dD/dT$

Average Acceleration = $\Delta V / \Delta T$

 $\lim_{\Delta T \rightarrow 0} \frac{\Delta V}{\Delta T} = \text{Instantaneous velocity} = \text{dV/dT}$

Class - 11, Unit-IV

Work, Energy And Power

Fernandez d'souza ordered noodles, but was served pizza and pizza was a zest.

If **f**orce and **D**isplacement are in **o**pposite direction, then work done is **n**egative.

If force and **D**isplacement are in **s**ame direction, then work done is **p**ositive.

If force and Displacement are **p**erpendicular to each other, then **w**ork done is **z**ero.

Class - 11, Unit-V

Motion Of System Of Particles & Rigid Body

How rhino came swift? Since dino came slow.

Write 2MR² under each figure and then divide by 2, 3, 4, 5 respectively.



Class - 11, Unit-VI



Mnemonics

Interpretation:

Letter E and F of Essential Food represents "Elliptical" and "Foci".

1st **Law** : Planets move in **elliptical** orbits with Sun at one of the foci.

Letter E of the word Everyday represents "Equal":

2nd 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:

3rd Law :

Square of the Time-period of the planet is proportional to the cube of the semi major axes of the orbit.

 $T^2 \alpha R^3$.

Class - 11, Unit-VII

1. Mechanical Properties Of Solid

Young Ravi bought a pen.

(1) Relation between **Y**, **B** and σ : (write Y and B(1+ σ) with coefficients and an equal sign in between. 1Y = 3B (1 + σ)

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 **Y**, η and σ : (write **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 σ , subtract the coefficient of **Y** from coefficient of η i.e. 2 - 1 = 1

So, the relation is $1\mathbf{Y} = 2\eta (1 + \sigma)$ or, $\mathbf{Y} = 2\eta (1 + \sigma)$

Young **R**avi **b**ought a **p**en



- 2. Thermal Properties of Matter
- Fingers we have five Cats have nine lives. With 160 more Cat will help you sure! Fingers we have five \rightarrow 5F Cats have nine lives. \rightarrow 9C With 160 more \rightarrow 9C + 160 Cat will help you sure! \rightarrow 5F = 9C + 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, **M**om has **3** bags full.
- Dadi needs 5 bags normally cool
- Papa keeps 6 bags normal rule.
- Papa, Dadi each needs 2 bags more
- **H**igh **c**old whenever, be very sure.

Mom has **3** bags full \rightarrow Degrees of freedom of Monoatomic gas is 3.

Dadi needs 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 → 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

Teacher Punished Lazy Dog.

Particle oscillation in **T**ransverse wave \rightarrow **P**erpendicular 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 **e**lectric field, **d**ivide the **c**harge (enclosed) by the free space **p**ermittivity and **a**rea of the Gaussian



Interpretation :

Colour codes of carbon resistors :

Colour	Corresponding 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:

Force Thumb First Finger Field Second Finger Current Thumb Motion Feel Free to Call Me Left Right hand < hand rule rule Thumb Motion Second Finger Current First Finger Field Force Thumb

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

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

Electromagnetic waves with increasing frequency
(decreasing wavelength) is in the order of:
(a) R adio wave
(1)

- (b) **M**icrowave
- (c) Infrared
- (d) **V**isible light
- (e) **U**ltraviolet
- (f) X-Rays
- (g) **G**amma Rays

Class - 12, Unit-VI

(a). Ray Optics & Optical Instruments



M means **M**ORE **i.e** Mirror Formula

M means MORE 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

(b). Ray Optics & Optical Instruments



L means **M**ORE **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



Work Function

Energy of emitted electron + Work function = Energy of incident Photon

Interpretation :

 $E + \phi = hf$

Or, E = hf = ϕ

Class - 12, Unit-VIII

(a). Atom : Hydrogen Spectra

Papa **b**rings Pastry for Babu **a**nd Lal

When ni = 1, the series is Lyman When ni = 2, the series is **B**almer When ni = 3, the series is **P**aschen When ni = 4, the series is **B**rackett When ni = 5, the series is **p**-fund

(b). Atom : Hydrogen Spectra

1

۹P

1 is Unimportant, **2** is Very important **a**nd **r**est **a**re Important

If ni = 1, i.e. Lyman series is in **UV** range. If ni = 2, i.e. Balmer series is in **VIS**IBLE 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



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

Truth **t**able of **A**ND and **OR g**ate



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 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 (×10¹²) Great \rightarrow Giga (×10⁹) Morning \rightarrow Mega (×10⁶) King \rightarrow Kilo (×10³) Henry \rightarrow Hecto (×10²) Doesn't \rightarrow Deca (×10) Usually \rightarrow Unit (×1) Drink \rightarrow Deci (×10⁻¹) Chocolate \rightarrow Centi (×10⁻²) Milk \rightarrow Milli (×10⁻³) Mixed with \rightarrow Micro (×10⁻⁶) Natural \rightarrow Nano (×10⁻⁹) Powder \rightarrow Pico (×10⁻¹²)

