

**10.THE S-BLOCK ELEMENTS** 

# Single Correct Answer Type

1.	Select the correct statem	ent(s)		
	a) Presence of MgCl <sub>2</sub> in t	able salt causes it to clump	)	
	b) Addition of NaHCO <sub>3</sub> to	o table salt converts MgCl <sub>2</sub>	to non-hygroscopic salt	Ţ
	c) Both (a) and (b)			
	d) None of the above			
2.	In which of the following	, the hydration energy is hi	gher than the lattice en	ergy?
	a) BaSO <sub>4</sub>	b) MgSO <sub>4</sub>	c) RaSO <sub>4</sub>	d) SrSO <sub>4</sub>
3.	Select the correct statem	ent(s)		
	a) Beryllium and magnes	sium hydride are covalent	and polymeric	
	b) $CaH_2$ , $SrH_2$ and $BaH_2$	are ionic		
	c) BeH <sub>2</sub> contains three-c	entre two-electron bond		
	d) All of the above are co	rrect statements		
4.	A metal <i>M</i> readily forms	water soluble <i>M</i> SO <sub>4</sub> . It also	o forms oxide MO which	becomes inert on heating.
	Hydroxide $M(OH)_2$ is ins	soluble in water but solubl	e in NaOH solution. Wha	at is M?
	a) Mg	b) Ba	c) Ca	d) Be
5.	Slaked lime and chlorine	reacts to produce		
	a) Quicklime		b) CaCl <sub>2</sub>	
	c) CaOCl <sub>2</sub>		d) Mixture of CaCl <sub>2</sub> a	nd $Ca(OCl_2)$
6.	Identify the correct state	ment		
	a) Gypsum is obtained by	y heating plaster of Paris		
	b) Plaster of Paris can be	obtained by hydration of	gypsum	
	c) Plaster of Paris contai	ns higher percentage of ca	lcium than does gypsum	1
-	d) Plaster of Paris obtain	ied from gypsum by oxidat	10N	
7.	Alkaline earth metals are			
0	a) Reducing agent	b) Dehydrating agent	c) Amphoteric	d) Oxidizing agent
8.	A compound which can t	be used in space vehicles be	oth to absorb $CO_2$ and II	berate $U_2$ is
0	a) NaUH Which of the following is	DJ Na <sub>2</sub> U	$CJ Na_2 U_2$	d ) CaU + NaUH
9.	which of the following is	h) CU, COOU	a) C U COONe	4) 110110
10	a) NaU	DJ LH <sub>3</sub> LUUH tmant of mania donrocaiu	$C_{1} C_{6} H_{5} COUNA$	a) HCHO
10.	a) No. CO	b Li CO		d) MaCO
11	a) $Na_2 CU_3$ No $[Bo(OH)]$ is formed	$DJ LI_2 U_3$	$CJ K_2 CU_3$	$a_{\rm J}$ MgCO <sub>3</sub>
11.	$na_2[De(OII)_4]$ is for life a) BoO reacts with $NaOH$		h) Bo roacts with Na(	)H colution
	c) Both (a) and (b) corre		d) None of the above	is correct
12	Be and Al do not recemb	le in	uj Nolle ol ule above	IS COTTECT
12.	a) Both bacoma passiva	on reaction with HNO due	to formation of oxida l	avor
	b) Their chlorides are Le	wis bases		ayei
	c) Chlorides exist in poly	moric form		
	d) Hydroxides are solubl	e in alkali as well as in acid	1	
13	Which of the following st	atements are true about II	A group elements?	
15.	a) All form nitrides in ai		h) Re is amphoteric	
	c) $MH_{-}$ is ionic 'salt-like'	hydride	d) All of the above ar	e correct statements
14	Select the incorrect state	ment	aj mi or the above al	
<u>т</u> т.	a) NaOH can be stored in	a vessel made of Al		
	h) HNO <sub>2</sub> can be stored in	a vessel made of Re/Al all	lov	
	c) HF can be stored in a	vessel made of way	ioy	
	ej m can be stored ma	Cost made of wax		

