

Call : 98271 97848



Pioneer Coaching
Institute Since 1995

GRAVITY - TUTORIAL

Teaching responsibly since 1995

MANAGED BY ALUMINI OF SENIORMOST LECTURERS OF ICSE/CBSE

NOT JUST MEMORIZING & COURSE COMPLETION BUT AUTHENTIC LEARNING WITH BASIC

ONLY INSTITUTE TO PROVIDE ALL 7 DAYS CLASSES WITH DAILY
TEST ANALYSIS FOR CHEMISTRY, MATHS & BIOLOGY

PREPARING VIII, IX, X, XI, XII Foundation Course
with JEE/NEET/Droppers

CHEMISTRY & BIO

YOGESHSONI (ICSE/CBSE)
EX LECT- ST. XAVIERS, EX HOD SVS RAIPUR
VISITING FACULTY- PITEC COLLEGE OF ENGINEERING
GUEST SPEAKER FOR VIT VELLORE INSTITUTE
OF TECHNOLOGY.
AWARDED BY CG GOVT FOR YUWA SANKALP.
TEACHING EXPERIENCE-20 YRS

PHYSICS

R.K. SHARMA SIR (MSC., B.ED)
SENIOR LECT. EXPERIENCE-22 YRS
HOLY CROSS .
WRITER - YUGBODH TEXT.

MATHS

DR.AGRAWAL SIR
(PH.D, B.ED) EXPERIENCE-
35 YRS. HOD CBSE SVS.

SOCIAL SCIENCE

RAJAANI SIR
SENIOR LECT-DAGA
SCHOOL

MATHS

B.K.SAHU (M.SC B.ED)
LECTURER
EXPERIENCE-17 YRS.

HINDI & SANSKRIT

DAILY CLASSES

ENGLISH GRAMMAR & Literature

Behind Canal Link Road Indrawati Colony, Behind Sarasvati Shishu Mandir,
Infront of well, House no. 5-6

www.yogeshsonigravitytutorial.in/quicksearch/googlemap



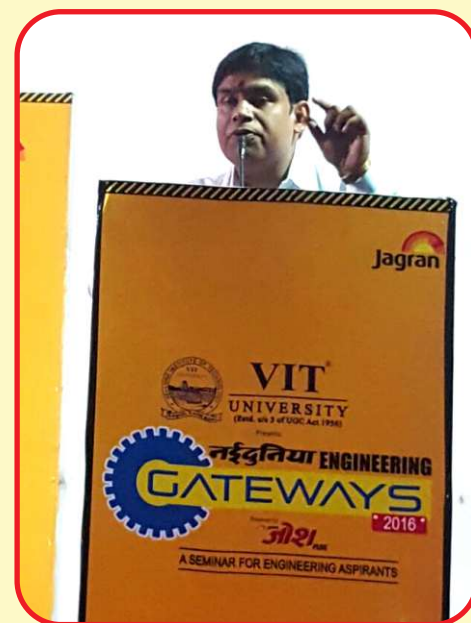
**AWARDED BY HONORABLE COLLECTOR RAIPUR SHRI O.P. CHOWDHRY
FOR QUALITATIVE TEACHING AT YUWA SANKALP PROGRAMME 2016.**



**AWARDED BY CG GOVT
FOR YUWA SANKALP**



**MEDIA SPEAKS- ARTICLE PUBLISHED ON
NAI DUNIYA NEWSPAPER FOR
PREPARATION OF JEE/NEET.**



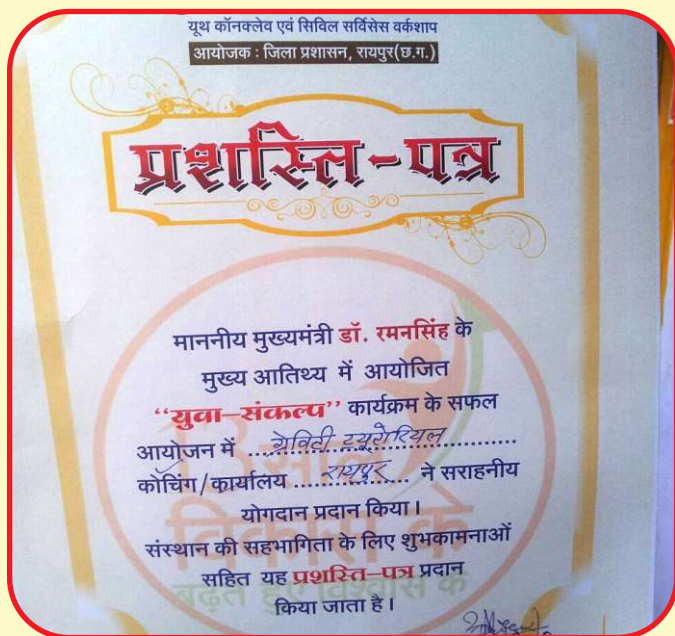
**GUEST SPEAKER FOR
CHEMISTRY AT SEMINAR
ORGANISED BY VIT VELLORE
INSTITUTE OF TECHNOLOGY
BY NAI DUNIYA**



AT GRAVITY LEARNING SCIENCE IS NOT MERELY TEACHING ITS PERFORMING.



AWARDED FOR PARTICIPATION BY ICFAI UNIVERSITY



AWARDED FOR PARTICIPATION



EXPLORING SCIENCE - BIO & CHEMISTRY WITH PRACTICAL





**MD. ARBAZ 75% X ICSE
ST. XAVIERS AWARDED FOR II POSITION
AIR FOR NATIONAL AERONAUTICS**



**AKSHAY SINGH SELECTED
FOR CONDENSED
MEDICAL COURSE KAZAKISTAN**



**SEMINAR CONDUCTED
FOR CHEMISTRY AT
SHRI BALAJI VIDYA MANDIR**



**SEMINAR CONDUCTED
FOR CHEMISTRY AT
B.S.S.PRANAVANAND ACADEMY**



**LEARNING THE TYPES OF
SOLUTIONS BY IX STD STUDENTS**



**ATHARWA MARWAH BAGGED
1ST PRIZE FOR MATHS OLYMPIAD OF CLASS IX CBSE**

Formula Book

CHEMISTRY

THE FOLLOWING SYMBOLS OF ELEMENTS ARE TAKEN FROM THEIR LATIN - NAMES

Sr. No.	Element	Latin-name	Symbol	Sr. No.	Element	Latin-name	Symbol
1.	Tin	Stannum	Sn	6.	Silver	Argentum	Ag
2.	Copper	Cuprum	Cu	7.	Gold	Aurum	Au
3.	Iron	Ferrum	Fe	8.	Mercury	Hydrargyrum	Hg
4.	Potassium	Kalium	K	9.	Lead	Plumbum	Pb
5.	Sodium	Natrium	Na	10.	Antimony	Stibium	Sb

THE MOST IMPORTANT RADICALS WITH THEIR NAMES, SYMBOLS AND VALENCIES

POSITIVE RADICALS (BASIC)

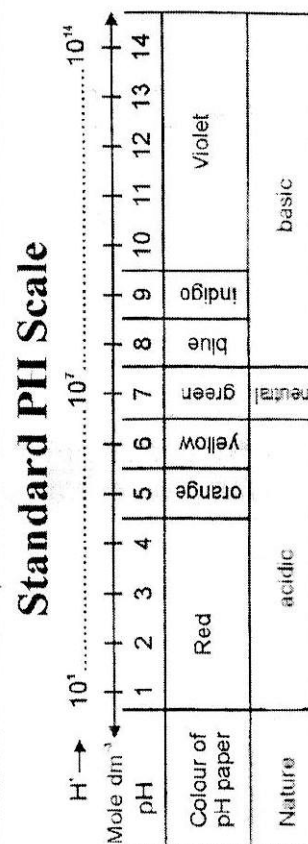
Sr. No.	Name	Symbol	Valency	Sr. No.	Name	Symbol	Valency
1.	Hydrogen	H	1	12.	Copper I (Cuprous)	Cu	1
2.	Barium	Ba	2	13.	Copper II (Cupric)	Cu	2
3.	Calcium	Ca	2	14.	Iron II (Ferrous)	Fe	2
4.	Magnesium	Mg	2	15.	Iron III (Ferric)	Fe	3
5.	Sodium	Na	1	16.	Tin II (Stannous)	Sn	2
6.	Zinc	Zn	2	17.	Tin IV (Stannic)	Sn	4
7.	Silver	Ag	1	18.	Mercury II (Mercurious)	Hg ₂	2
8.	Potassium	K	1	19.	Mercury II (Mercuric)	Hg	2
9.	Aluminium	Al	3	20.	Manganese II (Manganous)	Mn	2
10.	Ammonium	NH ₄	1	21.	Manganese III (Manganic)	Mn	3
11.	Barium	Ba	2	22.	Lead	Pb	2,4

NEGATIVE RADICALS (ACID)