Chapter - 2 **States of Matter**

1. Gas Law's

PTV

(letters that touches are directly proportional & letter don't are indirectly proportional)

 $[P \propto T], [V \propto T], P \propto \frac{1}{V}$

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)
- $P \rightarrow Pressure$ (Pressure exerted due to Collision with walls of container)
- $E \rightarrow Elastic Collision$
- $A \rightarrow Attractive forces are not present$
- $K \rightarrow K.E \propto Temp$

 $S \rightarrow$ Speed (Distribution of speed of particles remain const.)

5. Crystal System

Cu **T**e **M**OTHe **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** - $\alpha = \beta = \gamma$, $\alpha = \beta = \gamma$, $\alpha = \beta \neq \gamma$, $\infty = \beta = \gamma$, $\alpha \neq \beta \neq \gamma, \alpha = \beta \neq \gamma, \alpha = \beta = \gamma$ No. of Bravias Lattice - 3, 2, 2, 4, 1, 1, 1

6. Edge Length

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 ($\infty = \beta \neq \gamma$) Triclinic ($\infty \neq \beta \neq \gamma$)

Chapter - 3

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 \rightarrow Mass Number Isotopes \rightarrow Atomic Number Isotones \rightarrow Neutrons



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6. Metal activity series



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 e⁻ Oxidation Anode Negative

9. Electrolytic Cell



Loss of e[−] Oxidation Anode Positive

Chapter - 9 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
- 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), Iodine (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

Scary Tiny Vicious Creatures are Mean females come to Night Club Zen

Sc, Ti, V, Cr, Mn, Fe, Co, Ni, Cu, Zn,

11. 4d-Series

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

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 O₂ Roasting \rightarrow Presence of O₂

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)



- 2. H-Bonding
- iso FON ! (Say Fun)

Fluorine, Oxygen, Nitrogen

- 3. Hardness of Water
- **C**M is **t**emporarily **h**ard with **H**ead
- Clerks (HC) but permanently

Temporary hardness due to $Mg(HCO_3)_2$, $Ca(HCO_3)_2$ Permanent hardness due to $MgCl_2$, $CaCl_2$, $MgSO_4$, $CaSO_4$ Hard with civil servants (CS) Cl_7 , SO^{2-} hydrogen Carbonate (HCO₃⁻)

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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(Na+) is oxidised

 $\mathsf{ACC} \to \mathsf{reduced} \to \mathsf{Anode}$ of carbon on which $\mathsf{Cl}^{\scriptscriptstyle-}$ is reduced

7. Properties of Birch Reagent

Roman People Can Commute (RPCC)

 $(Na/Li + liq.NH_3) - (Reducing in nature, Paramagnetic, conducting, Coloured)$

p-block elements

8. Group 13 Elements

BAGIT

Boron (B), Aluminium (Al), Gallium (Ga), Indium (In), Thallium (Tl)

9. Group 14 Elements

Can Simple Germans Surprise Public

Carbon (C), Silicon (Si), Germanium (Ge), Tin (Sn), Lead (Pb),

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 Mn + Pink Colour less \rightarrow
- Mn₂+ Colour less MPC \rightarrow Fe₂+/Fe₂+ Yellow Green FYG \rightarrow Ni₂+ Brown Grey NBG \rightarrow Blue Cu₂+ Red CBR \rightarrow $Co_{3} +$ Deep Blue Deep Blue CDD \rightarrow

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) Iodine (I) Astatine (At)
- 14. Group 18 Elements
 - He Never Arrived; Karan exited with Rohan
 - Helium (He) Neon (Ne) Argon (Ar) Krypton (Kr) Xenon (Xe)

Chapter - 13 d & f block elements and Coordination Compounds

1. 3d-Series

Scary Tiny Vicious Creatures are Mean; Females Come to Night Club Zen

Sc, Ti, V, Cr, Mn, Fe, Co, Ni, Cu, Zn

2. 4d-Series

- Yes S(z)ir, Nob Most Technicians Rub Rod's Pale Silver Cadillac Y, Zr, Nb, Mo,Tc, Ru, Rh, Pd, Ag, 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

 $I < Br^- < SCN^- < Cl^- < S^{2-} < OH^- < C_2O_4^{-2-} < H_2O < NC5^- < EDTA^{4-} < NH_3 < CN^- < CO$

6. Pairing of e⁻ Octahedral Complexes



Common League People win Hearts

CFSE (Δ_0) < Pairing Energy Ligand \rightarrow Weak field Type of complex \rightarrow High spin Pairing of e⁻ in t₂g orbital