d) HF attacks glass

- 15. Automobile grease is obtained from
  a) CH<sub>3</sub>COONa
  b) C<sub>17</sub>H<sub>35</sub>COONa
  c) CH<sub>3</sub>CH<sub>2</sub>COOLi
  d) C<sub>17</sub>H<sub>35</sub>COOLi
- 16. Metal carbides on reaction with  $H_2$  Oform  $CH_4$ . Carbide can bea)  $CaC_2$ b)  $Mg_3C_2$ c)  $Be_2C$ d) SiC
- 17. Match compounds/metal in (X) with their uses in (Y)

X	Y
A. Liquid	1. Breathing
sodium	apparatus
metal	submarine
B. Potassium	2. Explosive
stearate	
C. Potassium	3. Coolant in nuclear
nitrate	reaction
D. Potassium	4. Soft soap
superoxide	

Hence, correct order is

AВ	C	D						
a) 1	3	2	4	b) 3	4	2	1	
c) 2	1	3	4	d) 4	2	3	1	

18. Which cannot be used to generate H<sub>2</sub>?
a) Al + NaOH
b) Zn + NaOH
c) Mg + NaOH
d) LiH + H<sub>2</sub>O
19. The deap colour produced when iodine is dissolved in a solution of potassium iodide is caused by the

19. The deap colour produced when lodine is dissolved in a solution of potassium lodide is caused by the presence of

d) All of the above are incorrect

	a) l <sub>2</sub>	b) I-	c) $I_3^-$	d) I <sub>2</sub>
20.	CO <sub>2</sub> cannot be obtained by	y heating		
	a) Na <sub>2</sub> CO <sub>3</sub>	b) CaCO <sub>3</sub>	c) Li <sub>2</sub> CO <sub>3</sub>	d) Ca $(HCO_3)_2$

21. Lattice energy of IIA group compounds (oxides, carbonates, fluorides)a) Decreases as size of the ion increasesb) Increases as size of the ion increases

- a) Decreases as size of the ion increasesc) Constant for a given type of anion
- 22. Select the correct statement(s)

a) CaCO<sub>3</sub> is more soluble in a solution of CO<sub>2</sub> on heating  $H_2O$ 

- b)  $NaCO_3$  is converted to  $Na_2O$  and  $CO_2$  on heating
- c)  $Li_2CO_3$  is thermally stable

d) Presence of CaCl<sub>2</sub> of CaSO<sub>4</sub> in water causes temporary hardness

- 23. The decomposition temperature is maximum for
- a) MgCO3b) CaCO3c) BaCO3d) SrCO324.Which is/are coloured and paramagnetic?<br/>a) KO2b) K2O3c) Both (a) and (b)d) None of thee25.Which is main constituent of egg-shell?c) Both (a) and (b)d) None of thee
  - a)  $CaCO_3$  b)  $CaSiO_3$  c)  $CaSO_4 \cdot \frac{1}{2}H_2O$  d)  $CaSO_4 \cdot 2H_2O$

26. Gun powder spontaneously react when ignited. Reaction can be

- a)  $2KNO_3(s) + 4C(s) \rightarrow K_2CO_3(s) + 3CO(g) + N_2(g)$
- b)  $2KNO_3(s) + 2S(s) \rightarrow K_2SO_4(s) + SO_2(g) + N_2(g)$
- c) Both (a) & (b)
- d) None of the above
- 27. Match compounds given in (X) with their uses in (Y)