Sr. No.	Name	Symbol	Valency	Sr. No.	Name	Symbol	Valency
1.	Hydride	H	1	15.	Nitrate	NO ₃	1
2.	Oxide	O	2	16.	Nitrite	NO ₂	1
3.	Hydroxide	OH	1	17.	Phosphate	PO ₄	3
4.	Carbide	C	4	18.	Phosphite	HPO ₃	2
5.	Nitride	N	3	19.	Sulphate	SO ₄	2
6.	Phosphide	P	3	20.	Bisulphite	HSO ₃	1
7.	Cyanide	CN	1	21.	Chromate	CrO ₄	2
8.	Iodide	I	1	22.	Dichromate	Cr ₂ O ₇	2
9.	Bromide	Br	1	23.	Peroxide	O ₂	2
10.	Chloride	Cl	1	24.	Iodate	IO ₃	1
11.	Fluoride	F	1	25.	Chlorate	ClO ₃	1
12.	Sulphide	S	2	26.	Hypochlorite	ClO	1
13.	Carbonate	CO ₃	2	27.	Hypobromite	BrO	1
14.	Bicarbonate	HCO ₃	1	28.	Sulphite	SO ₃	2

TO LEARN BY HEART, THE MOST IMPORTANT COMPOUND FORMULAE

1.	H ₂ O	Hydrogen Oxide (water)
2.	H ₂ SO ₄	Hydrogen Sulphate (sulphuric acid)
3.	HNO ₃	Hydrogen Nitrate (nitric acid)
4.	MgSO ₄	Magnesium Sulphate
5.	CaCO ₃	Calcium Carbonate
6.	NH ₄ OH	Ammonium Hydroxide
7.	CuSO ₄	Copper Sulphate
8.	NaCl	Sodium Chloride (eating-salt)
9.	SiO ₂	Silica (sand)
10.	NaOH	Sodium Hydroxide (caustic-soda)
11.	KOH	Potassium Hydroxide (caustic-potash)
12.	Na ₂ CO ₃ ·10H ₂ O	Sodium Carbonate (washing soda)
13.	NaHCO ₃	Sodium Bicarbonate (baking soda)
14.	CaCO ₃	Calcium Carbonate (lime-stone)
15.	C ₁₂ H ₂₂ O ₁₁	Sugar
16.	K ₂ SO ₄ ·Al ₂ (SO ₄) ₃ ·24H ₂ O	Alum
17.	MgSO ₄ ·7H ₂ O	Epsom Salt
18.	CaSO ₄ ·2H ₂ O	Gypsum Salt
19.	PbO ₂	Sindur (lead-oxide)
20.	O	Oxide
21.	O ₂	Oxygen
22.	OH	Hydroxide
23.	Co	Cobalt
24.	CO ₂	Carbon Dioxide
25.	ClO	Hypochlorite
26.	ClO ₃	Chlorate
27.	H	Hydride
28.	CN	Cyanide
29.	Ca(OCl)Cl	Bleaching Powder
30.	HgCl ₂	Corrosive Sublimate
31.	CuSO ₄ ·5H ₂ O	Blue Vitrol
32.	FeSO ₄ ·7H ₂ O	Green Vitrol
33.	ZnSO ₄ ·7H ₂ O	White Vitrol
34.	H ₂ SO ₄ (conc.)	Oil of Vitrol
35.	D ₂	Heavy Hydrogen
36.	D ₂ O	Heavy Water
37.	ZnCl ₂ + ZnO	Killed Spirit
38.	CaO	Lime
39.	CaCO ₃	Lime Stone
40.	N ₂ O	Laughing Gas
41.	FeSO ₄ (NH ₄) ₂ SO ₄ ·6H ₂ O	Mohr's Salt
42.	CaCO ₃	Marble
43.	(CO + N ₂)	Producer Gas
44.	(CO + N ₂)	Water Gas
45.	CH ₄	Marsh Gas
46.	CCl ₃ NO ₂	Chloropicrin (tear-gas)
47.	CHCl ₃	Chloroform (unconsciousness)
48.	Zn ₃ P ₂	Zinc Phosphide (mouse killer medicine)
49.	(CaSO ₄) ₂ (H ₂ O)	Plaster of Paris.



Decimal multiples and submultiples to be used with S.I. Units.

Prefix	Symbol	Submultiples/multiples
deci	d	10 ⁻¹
centi	c	10 ⁻²
milli	m	10 ⁻³
micro	μ	10 ⁻⁶
nano	n	10 ⁻⁹
pico	p	10 ⁻¹²
femto	f	10 ⁻¹⁵
atto	at	10 ⁻¹⁸
deca	da	10 ¹
hecto	h	10 ²
kilo	k	10 ³
mega	M	10 ⁶
giga	G	10 ⁹
tera	T	10 ¹²
Peta	P	10 ¹⁵
exa	E	10 ¹⁸

NOMENCLATURE

HALOGEN DERIVATIVES

Formula	Common Name	IUPAC Name
$\text{CH}_3\text{—Cl}$	methyl chloride	chloro methane
$\text{CH}_3\text{—CH}_2\text{—Br}$	ethyl bromide	bromo ethane
$\text{CH}_3\text{—CH}_2\text{—CH}_2\text{—I}$	n-propyl iodide	1-iodo propane
$\begin{array}{c} \text{CH}_3\text{—CH—CH}_3 \\ \\ \text{Cl} \end{array}$	isopropyl chloride	2-chloro propane
$\begin{array}{c} \text{Br} \\ \\ \text{CH}_3\text{—CH—CH}_3 \end{array}$	isopropyl bromide	2-bromo propane
$\text{CH}_3\text{—CH}_2\text{—CH}_2\text{—CH}_2\text{—I}$	n-butyl iodide	1-iodo butane
$\begin{array}{c} \text{CH}_3 \\ \\ \text{CH}_3\text{—C—CH}_3 \\ \\ \text{Br} \end{array}$	tert-butyl bromide	2-bromo, 2-methyl propane

ORGANIC HYDROXY COMPOUNDS

Formula	Common Name	IUPAC Name
$\text{CH}_3\text{—OH}$	methyl alcohol	methanol
$\text{CH}_2\text{—CH}_2\text{—OH}$	ethyl alcohol	ethanol
$\text{CH}_3\text{—CH}_2\text{—CH}_2\text{—OH}$	n-propyl alcohol	1-propanol
$\begin{array}{c} \text{CH}_3\text{—CH—CH}_3 \\ \\ \text{OH} \end{array}$	sec-propyl alcohol	2-propanol
$\begin{array}{c} \text{CH}_3\text{—CH—CH}_2\text{OH} \\ \\ \text{CH}_3 \end{array}$	iso-butyl alcohol	2-methyl 1-propanol
$\begin{array}{c} \text{CH}_3 \\ \\ \text{CH}_3\text{—C—OH} \\ \\ \text{CH}_3 \end{array}$	tert-butyl alcohol	1,1-dimethyl 1-ethanol

ALDEHYDES

Formula	Common Name	IUPAC Name
HCHO	formaldehyde	methanal
$\text{CH}_3\text{—CHO}$	acetaldehyde	ethanal
$\text{CH}_3\text{—CH}_2\text{—CHO}$	propanaldehyde	1-propanal
$\begin{array}{c} \text{CH}_3\text{—CH—CHO} \\ \\ \text{CH}_3 \end{array}$	isobutanaldehyde	2-methyl, propanal

KETONES

Formula	Common Name	IUPAC Name
$\text{CH}_3\text{—CO—CH}_3$	acetone (dimethylketone)	propanone
$\text{C}_2\text{H}_5\text{—CO—C}_2\text{H}_5$	diethyl ketone	3-propanone
$\text{CH}_3\text{—CH}_2\text{—CO—CH}_3$	ethyl methyl ketone	2-butanone
$\text{CH}_3\text{—CO—CH}_2\text{—CH}_3$	methyl propyl ketone	2-pentanone

ACIDS & ESTERS

Formula	Common Name	IUPAC Name
H—COOH	formic acid	methanoic acid
$\text{CH}_3\text{—COOH}$	acetic acid	ethanoic acid
$\text{CH}_3\text{—CH}_2\text{—COOH}$	propanoic acid	propanoic acid
$\text{CH}_3\text{—CH}_2\text{—CH}_2\text{—COOH}$	n-butyric acid	butanoic acid
HCOO—CH_3	methyl formate	methyl methanoate
$\text{HCOO—C}_2\text{H}_5$	ethyl formate	ethyl methanoate
$\text{CH}_3\text{—}\overset{\text{O}}{\parallel}\text{—C—O—C}_2\text{H}_5$	ethyl acetate	ethyl ethanoate

ETHERS

Formula	Common Name	IUPAC Name
$\text{CH}_3\text{—O—CH}_3$	dimethyl ether	methoxy methane
$\text{CH}_3\text{—O—CH}_2\text{—CH}_3$	ethyl methyl ether	methoxy ethane
$\text{C}_2\text{H}_5\text{—O—C}_2\text{H}_5$	diethyl ether	ethoxy ether