7. Werner's theory

f

Plcturesque SNow

Primary valency \rightarrow Ionisable (Charge on Ionisation sphere) Secondary valency \rightarrow Non Ionisable (Coordination Number)

8. Spectrochemical series

er I

I Bought Some Copies to Study
Fundamental of Chemistry
He Nutured Excellence in Necessary
Coordination Compounds

 $\begin{aligned} |\cdot < Br^{-} < SCN^{-} < Cl^{-} < S^{2-} < OH^{-} < C_{2}O_{4}^{2-} < H_{2}O < \\ NCS^{-} < EDTA^{4-} < NH_{3} < CN^{-} < CO \\ |\cdot = 1 \end{aligned}$ $\begin{aligned} Br^{-} = Brought \\ SCN^{-} = Some \\ Cl^{-} = Copies to \\ S^{2-} = Study \\ F = Fundamental \\ OH^{-} = Of \\ C_{2}O_{4}^{2-} = Chemistry \\ H_{2}O = He \\ NCS^{-} = Nutured \\ EDTA^{4-} = Excellence in \\ NH_{3} = Necessary \\ CN^{-} = Coordination \end{aligned}$

CO = Compounds

9. Pairing of e⁻ Octahedral Complexes

Common League People win Hearts

Vice-Versa

(i) CFSE (Δ_0) < Pairing Energy (P.E) Ligand \rightarrow Weak field ligand Type of complex \rightarrow High spin Complex Pairing of e⁻ in t2g orbital (ii) CFSE (Δ_0) < Pairing Energy (P.E)

10. Werner's theory

Plcturesque SNow

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

Chapter - 14 Environmental Chemistry

1. Gases air Pollutants

HOSCN

Hydrocarbons, Oxides of Sulphur (SO $_2$, SO $_3$), Carbon (CO, CO $_2$), Nitrogen (NO, NO $_2$)

(a) Geometrical(b) Optical





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MATHEMATICS



- 2. Finite Set A set having finite number of elements.
- **3.** Infinite **S**et A set having infinite number of elements.
- **4.** Equivalent **S**et 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) $(A \land A) \Leftrightarrow A$
 - (ii) $(A \lor A) \Leftrightarrow A$

- (i) $(A \land B) \land C \Leftrightarrow A \land (B \land C)$
- (ii) $(A \lor B) \lor C \Leftrightarrow A \lor (B \lor C)$
- 3. Commutative Law -
- (i) $A \lor B \Leftrightarrow B \lor A$
- (ii) $A \land B \Leftrightarrow B \land A$ (iii) $A \land B \Leftrightarrow B \land A$
- 4. Distributive Law -
 - (i) $A \lor (B \land C) \Leftrightarrow (A \lor B) \land (A \lor C)$
 - (ii) $A \land (B \lor C) \Leftrightarrow (A \land B) \lor (A \land C)$
- 5. Identity Laws -
 - (i) $A \lor T \Leftrightarrow A$
 - (ii) $A \land F \Leftrightarrow F$

- (iii) $A \lor T \Leftrightarrow T$
- (iv) $A \lor F \Leftrightarrow A$
- 6. Complement Laws -
 - (i) $A \lor (\sim A) \Leftrightarrow T$
 - (ii) $A \land (\sim A) \Leftrightarrow F$
 - (iii) $\sim T \Leftrightarrow F$
 - (iv) $\sim F \Leftrightarrow T$
- 7. Absorption Law -

(i)
$$A \lor (A \land B) \Leftrightarrow A$$

- (ii) $A \land (A \lor B) \Leftrightarrow A$
- (iii) $\sim (A \land B) \Leftrightarrow (-A) \lor (-B)$
- 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+ib where 'i' is an imaginary number called 'iota' and the value of iota is $\sqrt{-1}$

Types of Linear Inequalities



- 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- $x \ge 7$, $y \le 9$
- 6. linear Inequality in One Variable- x < 9, y > 12
- 7. linear Inequality in Two Variable- 5x+7y<12
- 8. Quadratic Inequality- $x^2 + 5x \le 10$

Chapter - 3

Matrices and Determinants

Identity Matrix-

$$A = \begin{pmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{pmatrix}, \quad a_{ij} = 1 \text{ when } i = j$$



Zero Matrix-

 $\mathbf{A} = \begin{pmatrix} 0 & 0 & 0 \\ 0 & 0 & 0 \\ 0 & 0 & 0 \end{pmatrix}$



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

- Determinant

"a Determined Artist Can become a Singer, if he is **O**ptimistic. (Zero) "a Determined Artist Can Never be Singer" if he is **Not O**ptimistic Non Singular $if_{H}|\dot{A}| = \dot{O}$, then A is Singular Otherwise, A is non-Singular ≠0 (Zero) "If Determined Artist is Not Optimistic then **ADJ**ust **B**elow International Adjoint __By Inverse Musicians" Determinant Matrix

