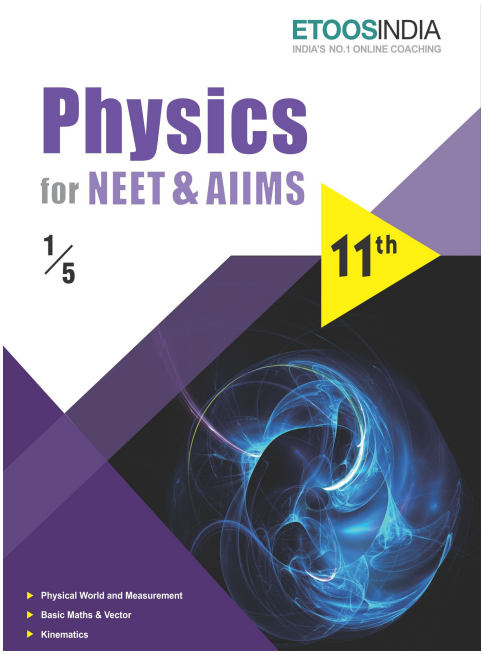
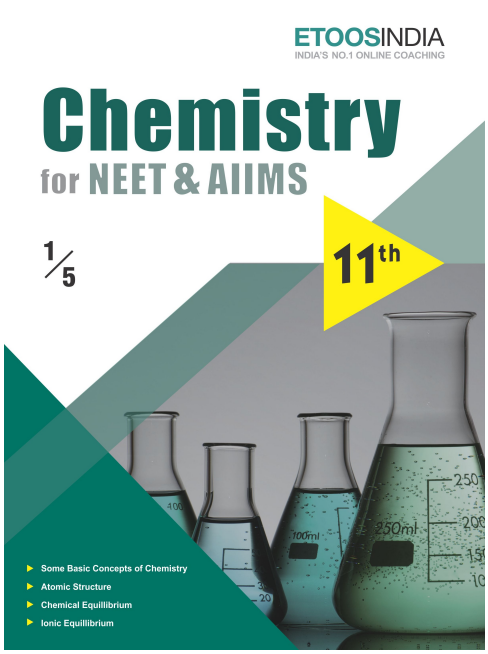
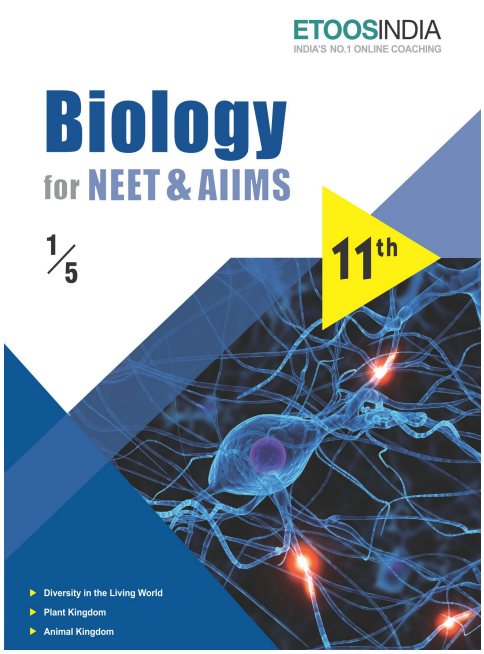
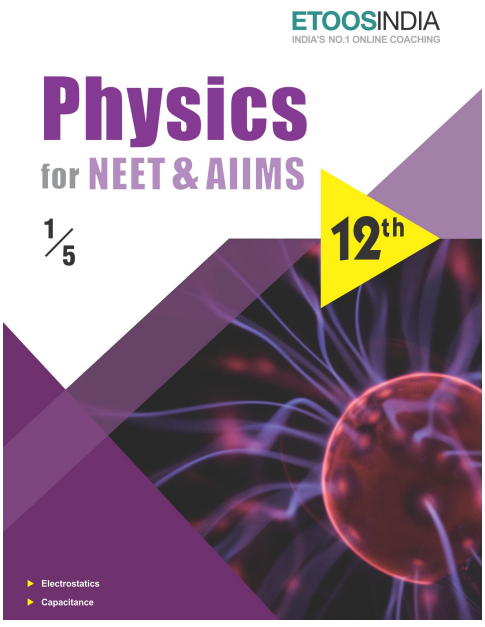
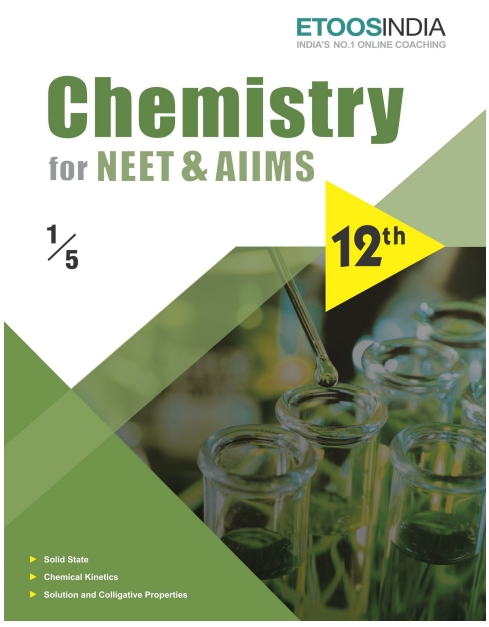
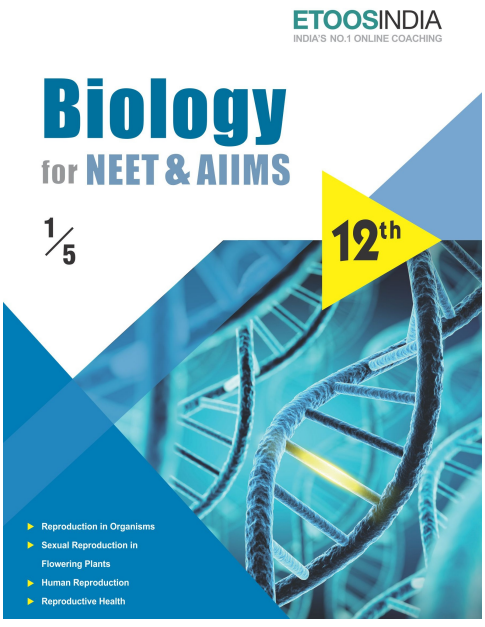