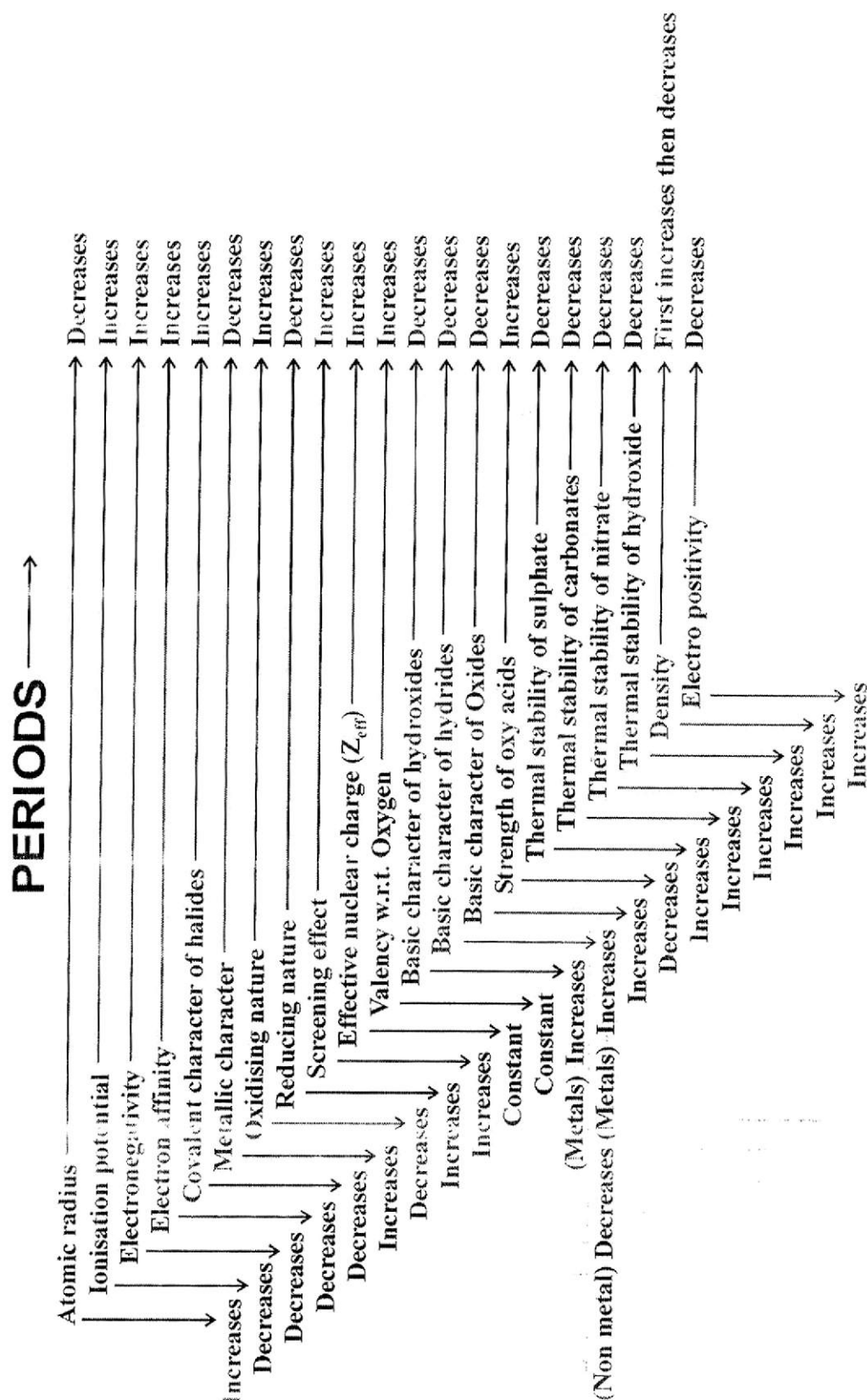
AMINE

Formula	Common Name	IUPAC Name
$\text{CH}_3\text{—NH}_2$	methyl amine	methanamine
$\text{CH}_3\text{—CH}_2\text{—NH}_2$	ethyl amine	ethanamine
$(\text{CH}_3\text{—CH}_2)_2\text{—NH}$	diethyl amine	diethanamine
$\text{CH}_3\text{—}\overset{\text{C}_2\text{H}_5}{\underset{ }{\text{N}}}\text{—H}$	ethyl methyl amine	methyl ethanamine

CONVERSION TABLE

From	Into	Multiply by
inch	mm	25.4
inch	cm	2.54
inch	m	2.54×10^{-2}
ft	m	0.3048
yard	m	0.9144
mile	m	1609.344
mile	km ²	1.609344
sq.in	cm ²	6.4516
sq.in	m ²	6.45×10^{-6}
sq.in	m ²	9.29×10^{-2}
sq.yard	m ²	0.8361
sq.yard	km ²	2.58999
sq.mile	hect ²	258.999
Acres	m	4046.856
Acres	hect	0.40469
cu.in	cm	16.3871
cu.in	lit ³	0.016387
cu.in	m ³	1.64×10^{-5}
cu.ft	m ³	2.84×10^{-2}
cu.ft	lit ³	0.028317
cu.yard	m	0.7646
lb	gms	453.60
ton	kg	1000
ton	lb	2240
ft/s	cm/s	30.48
ft/s	m/s	0.3048
mile/hr	km/hr	1.609344
lit	ml ³	10^{-3}
galon	ml ³	4.55×10^{-3}
galon	lit	4.550
miles/hr	ms ⁻¹	0.45
km/hr	ms ⁻¹	0.28
lb	kg	0.454
gcm ⁻³	kgm ⁻³	10^{-3}
lb/in ³	kgm ⁻³	2.77×10^{-4}
dyne	N	10^{-5}
kgf	N	9.80
if	dyne	980
J	erg	10^{-7}
erg	J	10^{-7}
ev	J	10
kwh	j	1.602×10^{-18}
Cal	j	3.6×10^5
Hp	w	4.186
mm	Hg	748
atms	pa	133.322
A°	m	1.013×10^5
micron	μ	10^{-6}
hp	kw	0.7457
lbf	kgf	0.45359
kw	w	1000
hp	kw	0.746
°F	°C	0.55
°C	°F	1.88
ounce	gm	28.349
carat	mg	0.353
m	cm	100
mm	cm	10
decim	cm	10

GENERAL TREND OF DIFFERENT PROPERTIES IN THE PERIOD AND GROUPS



CHEMISTRY AT ITS BEST ALL 7 DAYS BY YOGESH SONI

www.yogeshsonigravitytorial.in

<u>1.0079</u>	<u>Hydrogen</u>	<u>H</u>	<u>-259</u>	<u>-253</u>	<u>0.09</u>	<u>0.14</u>	<u>1776</u>	<u>1</u>	<u>1s¹</u>
<u>ATOMIC</u> <u>WEIGHT</u>	<u>NAME OF</u> <u>ELEMENT</u>	<u>SYMBOL</u>	<u>M.P.</u>	<u>B.P.</u>	<u>DENSITY</u>	<u>EARTH</u> <u>CRUST</u>	<u>DISCOVERY</u>	<u>GROUP</u>	<u>ELECTRONIC</u> <u>CONFIGURATION</u>
4.0026	Helium	He	-272	-269	0.18		1895	18	1s ²
6.941	Lithium	Li	180	1347	0.53		1817	1	[He] 2s ¹
9.0122	Beryllium	Be	1278	2970	1.85		1797	2	[He] 2s ²
10.811	Boron	B	2300	2550	2.34		1808	13	[He] 2s ² 2p ¹
12.0107	Carbon	C	3500	4827	2.26	0.094	ancient	14	[He] 2s ² 2p ²
14.0067	Nitrogen	N	-210	-196	1.25		1772	15	[He] 2s ² 2p ³
15.9994	Oxygen	O	-218	-183	1.43	46.71	1774	16	[He] 2s ² 2p ⁴
18.9984	Fluorine	F	-220	-188	1.7	0.029	1886	17	[He] 2s ² 2p ⁵
20.1797	Neon	Ne	-249	-246	0.9		1898	18	[He] 2s ² 2p ⁶
22.9897	Sodium	Na	98	883	0.97	2.75	1807	1	[Ne] 3s ¹
24.305	Magnesium	Mg	639	1090	1.74	2.08	1755	2	[Ne] 3s ²
26.9815	Aluminum	Al	660	2467	2.7	8.07	1825	13	[Ne] 3s ² 3p ¹
28.0855	Silicon	Si	1410	2355	2.33	27.69	1824	14	[Ne] 3s ² 3p ²
30.9738	Phosphorus	P	44	280	1.82	0.13	1669	15	[Ne] 3s ² 3p ³
32.065	Sulfur	S	113	445	2.07	0.052	ancient	16	[Ne] 3s ² 3p ⁴
35.453	Chlorine	Cl	-101	-35	3.21	0.045	1774	17	[Ne] 3s ² 3p ⁵
39.948	Argon	Ar	-189	-186	1.78		1894	18	[Ne] 3s ² 3p ⁶