X	Y
A. $Na_2CO_3$	1. glass
B. Na <sub>2</sub> SO <sub>4</sub>	2. bleach

	C. NaOH $3.SO_2$ absorbe	er			
	D. NaOCI 4. detergent				
	Hence, correct order is				
	A B C D				
	a) 4 1 3 2		b) 1 3 4 2		
	c) 2 4 1 3		d) 3 2 4 1		
28.	Which does not exist in solid s	state?			
	a) NaHCO <sub>3</sub> b)	NaHSO <sub>3</sub>	c) LiHCO <sub>3</sub>		d) CaCO <sub>3</sub>
29.	Magnalium contains				
	a) Aluminium + magnesium		b) Magnesium -	⊦ copper	
	c) Magnesium + iron		d) Magnesium -	- silver	
30.	Be and Al resemble in the follo	owing but not in			
	a) Both form electron deficier	nt hydrides	b) Both are rend	dered pass	ive by HNO <sub>3</sub>
	c) Both form amphoteric oxid	les	d) Both have <i>sp</i>	-hybridisa	tion in their com
31.	Gypsum is			-	
	a) $(aS02H_{a}0$ b)	$CaCO_{a} \cdot 2H_{a}O$	c) $(250, \frac{1}{2} H_{2})$	J	d) SiO
			2 2	)	4) 010 2
32.	Plaster of Paris is hardened by	у			
	a) Giving out water b)	Uniting with water	c) Changing inte	$o CaCO_3$	d) Liberating $CO_2$
33.	Which can dissolve I <sub>2</sub> ?				
	a) KI b)	NaI	c) Both (a) and	(b)	d) None of these
34.	Flame test is not given by				
	a) Ca b)	Ba	c) Mg		d) Li
35.	Lightest alkaline earth metal i	is			
	a) Be b)	Mg	c) Ca		d) Sr
36.	Setting of plaster of Paris is				
	a) Oxidation with atmospheri	ic oxygen	b) Combination	with atmo	ospheric CO <sub>2</sub>
	c) Dehydration		d) Hydration to	yield anot	her hydrate
37.	Which is used as a treatment	for bipolar disorder (an	illness that invo	lves alteri	nating periods of
	depression)?				
	a) $Li_2CO_3$ b)	K <sub>2</sub> CO <sub>3</sub>	c) LiCl		d) LiCH <sub>3</sub>
38.	A colourless solid ( <i>X</i> ) on heat	ting evolved CO <sub>2</sub> and als	so gave a while r	esidue, sol	uble in water. Residue also
	gave CO <sub>2</sub> when treated with d	lilute acid. [X] is			
	a) $Na_2CO_3$ b)	CaCO <sub>3</sub>	c) $Ca(HCO_3)_2$		d) NaHCO <sub>3</sub>
39.	Burning of Mg is extinguished	l by			
	a) Throwing N <sub>2</sub> liquid b)	Throwing sand	c) Throwing ice	!	d) Throwing water
40.	When Cl <sub>2</sub> is passed into moist	t slaked lime, compound	l formed is		
	a) $CaO_2Cl_2$ b)	CaO <sub>2</sub> Cl	c) CaOCl <sub>2</sub>		d) CaCl <sub>2</sub> O <sub>4</sub>
41.	The deliquescent among the f	following is			
	a) $CaCl_2$ b)	$FeSO_4 \cdot 7H_2O$	c) $CuSO_4 \cdot 5H_2C$	)	d) $BaCl_2 \cdot 2H_2O$
42.	Out of the following statemen	its			
	I. Cs <sup>+</sup> is highly hydrated				
	II. Li has highest melting poin	t among Li, Na, K and R	b		
	III. Only Li forms nitride out o	of alkali metals			
	The correct statements are				
	a) I and II h)	II and III	c) I and III		d) I, II and III
10	,	-	,		,, . <u>.</u>
45.	Select the correct statement				
43.	Select the correct statement a) Be and Al show diagonal re	elationship	b) Be form tetra	hedral co	nplexes $[Be(C_2O_4)_2]^{2-1}$
43.	Select the correct statement a) Be and Al show diagonal re c) Al forms AlF <sup>2-</sup> , on octabed	elationship Iral complex	b) Be form tetra d) All of the abo	hedral con	mplexes $[Be(C_2O_4)_2]^{2-}$ rect statement
43. 44	Select the correct statement a) Be and Al show diagonal re c) Al forms $AlF_6^{2-}$ , on octahed Which is most stable out of th	elationship Iral complex ne following?	b) Be form tetra d) All of the abo	hedral conve are cor	mplexes [Be(C <sub>2</sub> O <sub>4</sub> ) <sub>2</sub> ] <sup>2–</sup> rect statement
43. 44.	Select the correct statement a) Be and Al show diagonal re c) Al forms $AlF_6^{2-}$ , on octahed Which is most stable out of th a) $[Be(H_0O), 1^{2+}]$	elationship  ral complex ne following? [Mg(HaO),1 <sup>2–</sup>	b) Be form tetra d) All of the abo	hedral con ve are cor	mplexes $[Be(C_2O_4)_2]^{2-1}$ rect statement d) $[Sr(H_2O)_1]^{2+1}$