CHAPTER 11

S-BLOCK

When the elements are arranged in vertical columns according to increasing atomic weight, so that the horizontal lines contain analogous elements again according to increasing atomic weight, an arrangement results from which several general conclusions may be drawn.

" DMITRY IVANOVICH MENDELEEV"

INTRODUCTION

The s-block elements of the Periodic Talbe are those in which the last eletron enters the outermost s-orbital. As the s-orbital can accommodate only two electrons, two groups (1 & 2) belong to the s-block of the periodic Table. Group 1 of the Periodic table. Group 1 of the Periodic Table consists of the elements: lithium, sodium, potassium, rubidium, caesium and francium. They are collectively known as the alkali metals. These are so called because they form hydroxides on reaction with water which are strongly alkaline in nature. The elements of Group 2 include beryllium, magnesium, calcium, strontium, barium and radium. These elements with the exception of beryllium are commonly known as the alkaline earth metals. These are so called because theiroxides and hydroxides are alkaline in nature and these metal oxides are found in the earth's crust.

The elements in which the last electron enters the outer most s - orbital are called s-block elements. The group I and II of periodic table belongs to the s-block.

ALKALI METAL

PHYSICAL PROPERTIES :

(i) Physical State

(a) One electron in outermost sheel & General formula ns^1.
(b) Francium is radioactive element.
(c) All are silvery white
(d) Light soft, malleable and dutile metals with metallic lustre.
(e) Alkali metal are paramagnetic, diamagnetic and colourless in form of ions.

(ii) Atomic Size

(a) Biggest in their repective period
(except noble gas element)
(b) Size increases from Li to Fr due to addition of an extra shell.
Li < Na < K < Rb < Cs < Fr

(iii) Softness

(a) Alkali metals are soft because of
(i) Large atomic size
(ii) BCC crystal structure (HCP in Li)
(iii) Loose packing (68 % packing efficiency)
(iv) Weak metallic bond
(b) Cs is the softest metal in s-block

$$\text{Atomic size} \propto \frac{1}{\text{strength of metallic bond}} \propto \text{softness} \propto \frac{1}{\text{Melting \& Boiling point}}$$

(iv) Melting point and boiling point

(a) Weak interatomic bonds are due to their large atomic radil and presence of only one valence electron hence melting point and boiling point are low.
(b) Decreasing order of melting point and biling point is
Li > Na > K > Rb > Cs
(c) With the increase in the size of metal atom, the repulsion of the non-bonding electrons increases and therefore melting point and boiling point decreases from Li to Cs.

(v) Electro positive character or metallic character

Electropositive $\propto$ 1/Ionisation Potentical

Due to their larger sixe electron can easily be removed to form M^+ ion. Electro positive property increases from Li to Cs.

(vi) Flame Test

Alkali metals and their salts gives characteristic colour to bunsen flame. The flame energy causes an excitation of the outer most electron which on dropping back to ground state emits absorbed energy as visible light

Ex. Li-Crimson red Na-Golden yellow K-Violet
Rb-Red violet Cs-Blue

(vii) Photo Electric Effect

(a) Atomic size of K, Rb and Cs is quite large, so their ionisation potential is very low
(b) Due to very low ionisation potential their valuence shell electrons gets excited even by absorbing visible light. That's why Cs is used in photo cells.