CHEMISTRY AT ITS BEST ALL 7 DAYS BY YOGESH SONI
www.yogeshsonigravitytorial.in

<u>1.0079</u>	<u>Hydrogen</u>	<u>H</u>	<u>-259</u>	<u>-253</u>	<u>0.09</u>	<u>0.14</u>	<u>1776</u>	<u>1</u>	<u>1s¹</u>
<u>ATOMIC</u> <u>WEIGHT</u>	<u>NAME OF</u> <u>ELEMENT</u>	<u>SYMBOL</u>	<u>M.P.</u>	<u>B.P.</u>	<u>DENSITY</u>	<u>EARTH</u> <u>CRUST</u>	<u>DISCOVERY</u>	<u>GROUP</u>	<u>ELECTRONIC</u> <u>CONFIGURATION</u>
39.0983	Potassium	K	64	774	0.86	2.58	1807	1	[Ar] 4s ¹
40.078	Calcium	Ca	839	1484	1.55	3.65	1808	2	[Ar] 4s ²
44.9559	Scandium	Sc	1539	2832	2.99		1879	3	[Ar] 3d ¹ 4s ²
47.867	Titanium	Ti	1660	3287	4.54	0.62	1791	4	[Ar] 3d ² 4s ²
50.9415	Vanadium	V	1890	3380	6.11		1830	5	[Ar] 3d ³ 4s ²
51.9961	Chromium	Cr	1857	2672	7.19	0.035	1797	6	[Ar] 3d ⁵ 4s ¹
54.938	Manganese	Mn	1245	1962	7.43	0.09	1774	7	[Ar] 3d ⁵ 4s ²
55.845	Iron	Fe	1535	2750	7.87	5.05	ancient	8	[Ar] 3d ⁶ 4s ²
58.9332	Cobalt	Co	1495	2870	8.9		1735	9	[Ar] 3d ⁷ 4s ²
58.6934	Nickel	Ni	1453	2732	8.9	0.019	1751	10	[Ar] 3d ⁸ 4s ²
63.546	Copper	Cu	1083	2567	8.96		ancient	11	[Ar] 3d ¹⁰ 4s ¹
65.39	Zinc	Zn	420	907	7.13		ancient	12	[Ar] 3d ¹⁰ 4s ²
69.723	Gallium	Ga	30	2403	5.91		1875	13	[Ar] 3d ¹⁰ 4s ² 4p ¹
72.64	Germanium	Ge	937	2830	5.32		1886	14	[Ar] 3d ¹⁰ 4s ² 4p ²
74.9216	Arsenic	As	81	613	5.72		ancient	15	[Ar] 3d ¹⁰ 4s ² 4p ³
78.96	Selenium	Se	217	685	4.79		1817	16	[Ar] 3d ¹⁰ 4s ² 4p ⁴
79.904	Bromine	Br	-7	59	3.12		1826	17	[Ar] 3d ¹⁰ 4s ² 4p ⁵
83.8	Krypton	Kr	-157	-153	3.75		1898	18	[Ar] 3d ¹⁰ 4s ² 4p ⁶
85.4678	Rubidium	Rb	39	688	1.63		1861	1	[Kr] 5s ¹
87.62	Strontium	Sr	769	1384	2.54		1790	2	[Kr] 5s ²

CHEMISTRY AT ITS BEST ALL 7 DAYS BY YOGESH SONI

www.yogeshsonigravitytorial.in

<u>1.0079</u>	<u>Hydrogen</u>	<u>H</u>	<u>-259</u>	<u>-253</u>	<u>0.09</u>	<u>0.14</u>	<u>1776</u>	<u>1</u>	<u>1s¹</u>
<u>ATOMIC</u> <u>WEIGHT</u>	<u>NAME OF</u> <u>ELEMENT</u>	<u>SYMBOL</u>	<u>M.P.</u>	<u>B.P.</u>	<u>DENSITY</u>	<u>EARTH</u> <u>CRUST</u>	<u>DISCOVERY</u>	<u>GROUP</u>	<u>ELECTRONIC</u> <u>CONFIGURATION</u>
88.9059	Yttrium	Y	1523	3337	4.47		1794	3	[Kr] 4d ¹ 5s ²
91.224	Zirconium	Zr	1852	4377	6.51	0.025	1789	4	[Kr] 4d ² 5s ²
92.9064	Niobium	Nb	2468	4927	8.57		1801	5	[Kr] 4d ⁴ 5s ¹
95.94	Molybdenum	Mo	2617	4612	10.22		1781	6	[Kr] 4d ⁵ 5s ¹
98	Technetium	Tc	2200	4877	11.5		1937	7	[Kr] 4d ⁵ 5s ²
101.07	Ruthenium	Ru	2250	3900	12.37		1844	8	[Kr] 4d ⁷ 5s ¹
102.9055	Rhodium	Rh	1966	3727	12.41		1803	9	[Kr] 4d ⁸ 5s ¹
106.42	Palladium	Pd	1552	2927	12.02		1803	10	[Kr] 4d ¹⁰
107.8682	Silver	Ag	962	2212	10.5		ancient	11	[Kr] 4d ¹⁰ 5s ¹
112.411	Cadmium	Cd	321	765	8.65		1817	12	[Kr] 4d ¹⁰ 5s ²
114.818	Indium	In	157	2000	7.31		1863	13	[Kr] 4d ¹⁰ 5s ² 5p ¹
118.71	Tin	Sn	232	2270	7.31		ancient	14	[Kr] 4d ¹⁰ 5s ² 5p ²
121.76	Antimony	Sb	630	1750	6.68		ancient	15	[Kr] 4d ¹⁰ 5s ² 5p ³
127.6	Tellurium	Te	449	990	6.24		1783	16	[Kr] 4d ¹⁰ 5s ² 5p ⁴
126.9045	Iodine	I	114	184	4.93		1811	17	[Kr] 4d ¹⁰ 5s ² 5p ⁵
131.293	Xenon	Xe	-112	-108	5.9		1898	18	[Kr] 4d ¹⁰ 5s ² 5p ⁶
132.9055	Cesium	Cs	29	678	1.87		1860	1	[Xe] 6s ¹
137.327	Barium	Ba	725	1140	3.59	0.05	1808	2	[Xe] 6s ²
138.9055	Lanthanum	La	920	3469	6.15		1839	3	[Xe] 5d ¹ 6s ²
140.116	Cerium	Ce	795	3257	6.77		1803	101	[Xe] 4f ¹ 5d ¹ 6s ²

CHEMISTRY AT ITS BEST ALL 7 DAYS BY YOGESH SONI

www.yogeshsonigravitytorial.in

<u>1.0079</u>	<u>Hydrogen</u>	<u>H</u>	<u>-259</u>	<u>-253</u>	<u>0.09</u>	<u>0.14</u>	<u>1776</u>	<u>1</u>	<u>1s¹</u>
<u>ATOMIC</u> <u>WEIGHT</u>	<u>NAME OF</u> <u>ELEMENT</u>	<u>SYMBOL</u>	<u>M.P.</u>	<u>B.P.</u>	<u>DENSITY</u>	<u>EARTH</u> <u>CRUST</u>	<u>DISCOVERY</u>	<u>GROUP</u>	<u>ELECTRONIC</u> <u>CONFIGURATION</u>
140.9077	Praseodymium	Pr	935	3127	6.77		1885	101	[Xe] 4f ³ 6s ²
144.24	Neodymium	Nd	1010	3127	7.01		1885	101	[Xe] 4f ⁴ 6s ²
145	Promethium	Pm	1100	3000	7.3		1945	101	[Xe] 4f ⁵ 6s ²
150.36	Samarium	Sm	1072	1900	7.52		1879	101	[Xe] 4f ⁶ 6s ²
151.964	Europium	Eu	822	1597	5.24		1901	101	[Xe] 4f ⁷ 6s ²
157.25	Gadolinium	Gd	1311	3233	7.9		1880	101	[Xe] 4f ⁷ 5d ¹ 6s ²
158.9253	Terbium	Tb	1360	3041	8.23		1843	101	[Xe] 4f ⁹ 6s ²
162.5	Dysprosium	Dy	1412	2562	8.55		1886	101	[Xe] 4f ¹⁰ 6s ²
164.9303	Holmium	Ho	1470	2720	8.8		1867	101	[Xe] 4f ¹¹ 6s ²
167.259	Erbium	Er	1522	2510	9.07		1842	101	[Xe] 4f ¹² 6s ²
168.9342	Thulium	Tm	1545	1727	9.32		1879	101	[Xe] 4f ¹³ 6s ²
173.04	Ytterbium	Yb	824	1466	6.9		1878	101	[Xe] 4f ¹⁴ 6s ²
174.967	Lutetium	Lu	1656	3315	9.84		1907	101	[Xe] 4f ¹⁴ 5d ¹ 6s ²
178.49	Hafnium	Hf	2150	5400	13.31		1923	4	[Xe] 4f ¹⁴ 5d ² 6s ²
180.9479	Tantalum	Ta	2996	5425	16.65		1802	5	[Xe] 4f ¹⁴ 5d ³ 6s ²
183.84	Tungsten	W	3410	5660	19.35		1783	6	[Xe] 4f ¹⁴ 5d ⁴ 6s ²
186.207	Rhenium	Re	3180	5627	21.04		1925	7	[Xe] 4f ¹⁴ 5d ⁵ 6s ²
190.23	Osmium	Os	3045	5027	22.6		1803	8	[Xe] 4f ¹⁴ 5d ⁶ 6s ²
192.217	Iridium	Ir	2410	4527	22.4		1803	9	[Xe] 4f ¹⁴ 5d ⁷ 6s ²
195.078	Platinum	Pt	1772	3827	21.45		1735	10	[Xe] 4f ¹⁴ 5d ⁹ 6s ¹