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45.	Which of the following is/are correct statement(s)?					
	a) $Ca_3(PO_4)_2$ in part of bones	a) $Ca_3(PO_4)_2$ in part of bones b) $3Ca_3(PO_4) \cdot CaF_2$ is part of enamel o teeth				
	c) Ca <sup>2+</sup> ions are important in blood clotting d) All of the above are correct					
46.	What is impurity (as a salt) associated with table sal	t obtained from sea-water?				
	a) NaHCO <sub>2</sub> b) MgCO <sub>2</sub>	c) MgCl <sub>2</sub>	d) Nal			
47	Which disproportionate into $M_0 \Omega_0$ (peroxide) and $N_0$	I(metal) on heating?				
17.	a) $Li_1 O$ b) $N_2 O$	c) Both (a) & (b)	d) None of these			
10	Encom calt is		uj none or these			
40.						
	a) $BaSO_4 \cdot 2H_2O$ b) $CaSO_4 \cdot H_2O$	c) MgSO <sub>4</sub> · $2H_2O$	a) MgSO <sub>4</sub> · /H <sub>2</sub> O			
49.	Which are involved in various physiological function	s in animals?				
	a) Na <sup>+</sup> b) K <sup>+</sup>	c) Both (a) and (b)	d) None of these			
50.	Setting of cement is					
	a) Exothermic reaction	b) Endothermic reaction				
	c) Neither endothermic nor exothermic	d) None of the above				
51.	Noble gases (like He, Ne, Ar, Kr etc,) are isolated from	n air. One of the steps is/ar	e			
	a) Heating air with Li or Mg	b) Bubbling air into NaOH	solution			
	c) Both (a) and (b) are correct	d) None of the above is con	rrect			
52.	Select the correct statement(s)					
	a) $CaCO_3$ is more soluble in a solution of $CO_2$ than in	H <sub>2</sub> 0				
	b) $Na_2CO_3$ is converted to $Na_2O$ ad $CO_2$ on heating					
	c) $Li_2CO_3$ is thermally stable					
	d) Presence of CaCl <sub>2</sub> or CaSO <sub>4</sub> in water causes tempo	orary hardness				
53.	Which is used for fixing atmospheric nitrogen?					
	a) CaCN <sub>2</sub> (nitrolim) b) $Li_2N$	c) Mg <sub>2</sub> N <sub>2</sub>	d) All of these			
54.	$CO_2$ gas along with solid (Y) is obtained when sodiu	n salt (X) is heated.(X) is a	gain obtained when $CO_2$			
0 11	gas is passed into aqueous solution $(Y)$ . $(X)$ and $(Y)$	are				
	a) $Na_{a}(\Omega_{a}, Na_{a}(\Omega_{a}))$ b) $Na_{a}(\Omega_{a}, Na_{a}(\Omega_{a}))$	c) NaH $(\Omega_{a}, Na_{a}, \Omega_{a})$	d) NacCOc NaHCOc			
55	Which is the major constituent of gun nowder?	cj nanoo3, na2003	uj nu2003, nu11003			
55.	a) Nitro	c) Charcoal	d) Chile salt netre			
56	The electron affinity of Re is similar to	cj charcoar	u) chine sait petre			
50.	a) He has a mining of be is similar to	a) I ;	d) Na			
<b>F</b> 7	a) ne U) D The mein where he there even used in entersidence	Сј Ш li siu sl annon susti su i s	uj na			
57.	The pair whose both species are used in antacid med	licinal preparation is				
	a) NaHCO <sub>3</sub> and Mg(OH) <sub>2</sub>	b) $Na_2 CO_3$ and $Ca(HCO_3)_2$	2			
	c) $Ca(HCO_3)_2$ and $Mg(OH)_2$	d) $Ca(OH)_2$ and $NaHCO_3$				
58.	Match the compound (given in <i>X</i> ) with their colours	(given in Y)				
	XY					
	A. $Li_3N$ 1. Pale yellow					
	B. $K_2 O$ 2. Orange					
	$D_{1}$ $D_{2}$ $D_{2}$ $D_{3}$ $D_{1}$ $D_{2}$ $D_{3}$ $D_{4}$ $D_{2}$ $D_{3}$ $D_{4}$ $D_{4$					
	A = C = D					
	a)4 1 2 3	h) $2 \ 3 \ 1 \ 4$				
	a) + 1 - 2 - 3	d) None of these				
50	Palving nowder contains	uj Nolle ol tilese				
59.	a) NallCO Ca(U DO ) and starsh	b) NaUCO $C_{a}(U, DO)$				
	a) Nation $(H_2PO_2)_2$ and starting	D) NaHCO <sub>3</sub> , $Ca(H_2PO_2)_2$				
()	CJ NAHLU <sub>3</sub> , Starch	a) Nahuu <sub>3</sub>				
60.	Portland cement does not contain					
	a) $CaSiO_4$ b) $CaSiO_3$	c) $Ca_3Al_2O_6$	d) $Ca_3(PO_4)_2$			
61.	Reagent used as fixer in photography					
	a) AgBr b) AgNO <sub>3</sub>	c) $Na_2S_2O_3 \cdot 5H_2O$	d) Both (a) and (c)			
62.	The charage/size ratio of a cation determines its pole	arizing power. Which one o	t the following sequences			