Etoos Tips & Formulas

1.	Active nitrogen	:	N(atomic nitrogen)
2.	Alums	:	$M_2'SO_4.M_2'''(SO_4)_3.24H_2O$
			$M' = K^+, NH_4^+, Na^+$etc.
			$M''' = Cr^{+3}, Al^{+3}, Fe^{+3}$etc.
3.	Asbestos	:	$CaMg_3(SiO_3)_4$
4.	Arsine	:	AsH_3
5.	Aquaregia	:	Conc. HNO_3 + Conc. HCl (1 : 3 part)
6.	Anhydrone	:	$Mg(CLO_4)_2$
7.	Argentoferrous galena	:	$PbS + Ag_2S$
8.	Borax	:	$Na_2B_4O_7 . 10H_2O$
9.	Blue vitriol	:	$CuSO_4, 5H_2O$
10.	Barytes	:	$BaSO_4$
11.	Baryta water	:	$Ba(OH)_2$ solution
12.	Baryta	:	BaO
13.	Baking soda	:	$NaHCO_3$
14.	Bleaching powder	:	$CaOCl_2$
15.	Boranes	:	Hydride of borone
16.	Brine	:	NaCl solution
17.	Calgon	:	$Na_2[Na_4(PO_3)_6]$
18.	Coinage metals	:	Cu, Ag and Au
19.	Carborundum	:	SiC
20.	Cementite	:	FeC
21.	Caliche	:	$NaNO_3 + NalO_3$
22.	Caustic soda	:	NaOH
23.	Caustic potash	:	KOH
24.	Calomel	:	Hg_2Cl_2
25.	Corrosive sublimate	:	$HgCl_2$
26.	Deuterium	:	${}_1H^2$ of D
27.	D.D.T.	:	p-dichloro, diphenyl, trichloroethane
28.	Dry ice	:	Solid CO_2
29.	Freon	:	CF_2Cl_2
30.	Ferric Alum	:	$K_2SO_4. Fe_2(SO_4)_3. 24H_2O$
31.	Fenton's reagent	:	H_2O_2 + few drops of $FeSO_4$
32.	Fusion's mixutre	:	$Na_2CO_3 + K_2CO_3$
33.	Fluid magnesia	:	12% solution of $Mg(HCO)_2$
34.	Fehling solution	:	$CuSO_4. 5H_2O$ + NaOH + Na,K tartarate

SOLVED EXAMPLE

Ex. 1 Li has the maximum value of ionisation potential among alkali metals i.e.e lithium has the minimum tendency to ionise to give Li^+ ion. lithium is –

(A) Strongest reducing

(B) Poorest reducing agent

(C) Strongest oxidisting agent

(D) Poorest oxidising agent

Sol. **(A)** The ionisation potential value of LIthium is maximum among alkali metals i.e., its tendency to ionise to give Li^+ ions should be the minimum i.e. Li should be the poorest reducing agent. But, lithium is the strongest reducing agent. This is due to the largest value of hydration energy of Li^+ ions.

Ex. 2 The highest melting point among alkali metal of –

(A) Li **(B)** Na

(C) K **(D)** Rb

Sol. **(A)** Li has highest melting point among alkali metals. All alkali metals have low M.P. The M.P. decrease down the group. The low M.P. are attributed to their larger atomic size due to which the binding energies of their atoms in the crystal lattice are low.

Ex. 3 Commercial common salt becomes slightly damp on keeping. This is due to the fact that –

(A) Common salt is hygroscopic

(B) Common salt contains some impurity whichis hygroscopic

(C) Salt is efflorescent

(D) Salt is crystalline

Sol. **(B)** Commercial common salt commonly becomes slightly damp on keeping because common salt contains some impurity $MgCl_2$ and $CaCl_2$ which is hygroscopic in nature and absorbs moisture from the atmosphere.

Ex. 4 CO_2 gas along with solid (Y) is obtained when sodium salt (X) is heated. (X) is again obtained when CO_2 gas is passed into (Y). X & Y are –

(A) Na_2CO_3, Na_2O **(B)** Na_2CO_3, NaOH

(C) $NaHCO_3$, Na_2CO_3 **(D)** Na_2CO_3, $NaHCO_3$

Sol. **(C)** $2\underset{(X)}{NaHCO_3} \xrightarrow{Heat} \underset{(Y)}{Na_2CO_3} + H_2O + CO_2$

$\underset{(Y)}{Na_2CO_3} + H_2O + CO_2 \longrightarrow \underset{(X)}{2NaHCO_3}$