CHEMISTRY AT ITS BEST ALL 7 DAYS BY YOGESH SONI

www.yogeshsonigravitytorial.in

<u>1.0079</u>	<u>Hydrogen</u>	<u>H</u>	<u>-259</u>	<u>-253</u>	<u>0.09</u>	<u>0.14</u>	<u>1776</u>	<u>1</u>	<u>1s¹</u>
<u>ATOMIC</u> <u>WEIGHT</u>	<u>NAME OF</u> <u>ELEMENT</u>	<u>SYMBOL</u>	<u>M.P.</u>	<u>B.P.</u>	<u>DENSITY</u>	<u>EARTH</u> <u>CRUST</u>	<u>DISCOVERY</u>	<u>GROUP</u>	<u>ELECTRONIC</u> <u>CONFIGURATION</u>
196.9665	Gold	Au	1064	2807	19.32		ancient	11	[Xe] 4f ¹⁴ 5d ¹⁰ 6s ¹
200.59	Mercury	Hg	-39	357	13.55		ancient	12	[Xe] 4f ¹⁴ 5d ¹⁰ 6s ²
204.3833	Thallium	Tl	303	1457	11.85		1861	13	[Xe] 4f ¹⁴ 5d ¹⁰ 6s ² 6p ¹
207.2	Lead	Pb	327	1740	11.35		ancient	14	[Xe] 4f ¹⁴ 5d ¹⁰ 6s ² 6p ²
208.9804	Bismuth	Bi	271	1560	9.75		ancient	15	[Xe] 4f ¹⁴ 5d ¹⁰ 6s ² 6p ³
209	Polonium	Po	254	962	9.3		1898	16	[Xe] 4f ¹⁴ 5d ¹⁰ 6s ² 6p ⁴
210	Astatine	At	302	337			1940	17	[Xe] 4f ¹⁴ 5d ¹⁰ 6s ² 6p ⁵
222	Radon	Rn	-71	-62	9.73		1900	18	[Xe] 4f ¹⁴ 5d ¹⁰ 6s ² 6p ⁶
223	Francium	Fr	27	677			1939	1	[Rn] 7s ¹
226	Radium	Ra	700	1737	5.5		1898	2	[Rn] 7s ²
227	Actinium	Ac	1050	3200	10.07		1899	3	[Rn] 6d ¹ 7s ²
232.0381	Thorium	Th	1750	4790	11.72		1829	102	[Rn] 6d ² 7s ²
231.0359	Protactinium	Pa	1568		15.4		1913	102	[Rn] 5f ² 6d ¹ 7s ²
238.0289	Uranium	U	1132	3818	18.95		1789	102	[Rn] 5f ³ 6d ¹ 7s ²
237	Neptunium	Np	640	3902	20.2		1940	102	[Rn] 5f ⁴ 6d ¹ 7s ²
244	Plutonium	Pu	640	3235	19.84		1940	102	[Rn] 5f ⁶ 7s ²
243	Americium	Am	994	2607	13.67		1944	102	[Rn] 5f ⁷ 7s ²
247	Curium	Cm	1340		13.5		1944	102	

CHEMISTRY AT ITS BEST ALL 7 DAYS BY YOGESH SONI

www.yogeshsonigravitytorial.in

Name of constant		Unit	Electron(e ⁻)		Proton(p ⁺)	Neutron(n ⁰)
Mass (m)		amu	0.000546		1.00728	1.00899
		kg	9.109×10^{-31}		1.673×10^{-27}	1.675×10^{-27}
		Relative	1/1837		1	1
Charge(e)	Coulomb (C)		-1.602×10^{-19}		$+1.602 \times 10^{-19}$	Zero
		esu	-4.8×10^{-10}		$+4.8 \times 10^{-10}$	Zero
		Relative	-1		+1	Zero
Specific charge (e/m)		C/g	1.76×10^8		9.58×10^4	Zero
Particle	Symbol	Nature	Charge esu $\times 10^{-10}$	Mass (amu)	Discovered by	
Positron	e^+, le^0, β^+	+	+ 4.8029	0.0005486	Anderson (1932)	
Neutrino	ν	0	0	< 0.00002	Pauli (1933) and Fermi (1934)	
Anti-proton	p^-	-	- 4.8029	1.00787	Chamberlain Sugri (1956) and Weighland (1955)	
Positive mu meson	μ^+	+	+ 4.8029	0.1152	Yukawa (1935)	
Negative mu meson	μ^-	-	- 4.8029	0.1152	Anderson (1937)	
Positive pi meson	π^+	+	+ 4.8029	0.1514	} Powell (1947)	
Negative pi meson	π^-	-	- 4.8029	0.1514		
Neutral pi meson	π^0	0	0	0.1454		

3) Different Types of Atomic Species

Atomic species	Similarities	Differences	Examples
Isotopes (Soddy)	(i) Atomic No. (Z) (ii) No. of protons (iii) No. of electrons (iv) Electronic configuration (v) Chemical properties (vi) Position in the periodic table	(i) Mass No. (A) (ii) No. of neutrons (iii) Physical properties	(i) ${}_1^1\text{H}, {}_1^2\text{H}, {}_1^3\text{H}$ (ii) ${}_8^{16}\text{O}, {}_8^{17}\text{O}, {}_8^{18}\text{O}$ (iii) ${}_{17}^{35}\text{Cl}, {}_{17}^{37}\text{Cl}$
Isobars	(i) Mass No. (A) (ii) No. of nucleons	(i) Atomic No. (Z) (ii) No. of protons, electrons and neutrons (iii) Electronic configuration (iv) Chemical properties (v) Position in the periodic table.	(i) ${}_{18}^{40}\text{Ar}, {}_{19}^{40}\text{K}, {}_{20}^{40}\text{Ca}$ (ii) ${}_{52}^{130}\text{Te}, {}_{54}^{130}\text{Xe}, {}_{56}^{130}\text{Ba}$
Isotones	No. of neutrons	(i) Atomic No. (ii) Mass No., protons and electrons. (iii) Electronic configuration (iv) Physical and chemical properties	(i) ${}_{14}^{30}\text{Si}, {}_{15}^{31}\text{P}, {}_{16}^{32}\text{S}$ (ii) ${}_{19}^{39}\text{K}, {}_{20}^{40}\text{Ca}$ (iii) ${}_1^3\text{H}, {}_2^4\text{He}$

Physics

- Components of a Vector**
 if $V = 34 \text{ m/sec} \angle 48^\circ$ then
 $V_x = 34 \text{ m/sec} \cdot (\cos 48^\circ)$; and $V_y = 34 \text{ m/sec} (\sin 48^\circ)$
- Weight = $m \cdot g$**
 $g = 9.81 \text{ m/sec}^2$ near the surface of the Earth
 $= 9.795 \text{ m/sec}^2$ in Fort Worth, TX
Density = mass/volume
 $\rho = \frac{m}{V}$ (unit: kg/m^3)
- Ave speed = distance / time = $v = d/t$**
Ave velocity = displacement / time = $v = d/t$
Ave acceleration = change in velocity / time
- Friction Force $F_f = \mu \cdot F_N$**
 If the object is not moving, you are dealing with static friction and it can have any value from zero up to $\mu_s F_N$
 If the object is sliding, then you are dealing with kinetic friction and it will be constant and equal to $\mu_k F_N$
- Torque $\tau = F \cdot L \cdot \sin \theta$**
 Where θ is the angle between F and L ; unit: Nm
- Newton's Second Law $F_{\text{net}} = \Sigma F_{\text{ext}} = m \cdot a$**
- Work = $F \cdot D \cdot \cos \theta$**
 Where D is the distance moved and θ is the angle between F and the direction of motion, unit: J
- Power = rate of work done**

$$\text{Power} = \frac{\text{Work}}{\text{time}} \quad \text{unit: watt}$$
Efficiency = Work_{out} / Energy_{in}
Mechanical Advantage = force out / force in

$$\text{M.A.} = F_{\text{out}} / F_{\text{in}}$$
- Constant - Acceleration Linear Motion**

$$\begin{array}{ll} v = v_0 + a \cdot t & x \\ (x - x_0) = v_0 \cdot t + \frac{1}{2} \cdot a \cdot t^2 & v \\ v^2 = v_0^2 + 2 \cdot a \cdot (x - x_0) & t \\ (x - x_0) = \frac{1}{2} \cdot (v_0 + v) \cdot t & a \\ (x - x_0) = v \cdot t - \frac{1}{2} \cdot a \cdot t^2 & v_0 \end{array}$$
- Heating a Solid, Liquid or Gas**
 $Q = m \cdot c \cdot \Delta T$ (no phase Changes!)
 Q = the heat added, c = specific heat, ΔT = temperature change, K
- Linear Momentum**
 momentum = $p = m \cdot v$ = mass $\cdot$ velocity
 momentum is conserved in collisions
- Center of Mass - point masses on a line**

$$x_{\text{cm}} = \Sigma (mx) / M_{\text{total}}$$
- Angular Speed vs. Linear Speed**
 Linear speed = $v = r \cdot \omega = r \cdot \text{angular speed}$
- Pressure under Water $P = \rho \cdot g \cdot h$**
 h = depth of water, ρ = density of water
- Universal Gravitation $F = G \frac{m_1 m_2}{r^2}$**
 $G = 6.67 \text{ E-11 Nm}^2 / \text{kg}^2$
- Mechanical Energy**
 $PE = P = m \cdot g \cdot h$
 $KE_{\text{Linear}} = K = \frac{1}{2} \cdot m \cdot v^2$
- Impulse = Change in Momentum**
 $F \Delta t = \Delta(m \cdot v)$
- Snell's Law $n_1 \cdot \sin \theta_1 = n_2 \cdot \sin \theta_2$**
Index of Refraction
 $n = c / v$
 c = speed of light = $3 \text{ E} + 8 \text{ m/s}$
- Ideal Gas Law $P \cdot V = n \cdot R \cdot T$**
 n = no. of moles of gas,
 R = gas law constant = 8.31 J / K mole
- Periodic Waves $v = f \cdot \lambda$**
 $f = 1 / T$ T = period of wave
- Constant - Acceleration Circular Motion**

$$\begin{array}{ll} \omega = \omega_0 + \alpha \cdot t & \theta \\ (\theta - \theta_0) = \omega_0 \cdot t + \frac{1}{2} \cdot \alpha \cdot t^2 & \omega \\ \omega^2 = \omega_0^2 + 2 \cdot \alpha \cdot (\theta - \theta_0) & t \\ (\theta - \theta_0) = \frac{1}{2} \cdot (\omega_0 + \omega) \cdot t & \alpha \\ (\theta - \theta_0) = \omega \cdot t - \frac{1}{2} \cdot \alpha \cdot t^2 & \omega_0 \end{array}$$
- Buoyant Force - Buoyancy**
 $F_B = \rho \cdot V \cdot g = m_{\text{Displaced fluid}} \cdot g$ = weight_{Displaced fluid}
 ρ = density of the fluid, V = volume of fluid displaced
- Ohm's Law $V = I \cdot R$**
 V = voltage applied, I = current, R = resistance
Resistance of a Wire
 $R = \rho \cdot L / A_x$
 ρ = resistivity of wire material, L = length of the wire
 A_x = cross-sectional area of the wire
- Heat of a Phase Change**
 $Q = m \cdot L$
 L = Latent Heat of phase change
- Hooke's Law $F = k \cdot x$**
Potential Energy of a spring
 $W = \frac{1}{2} \cdot k \cdot x^2$ = Work done on spring