"A is(non-singular)*i.e.* $|A| \neq 0$ then

(adj A)

Interpretation : Singular & Non Singular Matrix -

if |A| = 0, then A is singular. Otherwise A is non-singular

Inverse of a Matrix -

Inverse of a Matrix exists if A is non- singular *i.e* |A| # 0, and is given by

$$A^{-1} = \frac{I}{|A|} \operatorname{adj} A$$

Properties Of |A|

Properties of |A| -

identical then |A| = a



(i) |A| remains unchanged, if the rows and

(ii) If any two rows (or columns) of A are

(iii) If any two rows (or Columns) of A are

columns of A are interchanged i.e. |A| = |A'|

interchanged, then the sign of |A| changes.

Chapter - 5 Principle of Mathematical Induction

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San Francis Principal OM Invited Parents

SFPOMIP

Principle of Mathematical Induction (B) Provided Test Paper of 1st Term PTP(1)T

Principle of Mathematical Induction (C) Also Test Paper of Kth Term

ATP(K)T

Principle of Mathematical Induction (D) Then Test Paper of (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 P(*K*) is true.

Interpretation :

Step3: Assume that P(k) is true.

Principle of Mathematical Induction (I)

TPTP(K+1)T-prove that P(k+1) is true.

Interpretation :

Step4: Using step 3, prove that 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 P(k) is true. Hence, by the principle of mathematical induction, P(n) is true for all natural numbers n.

Chapter - 7 Sequence and Series

Relationship between **A**M, **G**M and **H**M

Area Of House in Square Gigameter

Of (Multiplication) Square Geometric Mean

Arithmetic Mean Harmonic Mean

Arithmetic Progression (AP)

(a) Nth Term of Arithmetic Progression -

Nokia Offers Additional Programmers in

E T A P N 1 B D English To Attract Positive New One Buyer Daily

Nth Term of AP = a + (n - 1)d



Mean Value Theorem & Rolle's
Theorem
differentiable
on open interval



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-

$$f'(c) = \frac{f(b) - f(a)}{b - a}$$

Rolle's Theorem -

If f: [a,b] \rightarrow R continuous on [a,b] and differentiable on [a,b] and f(a) = f(b) then \exists some c in (a,b) s.t. f'(c) =0

Chapter - 9 Integral Calculus





L — Linear

Interpretation :

Differential equation is of the form $\frac{dy}{dx}$ +py=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

Y.IF=≡Q.IF+C

Homogeneous Differential Equation

Hojayega Geneous Dimag Ekdum



Interpretation :

Differential equation can be expressed in the

form
$$\frac{dy}{dx} = f(x, y)$$
 or $\frac{dx}{dy} = g(x, y)$

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=vx so that dependent variable y is changed to another variable v, where v is some unknown function.



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 l, m, n are the D. cs of a line, then $l^2+m^2+n^2=1$

Chapter - 13 Vector Algebra



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".



Interpretation :

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





Interpretation:

The vector sum of the three sides of a triangle taken in order is \overrightarrow{O} i.e $\overrightarrow{AB} + \overrightarrow{BC} + \overrightarrow{CA} = \overrightarrow{O}$

Chapter - 14 Statistics & Probability

Mutually Exclusive Events MEE-Mutual Enemies Everywhere Morning Evening Everyday Cannot Occur Mutually Exclusive Events cannot occur Sametime

simultaneously

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=All even outcomes & events B=All odd outcomes. then, A & B are mutually exclusive events, they cannot occur simultaneously

Poisson Distribution DPD – Directions for Pure Dishes

Distribution–Poisson Distribution





Variance and standard deviation for ungrouped data-(a) Standard deviation for ungrouped data-Subject me Distinction Un Groups ki (Standard) (Deviation) (Ungrouped data) Rhti, jo "Add kre Xtra Mehnont (Root) $(\Sigma' sign)$ (minus) X Bar Double Power ke saath" Distinction wale Number ke Saath" S. D. (σ) = Divided by "Nere Naam me mera Sign-S se sigma Variance for ungrouped data "Vedic Fundamentals Under Graduates (Variance) (for) (Ungrouped data) lagaao **S**quare me **D**istinction (Square) (Standard) (Deviation) number Paao" Variance = $(Standard deviation)^2$ 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 " $6^{2"}$

Chapter - 15

Sum and Difference of two Angles







Interpretation :

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

* $\sin\theta = 0 \Leftrightarrow \theta = n\pi$

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

* $tan\theta = 0 \Leftrightarrow \theta = n\pi$