Ex. 5 The highest NaOH gives disproportionation reaction with

(A) S **(B)** CO_2

(C) SO_2 **(D)** SO_3

Sol. **(A)** $4S + 6NaOH \xrightarrow{\Delta} Na_2S_2O_3 + 2Na_2S + 3H_2O$

with excess pentasulfide forms

$Na_2S + 4S \longrightarrow Na_2S_5$

Ex. 6 Metallic magnesium is prepared by

(A) Reduction of MgO by coke

(B) Electrolysis of aqueous solution of $Mg(NO_3)$

(C) Displacement of Mg by ion from $MgSO_4$ solution

(D) Electrolysis of molten $MgCl_2$

Sol. **(D)** $\underset{(Molten)}{MgCl_2} \xrightarrow{Electrolysis} \underset{Cation}{Mg^{+2}} + \underset{Anion}{2Cl}$

Anode : $2Cl^- \longrightarrow 2Cl + 2e^-$, $Cl + Cl \longrightarrow Cl_3$

Cathode : $Mg^{+2} + 2e^- \longrightarrow Mg$

Ex. 7 The first ionization potential of Mg is

(A) Less than Al **(B)** More than Al

(C) Equal toAl **(D)** Zero

Sol. **(B)** The first ionization potential of Mg is more than Al sice the electron has to be removed from completely filled svalence shell of Mg.

Ex. 8 Portland cement is manufactured by using–

(A) Lime stone, clay and sand

(B) Lime stone, gypsum and sand

(C) Lime stone, gypsum and alumina

(D) Lime stone, clay and gypsum

Sol. **(D)** Lime stone – $CaCO_3$

Clay – silica and alumina

Gypsum – $CaSO_4.2H_2O$

Ex. 9 Gypsum $CaSO_4.2H_2O$ on heating to about 120°C forms a compound which has the chemical composition represented by

(A) $CaSO_4$ **(B)** $2CaSO_4.H_2O$

(C) $CaSO_4.H_2O$ **(D)** $2CaSO_4.3H_2O$

Sol. **(B)**

$\underset{Gypsum}{2(CaSO_4.2H_2O)} \xrightarrow[Dehydration]{120°} \underset{Plaster\ of\ paris}{2CaSO_4.H_2O} + 3H_2O$

Exercise # 1 SINGLE OBJECTIVE NEET LEVEL

1. As compared to potassium, sodium has
(A) Lower electronegativity
(B) Higher ionization potential
(C) Greater atomic radius
(D) Lower melting point

2. Potassium is kept in
(A) Alcohol (B) Water
(C) Kerosene (D) Liquid ammonia

3. The product obtained on fusion of $BaSO_4$ and Na_2CO_3 is
(A) $BaCO_3$ (B) BaO
(C) $Ba(OH)_2$ (D) $BaHSO_4$

4. Which of the following statement is correct regarding alkali metals
(A) Cation is less stable than the atom
(B) Cation is smaller than the atom
(C) Size of cation and atom is the same
(D) Cation is greater in size than the atom

5. Valency electrons in alkali metals are
(A) 1 (B) 7
(C) 4 (D) 2

6. Magnitude of which of the following property of alkali metals increases with the increase of atomic number
(A) Electronegativity (B) Ionic radius
(C) First ionization energy (D) Melting point

7. As compared to lithium, sodium reacts quickly with water because
(A) Its molecular weight is less
(B) It is stronger electronegative
(C) It is stronger electropositive
(D) It is a metal

8. Which is an ore of potassium
(A) Carnellite (B) Cryolite
(C) Bauxite (D) Dolomite

9. Na_2CO_3 can be manufactured by Solvey's process but K_2CO_3 cannot be prepared because
(A) K_2CO_3 is more soluble
(B) K_2CO_3 is less soluble
(C) $KHCO_3$ is more soluble than $NaHCO_3$
(D) $KHCO_3$ is less soluble than $NaHCO_3$

10. Which of the following alkali metals is smallest in size
(A) Rb (B) K
(C) Na (D) Li

11. When potassium dichromate crystal are heated with conc. HCl
(A) O_2 is evolved
(B) Chromyl chloride vapours are evolved
(C) Cl_2 is evolved
(D) No reaction takes place

12. Which of the following does not illustrate the anomalous properties of lithium
(A) The melting point and boiling point of Li are comparatively high
(B) Li is much softer than the other group I metals
(C) Li forms a nitride Li_3N unlike group I metals
(D) The ion of and its compounds are more heavily hydrated than those of the rest of the group

13. Correct order of increasing activity is
(A) Cu, Mg, Na (B) Na, Mg, Cu
(C) Mg, Na, Cu (D) Cu, Na, Mg

14. On heating anhydrous Na_2CO_3, ... is evolved
(A) CO_2 (B) Water vapour
(C) CO (D) No gas

15. Chile saltpetre is
(A) $NaNO_3$ (B) Na_2SO_4
(C) KNO_3 (D) Na_2SO_3

16. A mixture of KCl and KF is added to sodium chloride
(A) To increase the conductivity of NaCl
(B) To decrease the melting point of NaCl
(C) To supress the degree of dissociation of NaCl
(D) To decrease the volatility of NaCl