26. Electric Power

$$P = I^2 R = V^2 / R = I \cdot V$$

27. Speed of a Wave on a String

$$T = \frac{mv^2}{L}$$

T = tension in string, m = mass of string
 L = length of string

28. Projectile Motion

Horizontal: $x - x_0 = v_{0x} t + 0$

Vertical: $y - y_0 = v_{0y} t + \frac{1}{2} a t^2$

29. Centripetal Force $F = \frac{mv^2}{r} = m \omega^2 r$

30. Kirchhoff's Laws

Loop Rule: $\sum_{\text{Around any loop}} \Delta V_i = 0$

Node Rule: $\sum_{\text{at any node}} I_i = 0$

31. Minimum Speed at the top of a Vertical Circular Loop

$$v = \sqrt{rg}$$

32. Resistor Combinations

SERIES $R_{eq} = R_1 + R_2 + R_3 + \dots$

PARALLEL $\frac{1}{R_{eq}} = \frac{1}{R_1} + \frac{1}{R_2} + \dots + \frac{1}{R_n} = \sum_{i=1}^n \frac{1}{R_i}$

33. Newton's Second Law and Rotational Inertia

$$\tau = \text{torque} = I \cdot \alpha$$

$$I = \text{moment of inertia} = m \cdot r^2 \text{ (for a point mass)}$$

35. Circular Unbanked Tracks $\frac{mv^2}{r} = \mu mg$

36. Continuity of Fluid Flow $A_m \cdot v_{in} = A_{out} \cdot v_{out}$

37. Moment of Inertia

Cylindrical hoop $I = m \cdot r^2$

Solid cylinder or disk $\frac{1}{2} m \cdot r^2$

Solid sphere $\frac{2}{5} m \cdot r^2$

Hollow sphere $\frac{2}{3} m \cdot r^2$

Thin rod (center) $\frac{1}{12} m \cdot L^2$

Thin rod (end) $\frac{1}{3} m \cdot L^2$

38. Capacitors $Q = C \cdot V$

Q = charge on the capacitor

C = capacitance of the capacitor

V = voltage applied to the capacitor

RC Circuits (Discharging) $V_c = V_0 \cdot e^{-t/RC}$
 $V_c - I \cdot R = 0$

39. Thermal Expansion

Linear: $\Delta L = L_0 \cdot \alpha \cdot \Delta T$

Volume: $\Delta V = V_0 \cdot \beta \cdot \Delta T$

40. Bernoulli's Equation

$$P + \rho \cdot g \cdot h + \frac{1}{2} \cdot \rho \cdot v^2 = \text{constant}$$

$$Q_{\text{Volume Flow Rate}} = A_1 \cdot v_1 = A_2 \cdot v_2 = \text{constant}$$

41. Rotational Kinetic Energy (See LEM, pg 8)

$$KE_{\text{rotational}} = \frac{1}{2} \cdot I \cdot \omega^2 = \frac{1}{2} \cdot I \cdot (v/r)^2$$

$$KE_{\text{rolling w/o slipping}} = \frac{1}{2} \cdot m \cdot v^2 + \frac{1}{2} \cdot I \cdot \omega^2$$

$$\text{Angular Momentum} = L = I \cdot \omega = m \cdot v \cdot r \cdot \sin \theta$$

Angular Impulse equals Change in Angular Momentum

$$\Delta L = \tau_{\text{torque}} \cdot \Delta t = \Delta(I \cdot \omega)$$

42. Period of Simple Harmonic Motion

$$T = 2\pi \sqrt{\frac{m}{k}}$$

where k = spring constant, $f = 1/T = 1/\text{period}$

43. Banked Circular Tracks

$$v^2 = r \cdot g \cdot \tan \theta$$

44. First Law of Thermodynamics

$$\Delta U = Q_{\text{Net}} + W_{\text{Net}}$$

Change in Internal Energy of a system =

Net Heat added to the system + Net Work done on the system

Flow of Heat through a Solid

$$\Delta Q / \Delta t = k \cdot A \cdot \Delta T / L$$

k = thermal conductivity, A = area of solid, L = thickness of solid

45. Potential Energy stored in a Capacitor

$$P = \frac{1}{2} \cdot C \cdot V^2$$

RC Circuit formula (Charging)

$$V_c = V_{\text{cell}} \cdot (1 - e^{-t/RC})$$

$$R \cdot C = \tau = \text{time constant}$$

$$V_{\text{cell}} - V_{\text{capacitor}} - I \cdot R = 0$$

46. Simple Pendulum $T = \sqrt{\frac{L}{g}} 2\pi$ and $f = 1/T$

47. Sinusoidal motion

$$x = A \cdot \cos(\omega \cdot t) = A \cdot \cos(2\pi \cdot f \cdot t)$$

ω = angular frequency, f = frequency

48. Doppler Effect $f' = f \frac{343 \pm \text{Toward } v_o}{343 \mp \text{Toward } v_s}$

v_o = velocity of observer, v_s = velocity of source

49. 2nd Law of Thermodynamics

The change in internal energy of a system is

$$\Delta U = Q_{\text{Added}} + W_{\text{Done On}} - Q_{\text{Lost}} - W_{\text{Done By}}$$

Maximum Efficiency of a Heat Engine
 (Carnot Cycle) (Temper in Kelvin)

$$\% \text{Eff} = (1 - \frac{T_c}{T_h}) \cdot 100\%$$

50. Thin Lens Equation

$$\frac{1}{f} = \frac{1}{D_o} + \frac{1}{D_i} = \frac{1}{o} + \frac{1}{i}$$

f = focal length
 i = image distance
 o = object distance

Magnification

$$M = -D_i / D_o = -i / o = H_i / H_o$$

Helpful reminders for mirrors and lenses

Focal Length of:	positive	negative
mirror	concave	convex
lens	converging	diverging
Object distance = O	all objects	
Object height = H_o	all objects	
Image distance = i	real	virtual
Image height = H_i	virtual, upright	real, inverted
Magnification	virtual, upright	real, inverted

51. Coulomb's Law $F = k \frac{q_1 q_2}{r^2}$

$$k = \frac{1}{4\pi\epsilon_0} = 9E9 \frac{N.m^2}{C^2}$$

52. Capacitor Combinations

PARALLEL $C_{eq} = C_1 + C_2 + C_3 + \dots$

SERIES $\frac{1}{C_{eq}} = \frac{1}{C_1} + \frac{1}{C_2} + \dots + \frac{1}{C_n} = \sum_{i=1}^n \frac{1}{C_i}$

53. Work done on a gas or by a gas
 $W = P \Delta V$

54. Electric Field around a point charge

$$E = k \frac{q}{r^2}$$

$$k = \frac{1}{4\pi\epsilon_0} = 9E9 \frac{N.m^2}{C^2}$$

55. Magnetic Field around a wire

$$B = \frac{\mu_0 I}{2\pi r}$$

Magnetic Flux

$$\Phi = B \cdot A \cdot \cos \theta$$

Force caused by a magnetic field on a moving charge

$$F = q \cdot v \cdot B \cdot \sin \theta$$

56. Entropy change at constant T

$$\Delta S = Q / T$$

(Phase changes only : melting, boiling, freezing, etc)

57. Capacitance of a Capacitor

$$C = \kappa \cdot \epsilon_0 \cdot A / d$$

κ = dielectric constant

A = area of plates

d = distance between plates

$$\epsilon_0 = 8.85 \text{ E } (-12) \text{ F/m}$$

58. Induced Voltage

N = no. of loops

$$Emf = N \frac{\Delta \Phi}{\Delta t}$$

Lenz's Law - induced current flows to create a B-field opposing the change in magnetic flux.

59. Inductors during an increase in current

$$V_L = V_{cell} \cdot e^{-t/(L/R)}$$

$$I = (V_{cell} / R) \cdot [1 - e^{-t/(L/R)}] \quad L / R = \tau = \text{time constant}$$

60. Transformers $N_1 / N_2 = V_1 / V_2$
 $I_1 \cdot V_1 = I_2 \cdot V_2$

61. Decibel Scale

$$B \text{ (Decibel level of sound)} = 10 \log (I / I_0)$$

I = intensity of sound, I_0 = intensity of softest audible sound

62. Poiseuille's Law

$$\Delta P = 8 \cdot \eta \cdot L \cdot Q / (\pi \cdot r^4)$$

η = coefficient of viscosity, L = length of pipe

r = radius of pipe, Q = flow rate of fluid

Stress and Strain

Y or S or B = stress / strain

$$\text{stress} = F / A$$

Three kinds of strain : unit-less ratios

I. Linear : strain = $\Delta L / L$

II. Shear : strain = $\Delta x / L$

III. Volume : strain = $\Delta V / V$

63. Postulates of Special Relativity

1. Absolute, uniform motion cannot be detected.
2. No energy or mass transfer can occur at speeds faster than the speed of light.

64. Lorentz Transformation Factor $\beta = \sqrt{1 - \frac{v^2}{c^2}}$

65. Relativistic Time Dilation $\Delta t = \Delta t_0 / \beta$

66. Relativistic Length Contraction $\Delta x = \beta \cdot \Delta x_0$
Relativistic Mass Increase $m = m_0 / \beta$

67. Energy of a Photon or a Particle $E = h \cdot f = m \cdot c^2$

h = Planck's constant = $6.63 \text{ E } (-34) \text{ J sec}$

f = frequency of the photon

68. Radioactive Decay Rate Law

$$A = A_0 \cdot e^{-kt} = (1/2^n) A_0 \quad (\text{after } n \text{ half-lives})$$

Where $k = (\ln 2) / \text{half-life}$

69. Blackbody Radiation and the Photoelectric Effect

$$E = n \cdot h \cdot f \text{ where } h = \text{Planck's constant}$$

70. Early Quantum Physics

Rutherford-Bohr Hydrogen-like Atoms

$$\frac{1}{\lambda} = R \left(\frac{1}{n_1^2} - \frac{1}{n_2^2} \right) \text{ meters}^{-1}$$

or

$$f = \frac{c}{\lambda} = cR \left(\frac{1}{n_1^2} - \frac{1}{n_2^2} \right)$$

R = Rydberg's Constant = $1.097373143 \times 10^7 \text{ m}^{-1}$

n_1 = series integer (2 = Balmer), n_2 = an integer $> n_1$

Mass-Energy Equivalence $m_v = m_0 / \beta$

Total Energy = KE + $m_0 c^2 = m_0 c^2 / \beta$

Usually written simply as $E = mc^2$

De Broglie Matter Waves

For light: $E_p = hf = hc / \lambda = p \cdot c$

Therefore, momentum: $p = h / \lambda$

Similarly for particles, $p = m \cdot v = h / \lambda$,

so the matter wave's wavelength must be $\lambda = h / mv$

Energy Released by Nuclear Fission or Fusion Reaction

$$E = m_0 \cdot c^2$$

MISCELLANEOUS FORMULAS

Quadratic Formula

$$\text{if } ax^2 + bx + c = 0$$

then

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

Trigonometric Definitions

$\sin \theta = \text{opposite} / \text{hypotenuse}$

$\cos \theta = \text{adjacent} / \text{hypotenuse}$

$\tan \theta = \text{opposite} / \text{adjacent}$

$\sec \theta = 1 / \cos \theta = \text{hyp} / \text{adj}$

$\csc \theta = 1 / \sin \theta = \text{hyp} / \text{opp}$

$\cot \theta = 1 / \tan \theta = \text{adj} / \text{opp}$

Inverse Trigonometric Definitions

$\theta = \sin^{-1} (\text{opp} / \text{hyp})$

$\theta = \cos^{-1} (\text{opp} / \text{hyp})$

$\theta = \tan^{-1} (\text{opp} / \text{hyp})$

Law of Sines

$$a / \sin A = b / \sin B = c / \sin C$$

or

$$\sin A / a = \sin B / b = \sin C / c$$

Law of Cosines

$$a^2 = b^2 + c^2 - 2bc \cos A$$

$$b^2 = c^2 + a^2 - 2ca \cos B$$

$$c^2 = a^2 + b^2 - 2ab \cos C$$

T-Pots

For the functional form

$$\frac{1}{A} = \frac{1}{B} + \frac{1}{C}$$

You may use "The Product over the Sum" rul.

$$A = \frac{B \cdot C}{B + C}$$

For the Alternate Functional form

$$\frac{1}{A} = \frac{1}{B} - \frac{1}{C}$$

You may substitute T-Pot-d

$$A = \frac{B \cdot C}{C - B} = - \frac{B \cdot C}{B - C}$$

Fundamental SI Units

Unit	Base Unit	Symbol
Length	meter	m
Mass	kilogram	kg
Time	second	s
Electric Current	ampere	A
Thermodynamic Temperature	kelvin	K
Luminous Intensity	candela	cd
Quantity of Substance	moles	mol
Plane Angle	radian	rad
Solid Angle	steradian	sr or str

Some Derived SI Units

Symbol / Unit	Quantity	Base Units
C coulomb	Electric Charge	A • s
F farad	Capacitance	A ² • s ⁴ / (kg • m ²)
H henry	Inductance	kg • m ² / (A ² • s ²)
Hz hertz	Frequency	s ⁻¹
J joule	Energy & Work	kg • m ² / s ² = N • m
N newton	Force	kg • m / s ²
Ω ohm	Elec Resistance	kg • m ² / (A ² • s ²)
Pa pascal	Pressure	kg / (m • s ²)
T tesla	Magnetic Field	kg / (A • s ²)
V volt	Elec Potential	kg • m ² / (A • s ²)
W watt	Power	kg • m ² / s ³

Non-SI Units

°C degrees Celsius	Temperature
eV electron-volt	Energy, Work

CHEMISTRY AT ITS BEST ALL 7 DAYS BY YOGESH SONI

www.yogeshsonigravitytorial.in

Aa acceleration, Area, A_x = Cross-sectional Area, Amperes, Amplitude of a Wave, Angle,	A α Alpha angular accelerations, coefficient of linear expansion,
Bb Magnetic Field, Decibel Level of Sound, Angle,	B β Beta coefficient of volume expansions, Lorentz transformation factor,
Cc specific heat, speed of light, Capacitance, Angle, Coulombs, °Celsius, Celsius Degrees, candela,	X χ Chi
Dd displacement, differential change in a variable, Distance, Distance Moved, distance,	Δ δ Delta Δ = change in a variable,
Ee base of the natural logarithms, charge on the electron, Energy,	E ε Epsilon ϵ_0 = permittivity of free space,
Ff Force, frequency of a wave or periodic motion, Farads,	Φ φ Phi Magnetic Flux, angle,
Gg Universal Gravitational Constant, acceleration due to gravity, Gauss, grams, Giga-,	Γ γ Gamma surface tension = F/L , $1/\gamma$ = Lorentz transformation factor,
Hh depth of fluid, height, vertical distance, Henrys, Hz = Hertz,	H η Eta
Ii Current, Moment of Inertia, image distance, Intensity of Sound,	I ι Iota
Jj Joules,	Θ θ Theta and Phi lower case alternates,
Kk K or KE = Kinetic Energy, force constant of a spring, thermal conductivity, coulomb's law constant, kg = kilograms, Kelvins, kilo-, rate constant for Radioactive decay = $1/\tau = \ln 2 / \text{half-life}$,	Κ κ Kappa dielectric constant,
Ll Length, Length of a wire, Latent Heat of Fusion or Vaporization, Angular Momentum, Thickness, Inductance,	Λ λ Lambda wavelength of a wave, rate constant for Radioactive decay = $1/\tau = \ln 2 / \text{half-life}$,
Mm mass, Total Mass, meters, milli-, Mega-, m_0 = rest mass, mol = moles,	M μ Mu friction, μ_0 = permeability of free space, micro-,
Nn index of refraction, moles of a gas, Newtons, Number of Loops, nano-,	N ν Nu alternate symbol for frequency,
Oo	Ο ο Omicron
Pp Power, Pressure of a Gas or Fluid, Potential Energy, momentum, Power, Pa = Pascal,	Π π Pi 3.1425926536.....
Qq Heat gained or lost, Maximum Charge on a Capacitor, object distance, Flow Rate,	Θ θ Theta angle between two vectors,
Rr radius, Ideal Gas Law constant, Resistance, magnitude or length of a vector, rad = radians	Ρ ρ Rho density of a solid or liquid, resistivity,
Ss speed, seconds, Entropy, length along an arc,	Σ σ Sigma Summation, standard deviation,
Tt time, Temperature, Period of a Wave, Tension, Teslas, $t_{1/2}$ = half-life,	Τ τ Tau torque, time constant for a exponential processes; eg $\tau = RC$ or $\tau = L/R$ or $\tau = 1/k = 1/\lambda$,
Uu Potential Energy, Internal Energy,	Υ υ Upsilon
Vv velocity, Velocity, Volume of Gas, velocity of wave, Volume of Fluid Displaced, Voltage, Volts,	ς ω Zeta and Omega lower case alternates,
Ww weight, Work, Watts, Wb = Weber,	Ω ω Omega angular speed or angular velocity, Ohms
Xx distance, horizontal distance, x-coordinate east-and-west coordiante,	Ξ ξ Xi
Yy vertical distance, y-coordinate, north-and-south coordinate,	Ψ ψ Psi
Zz z-coordinate, up-and-down coordinate,	Z ζ Zeta