Exercise # 2 SINGLE OBJECTIVE AIIMS LEVEL

1. $CsBr_3$ contains
(A) Cs-Br covalent bonds
(B) Cs^{3+} and Br^- ions
(C) Cs^+ and Br_3^- ions
(D) Cs^{3+} and Br_3^{3-} ions

2. The golden yellow colour associated with NaCl to Bunsen flame can be explained on the basis of
(A) low ionisation potential of sodium
(B) emission spectrum
(C) photosensitivity of sodium
(D) sublimation of metallic sodium of yellow vapours

3. Incorrect statement regsrding the dissolution of alkali & alkaline earth metals in liq. NH_3 is
(A) Due to high L.E. and I.E. Be and Mg do not dissolve in liquid NH_3.
(B) Deep biue collour is due to absorption spectrum of solvated electron.
(C) Solution conducts electricity at all concentration.
(D) Solution remains paramagnetic at all concentration.

4. Which of the following carbide produces propyne on reaction with water.
(A) CaC_2 (B) Be_2C
(C) Al_4C_3 (D) Mg_2C_3

5. (Yellowppt)
$T \xleftarrow{k_2CrO_4/H^+} X \xrightarrow{dil.HCl} Y$ (Yellowppt)+ Z $\uparrow$
(pungent smelling gas) If X gives green flame test. Then, X is
(A) $MgSO_4$ (B) BaS_2O_3
(C) $CuSO_4$ (D) PbS_2O_3

6. Which of the following carbide does not release any hydrocarbon on reaction with water.
(A) SiC (B) Be_2C
(C) CaC_2 (D) Mg_2C_3

7. The salt which finds uses in qualitative inorganic analysis is
(A) $CuSO_4.5H_2O$ 0r $ZnSO_4.5H_2O$
(B) $K_2SO_4.Al_2(SO_4)_3.24H_2O$
(C) $Na(NH_4)HPO_4.4H_2O$
(D) $FeSO_4.(NH_4)_2SO_4.6H_2O$

8. (i) $A + Na_2CO_3 \rightarrow B + C$
(ii) $A \xrightarrow{CO_2}$ (Milky) C
The chemical formula of A and B are respectively
(A) NaOH & $Ca(OH)_2$
(B) $Ca(OH)_2$and NaOH
(C) NaOH and CaO
(D) CaO & $Ca(OH)_2$

9. Which of the following statement is false
(A) The milk of magnesia used as antacid is chemically MgO +$MgCl_2$
(B) Stability of alkali metal peroxides increases with increase in atomic number.
(C) Hydration energy of AgF is higher than its lattice energy.
(D) Anhydrous $MgCl_2$ cannot be prepared by direct heating of $MgCl_2.6H_2O$.

10. $a + Al_2O_3 \xrightarrow{Hightemperature} X \xrightarrow[water]{CO_2 in} Y;$
Compound Y is
(A) $NaAlO_2$ (B) $NaHCO_3$
(C) Na_2CO_3 (D) Na_2O_2

11. Mg_2C_3 reacts with water forming propyne. C_3^{4-} has
(A) Two sigma and two pi bonds
(B) Three sigma and one pi bond
(C) Two sigma and one pi bond
(D) Two sigma and three pi bonds

12. (White ppt)
$D \xleftarrow{Na_2CO_3} A \xrightarrow[(inaceticacid)]{K_2CrO_4} B$(Yellowppt)
$dil.H_2SO_4 \downarrow$ C(Whiteppt)
if is the metallic salt, then the white ppt. of D must be of
(A) stronsium carbonate
(B) red lead
(C) barium carbonate
(D) calcium carbonate

13. Calcium imide on hydrolysis will give gas **(B)** which on oxidation by bleaching powder gives gas **(C)** gas (C) on reaction with magnesium give compound **(D)**.**(D)** on hydrolysis gives again gas **(B)**.**(B)**,**(C)** and **(D)** are
(A) NH_3,N_2,Mg_3N_2
(B) N_2,NH_3,MgNH
(C) N_2 , N_2O_5 ,$Mg(NO_3)_2$
(D) NH_3, NO_2 , $Mg(NO_2)_2$

Exercise # 3 PART - 1 MATRIX MATCH COLUMN

1. Match the column-

Column - I	Column - II
(A) Ba	(p) Golden yellow
(B) Ca	(q) Apple green
(C) Na	(r) Brick red
(D) Rb	(s) violet

2. Match the column-

Column I	Column II
For the production of H_2O_2	
(A) Down process	(p) K_2CO_3
(B) Solvay process	(q) Manufacture of Na
(C) Leblance process	(r) Manufacture of NaOH
(D) Castner- Kellner cell	(s) Na_2CO_3

3. Match the column-

Column - I	Column - II
(A) $NaOH + SO_2 \rightarrow$	(p) $NaNO_3$
(B) $NaOH + CO_2 \rightarrow$	(q) Na_2SO_3
(C) $NaOH + NO_2 \rightarrow$	(r) Na_2CO_3
(D) $NaOH + HNO_3 \rightarrow$	(s) $NaNO_2$

4. Match the column-

Column -I	Column -II
(A) Metal sulphate $\xrightarrow{\Delta}$ metal oxide + SO2 + O_2	(p) Ba
(B) Metal cation + $K_2CrO_4 \rightarrow$ yellow ppt	(q) Sr
(C) Metal + $NH_3 \xrightarrow{(liquid)}$ blue solution	(r) Na
(D) MCl_2 + conc. $H_2SO_4 \rightarrow$ white ppt.	(s) Mg

5. Match the column-

Column -I	Column - II
(A) $Rb_2CO_3 > K_2CO_3 > Na_2CO_3$	(p) solubility of salts in water
(B) $SrSO_4 > CaSO_4 > MgSO_4$	(q) Thermal stability of salts
(C) Rb > K > Na	(r) Softness of metals
(D) Be > Mg > Ca	(s) Hydration energy of metals

Exercise # 4

PART - 1 | PREVIOUS YEAR (NEET/AIPMT)

1. The correct order of the mobility of the alkali metal ions in aqueous solution is [CBSE AIPMT 2006]
(A) $Li^+ > Na^+ > K^+ > Rb^+$
(B) $Na^+ > K^+ > Rb^+ > Li^+$
(C) $K^+ > Rb^+ > Na^+ > Li^+$
(D) $Rb^+ > K^+ > Na^+ > LI^+$

2. The correct order of increasing thermal stability of K_2CO_3, $MgCO_3$, $CaCO_3$ and $BeCO_3$ is [CBSE AIPMT 2007]
(A) $BeCO_3 < MgCO_3 < K_2CO_3 < CaCO_3$
(B) $BeCO_3 < MgCO_3 < CaCO_3 < K_2CO_3$
(C) $MgCO_3 < BeCO_3 < CaCO_3 < K_2CO_3$
(D) $K_2CO_3 < MgCO_3 < CaCO_3 < BeCO_3$

3. In which of the following the hydration energy is higher than the lattice energy? [CBSE AIPMT 2007]
(A) $BaSO_4$ (B) $MgSO_4$
(C) $RaSO_4$ (D) $SrSO_4$

4. The sequence of ionic mobility in aqueous solution is [CBSE AIPMT 2008]
(A) $K^+ > Na^+ > Rb^+ > Cs^+$
(B) $Cs^+ > Rb^+ > K^+ > Na^+$
(C) $Rb^+ > K^+ > Cs^+ > Na^+$
(D) $Na^+ > K^+ > Rb^+ > Cs^+$

5. Equimolar solution of the following were prepared in water separately. Which one of the solution will record the highest pH ? [CBSE AIPMT 2008]
(A) $SrCl_2$ (B) $BaCl_2$
(C) $MgCl_2$ (D) $CaCl_2$

6. Which one of the following is present as an active ingredient in bleaching powder for bleaching [CBSE AIPMT 2011]
(A) $Ca(OCl)_2$ (B) CaO_2Cl_2
(C) $CaCl_2$ (D) $CaOCl_2$

7. On heating which of the following releases CO_2 most easily ? [CBSE AIPMT 2015]
(A) K_2CO_3 (B) Na_2CO_3
(C) $MgCO_3$ (D) $CaCO_3$

8. Solubility of the alkaline earth's metal sulphates in water decreases in the sequence [CBSE AIPMT 2015]
(A) Mg > Ca > Sr > Ba
(B) Ca > Sr > Ba > Mg
(C) Sr > Ca > Mg > Ba
(D) Ba > Mg > Sr > Ca

9. "Metals are usually not found as nitrates in their ores". [CBSE AIPMT 2015]
Out of the following two (I and II) reasons which is/ are true for the above observation ?
I. Metal nitrates are highly unstable.
II. Metal nitrates are highly soluble in water.
(A) I and II are true (B) I and II are false
(C) I is false but II is true (D) I is true but II is false

10. In context with beryllium, which one of the following statements is incorrect ? [NEET 2016, Phase II]
(A) It is rendered passive by nitric acid
(B) It forms Be_2C
(C) Its salts rarely hydrolyse
(D) Its hydride is electron-deficient and polymeric