ACHIEVEMENTS 2014 -2016



Prashant Ratre
Selected for
IIT Dhanbad



Umang Beriya
XII (C.G.)-87%
Maths 2016



Shailesh
93/100 (Maths) 10th
83/100 (Chemistry) 2016



Ankit Sahoo
DPS VIII - 87%



Arya Mukherjee
DPS VIII - 90+



MD. Arbaaz
St. Xaviers X ICSE - 75%



Ankita
CGPA - 10
Radiant Public School 2016



MD. Shoaib
CGPA - A1 Class - X
Holy Cross
Bairan Bazar 2017



Avnish Pandey
Selected for IIIT Orissa



Gourav Tiwari
Selected for Rajasthan
BTECH XII - 85%



Aditi Tripathi
St. Xaviers IX - 95% ICSE



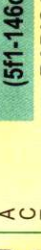
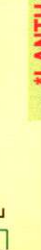
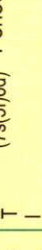
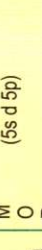
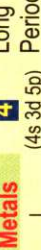
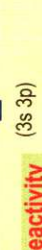
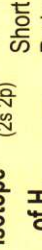
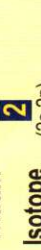
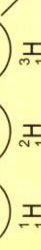
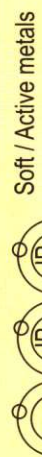
Saket Sahu
XII - 91% CBSE 2014
SELECTED FOR NIT RAIPUR

(Covering Entire Syllabus From Dr. O.P. Tondon & Pradeep's text book)

Only Institute to Provide 7 days Classes for Chemistry & Biology, Maths - DR. Agrawal (P.H.D., B.Ed.) Exp - 35 year CBSE / ICSE

Physics - R.K. Sharma Sir (MSc, B.Ed.) Exp. 22 Year, Writer - Yogeshbodh Text, Chemistry - Yogesh Soni

Mendeleef Group	IA	IIA	IIIB	IVB	VB	VIB	VIIIB	VIII		IB	IIB	IIIA	IVA	VIA	VIIA	0		
Modern Group Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18



3 crystalline allotropes of carbon
Diamond, Graphite, Fullerenes

P-Block (ns2 np1-6)

Fluorine is the most Electro Negative Element

18

2 He Helium

10 Ne Neon

18 Ar Argon

36 Kr Krypton

54 Xe Xenon

86 Rn Radon

118 Uuo Ununium

17 F Fluorine

8 O Oxygen

16 S Sulphur

34 Se Selenium

52 Te Tellurium

84 Po Polonium

116 Uuh Ununium

7 N Nitrogen

15 P Phosphorus

33 As Arsenic

51 Sb Antimony

83 Bi Bismuth

115 Uup Ununium

6 C Carbon

14 Si Silicon

32 Ge Germanium

50 Sn Tin

82 Pb Lead

114 Uuq Ununium

5 B Boron

13 Al Aluminium

31 Ga Gallium

49 In Indium

81 Tl Thallium

113 Uut Ununium

4 He Helium

10 Ne Neon

18 Ar Argon

36 Kr Krypton

54 Xe Xenon

86 Rn Radon

118 Uuo Ununium

17 F Fluorine

8 O Oxygen

16 S Sulphur

34 Se Selenium

52 Te Tellurium

84 Po Polonium

116 Uuh Ununium

7 N Nitrogen

15 P Phosphorus

33 As Arsenic

51 Sb Antimony

83 Bi Bismuth

115 Uup Ununium

6 C Carbon

14 Si Silicon

32 Ge Germanium

50 Sn Tin

82 Pb Lead

114 Uuq Ununium

5 B Boron

13 Al Aluminium

31 Ga Gallium

49 In Indium

81 Tl Thallium

113 Uut Ununium

4 He Helium

10 Ne Neon

18 Ar Argon

36 Kr Krypton

54 Xe Xenon

86 Rn Radon

118 Uuo Ununium

17 F Fluorine

8 O Oxygen

16 S Sulphur

34 Se Selenium

52 Te Tellurium

84 Po Polonium

116 Uuh Ununium

7 N Nitrogen

15 P Phosphorus

33 As Arsenic

51 Sb Antimony

83 Bi Bismuth

115 Uup Ununium

6 C Carbon

14 Si Silicon

32 Ge Germanium

50 Sn Tin

82 Pb Lead

114 Uuq Ununium

5 B Boron

13 Al Aluminium

31 Ga Gallium

49 In Indium

81 Tl Thallium

113 Uut Ununium

4 He Helium

10 Ne Neon

18 Ar Argon

36 Kr Krypton

54 Xe Xenon

86 Rn Radon

118 Uuo Ununium

17 F Fluorine

8 O Oxygen

16 S Sulphur

34 Se Selenium

52 Te Tellurium

84 Po Polonium

116 Uuh Ununium

7 N Nitrogen

15 P Phosphorus

33 As Arsenic

51 Sb Antimony

83 Bi Bismuth

115 Uup Ununium

6 C Carbon

14 Si Silicon

32 Ge Germanium

50 Sn Tin

82 Pb Lead

114 Uuq Ununium

5 B Boron

13 Al Aluminium

31 Ga Gallium

49 In Indium

81 Tl Thallium

113 Uut Ununium

4 He Helium

10 Ne Neon

18 Ar Argon

36 Kr Krypton

54 Xe Xenon

86 Rn Radon

118 Uuo Ununium

17 F Fluorine

8 O Oxygen

16 S Sulphur

34 Se Selenium

52 Te Tellurium

84 Po Polonium

116 Uuh Ununium

7 N Nitrogen

15 P Phosphorus

33 As Arsenic

51 Sb Antimony

83 Bi Bismuth

115 Uup Ununium

6 C Carbon

14 Si Silicon

32 Ge Germanium

50 Sn Tin

82 Pb Lead

114 Uuq Ununium

5 B Boron

13 Al Aluminium

31 Ga Gallium

49 In Indium

81 Tl Thallium

113 Uut Ununium

4 He Helium

10 Ne Neon

18 Ar Argon

36 Kr Krypton

54 Xe Xenon

86 Rn Radon

118 Uuo Ununium

17 F Fluorine

8 O Oxygen

16 S Sulphur

34 Se Selenium

52 Te Tellurium

84 Po Polonium

116 Uuh Ununium

7 N Nitrogen

15 P Phosphorus

33 As Arsenic

51 Sb Antimony

83 Bi Bismuth

115 Uup Ununium

6 C Carbon

14 Si Silicon

32 Ge Germanium

50 Sn Tin

82 Pb Lead

114 Uuq Ununium

5 B Boron

13 Al Aluminium

31 Ga Gallium

49 In Indium

81 Tl Thallium

1. Only institute to provide 7 days chemistry classes covering entire syllabus from Pradeep's Text (Vol I & II) for classes XI, X & VIII.
2. Complete coverage of NCERT & S. Chand Text for classes IX, X & VIII.
3. Separate Batches for Hindi & English Medium.
4. Free Demo classes (5 days). Classes upto the end exams weekly test with file record & marks is sent through SMS. All test papers are maintained as file record, which is handed over to parents during PTM.
5. Classes run on all 7 days with regular doubt class.
6. Only Institute in Raipur run by senior most lectures of ICSE/CBSE.
7. Disciplined and advanced digital class rooms.
8. Focus on board results, unit wise tests (makor & minor).
9. Regular focus on sample papers from all-in-one (Arihant & Evergreen) before term Exam.
10. Individual attention to weaker students.
11. Teaching through white Board, projector method, Teaching aid. Science lab Experiments.
12. Monthly parents interaction.
13. Lowest & affordable fee on 3-4 easy installments.
14. Most effective & detailed study material (Theory & competitive)
15. Library facility over 800 reference books.
16. Trusted & recognised by parents & Principals.
17. For us education is not business.



WORKSHOP ON JEE BY
VELLORE INSTITUTE OF
TECHNOLOGY



AWARDED FOR ACTIVE
PARTICIPATION BY
CG GOVT 2016



WORKSHOP CONDUCTED BY ICAFI UNIVERSITY



Gourav Tiwari
XII - 85%
Selected for Rajasthan BTECH



Prashant Ratre
Selected for NIT Raipur
IIT Dhanbad



Umang Beriya
XII (C.G.) - 87%
Maths 2016



Gourav Verma
83 / 100
Chemistry



Md. Saqlain
8.4 CGPA IX



Akshay Singh
selected for MBBS
UKRAINE 2017



Swati
CGPA B1.
Class X 2017



Shoaib.
CGPA A1. CLASS X 2017.
HOLYCROSS



Shailesh
93 / 100 (Maths) 10th
83/100 (Chemistry) 2016 Adarsh Vidyalaya



Rahul Yadav
85 % - XI
Mata Sundari



Naman
CGPA - 10
Maharishi



Ankita
CGPA - 10
Radiant Public



Aditi Tripathi
96% - IX
St. Xaviers



Md. Arbaqz
75% 2016
X-ICSE, St. Xaviers



Tushar
2016 CGPA 8.0
HOLYCROSS KAPA



Detailed Kota Notes (14 GB)

Daily DPP (Practise Papers)

Daily Classes 1 Hour of Maths, Science, SST, Hindi, Sanskrit
for VIII, IX, X, CBSE

(Free Demo Classes 1 Week)

Regular Focus on Sample papers (All in one & Evergreen)

Marks through SMS & Papers as file Records.

Fees in 3 easy installment

Library facility - 800 books