11. Which of the following statement about hydrogen is incorrect ? [NEET 2016, Phase I]
(A) Hydrogen never acts as cation in ionic salts
(B) Hydronium ion, H_3O^+ exists freely in solution
(C) Dihydrogen does not act as a reducing agent
(D) Hydrogen has three isotopes of which tritium is the most common

12. The product obtained as a result of a reaction of nitrogen with CaC_2 is [NEET 2016, Phase I]
(A) CaCN (B) $CaCN_3$
(C) Ca_2CN (D) $Ca(CN)_2$

13. Ionic mobility of which of the following alkali metal ions is lowest when aqueous solution of their salts are put under an electric field ? [NEET 2017]
(A) Na (B) K
(C) Rb (D) Li

MOCK TEST

1. Philospher's wool when heated with BaO at 1100° C gives a compound. Identify the compound
(A) $BaZnO_2$ (B) $Ba + ZnO_2$ (C) $BaCdO_2$ (D) $BaO_2 + Zn$

2. The number of electron and proton in the third alkaline earth metal ion will be
(A) $\frac{e}{20}, \frac{p}{20}$ (B) $\frac{e}{18}, \frac{p}{20}$ (C) $\frac{e}{18}, \frac{p}{18}$ (D) $\frac{e}{19}, \frac{p}{20}$

3. The compounds of alkaline earth metals have the following magnetic nature
(A) Diamagnetic (B) Paramagnetic (C) Ferromagnetic (D) Diaferromagnetic

4. Which of the following is in the increasing order of the ionic character
(A) $PbCl_4 < PbCl_2 < CaCl_2 < NaCl$ (B) $PbCl_2 < PbCl_4 < CaCl_2 < NaCl$
(C) $PbCl_2 < PbCl_4 < NaCl < CaCl_2$ (D) $PbCl_4 < PbCl_2 < NaCl < CaCl_2$

5. KO_2 (potassium superoxide) is used in oxygen cylinders in space and submarines because it
(A) Absorbs CO_2 and increases O_2 content (B) Eliminates moisture
(C) Absorbs CO_2 (D) Produces ozone

6. Fire extinguishers contain H_2SO_4 and
(A) $CaCO_3$ (B) Na_2CO_3
(C) $NaHCO_3$ (D) $NaHCO_3$ and Na_2CO_3

7. The stability of the following alkali metal chlorides follows the order
(A) LiCl > KCl > NaCl > CsCl (B) CsCl > KCl > NaCl > LiCl
(C) NaCl > KCl > LiCl > CsCl (D) KCl > CsCl > NaCl > LiCl

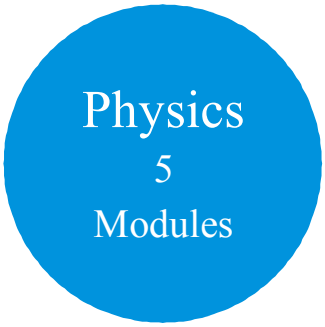
8. The reaction of $Na_2S_2O_3$ with iodine gives
(A) Sodium sulphide (B) Sodium sulphite (C) Sodium sulphate (D) Sodium tetrathionate

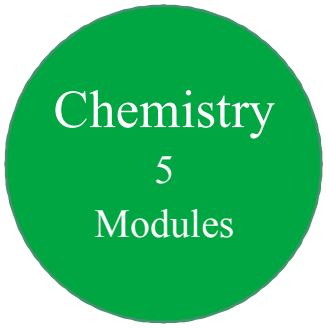
9. Lithium aluminium hydride acts as
(A) Oxidising agent (B) Reducing agent (C) Both the above (D) None of these

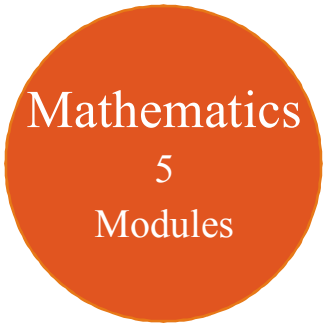
10. Four reactions are given below
(i) $2Li + 2H_2O \rightarrow 2LiOH + H_2$ (ii) $2Na + 2H_2O \rightarrow 2NaOH + H_2$
(iii) $2LiNO_3 \xrightarrow{Heat} 2LiNO_2 + O_2$ (iv) $2NaNO_3 \xrightarrow{Heat} 2NaNO_2 + O_2$
Which of the above, if any, is wrong
(A) (iv) (B) (iii) (C) (i) (D) None of these

11. Increasing order of solubility is
(A) $CaCO_3, KHCO_3, NaHCO_3$ (B) $NaHCO_3, KHCO_3, CaCO_3$
(C) $KHCO_3, NaHCO_3, CaCO_3$ (D) $CaCO_3, NaHCO_3, KHCO_3$

11th Class Modules Chapter Details

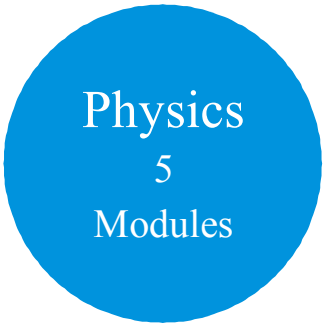


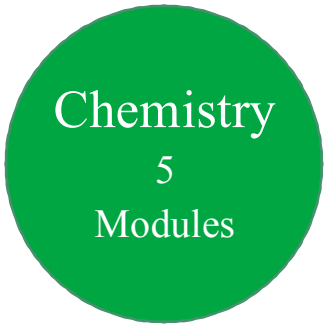


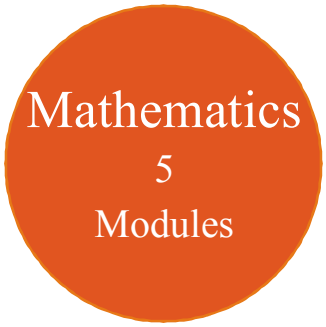


PHYSICS	CHEMISTRY	BIOLOGY
Module-1 1. Physical World & Measurements 2. Basic Maths & Vector 3. Kinematics **Module-2** 1. Law of Motion & Friction 2. Work, Energy & Power **Module-3** 1. Motion of system of particles & Rigid Body 2. Gravitation **Module-4** 1. Mechanical Properties of Matter 2. Thermal Properties of Matter **Module-5** 1. Oscillations 2. Waves	**Module-1(PC)** 1. Some Basic Conceps of Chemistry 2. Atomic Structure 3. Chemical Equilibrium 4. Ionic Equilibrium **Module-2(PC)** 1. Thermodynamics & Thermochemistry 2. Redox Reaction 3. States Of Matter (Gaseous & Liquid) **Module-3(IC)** 1. Periodic Table 2. Chemical Bonding 3. Hydrogen & Its Compounds 4. S-Block **Module-4(OC)** 1. Nomenclature of Organic Compounds 2. Isomerism 3. General Organic Chemistry **Module-5(OC)** 1. Reaction Mechanism 2. Hydrocarbon 3. Aromatic Hydrocarbon 4. Environmental Chemistry & Analysis Of Organic Compounds	**Module-1** 1. Diversity in the Living World 2. Plant Kingdom 3. Animal Kingdom **Module-2** 1. Morphology in Flowering Plants 2. Anatomy of Flowering Plants 3. Structural Organization in Animals **Module-3** 1. Cell: The Unit of Life 2. Biomolecules 3. Cell Cycle & Cell Division 4. Transport in Plants 5. Mineral Nutrition **Module-4** 1. Photosynthesis in Higher Plants 2. Respiration in Plants 3. Plant Growth and Development 4. Digestion & Absorption 5. Breathing & Exchange of Gases **Module-5** 1. Body Fluids & Its Circulation 2. Excretory Products & Their Elimination 3. Locomotion & Its Movement 4. Neural Control & Coordination 5. Chemical Coordination and Integration

12th Class Modules Chapter Details







PHYSICS

Module-1

1. Electrostatics
2. Capacitance

Module-2

1. Current Electricity
2. Magnetic Effect of Current and Magnetism

Module-3

1. Electromagnetic Induction
2. Alternating Current

Module-4

1. Geometrical Optics
2. Wave Optics

Module-5

1. Modern Physics
2. Nuclear Physics
3. Solids & Semiconductor Devices
4. Electromagnetic Waves

CHEMISTRY

Module-1(PC)

1. Solid State
2. Chemical Kinetics
3. Solutions and Colligative Properties

Module-2(PC)

1. Electrochemistry
2. Surface Chemistry

Module-3(IC)

1. P-Block Elements
2. Transition Elements (d & f block)
3. Co-ordination Compound
4. Metallurgy

Module-4(OC)

1. HaloAlkanes & HaloArenes
2. Alcohol, Phenol & Ether
3. Aldehyde, Ketone & Carboxylic Acid

Module-5(OC)

1. Nitrogen & Its Derivatives
2. Biomolecules & Polymers
3. Chemistry in Everyday Life

BIOLOGY

Module-1

1. Reproduction in Organisms
2. Sexual Reproduction in Flowering Plants
3. Human Reproduction
4. Reproductive Health

Module-2

1. Principles of Inheritance and Variation
2. Molecular Basis of Inheritance
3. Evolution

Module-3

1. Human Health and Disease
2. Strategies for Enhancement in Food Production
3. Microbes in Human Welfare

Module-4

1. Biotechnology: Principles and Processes
2. Biotechnology and Its Applications
3. Organisms and Populations

Module-5

1. Ecosystem
2. Biodiversity and Conservation
3. Environmental Issues