	represents the increasing order of the polarizing power of cationic species; K <sup>+</sup> , Ca <sup>2+</sup> , Mg <sup>2+</sup> , Be <sup>2+</sup> ?					
	a) $Mg^{2+} < Be^{2+} < K^+$	< Ca <sup>2+</sup>	b) $Be^{2+} < K^+ < Ca^{2+} <$	$Mg^{2+}$		
	c) $K^+ < Ca^{2+} < Mg^{2+}$	< <i>B</i> e <sup>2+</sup>	d) $Ca^{2+} < Mg^{2+} < Be^{2+}$	< K <sup>+</sup>		
63.	NaNO <sub>3</sub> is converted to KNO <sub>3</sub> by following reaction NaNO <sub>3</sub> ( $aq$ ) + KCl( $aq$ ) $\rightleftharpoons$ KNO <sub>3</sub> ( $aq$ ) + NaCl( $s$ )					
	In the above equilibriur	n, which is least soluble i	n hot water?			
	a) NaNO <sub>3</sub>	b) KCl	c) KNO <sub>3</sub>	d) NaCl		
64.	Which are true stateme	nts about <i>s</i> -block elemen	its?			
	a) Metals are obtained l	by the electrolysis of fuse	d chlorides			
	b) Only one type of vale	ncy, $+1$ for I A and $+2$ for	or II A, is shown			
	c) Oxides are basic exce	ept BeO				
	d) All of the above are c	orrect statements				
65.	Suboxide of Rb has the	formula				
	a) $RbO_2$	b) $RbO_3$	c) $Rb_2O_2$	d) $Rb_6O$		
66.	1 mole of a substance (A	X) was treated with an ex	ccess of water. 2 moles of read	ily combustible gas were		
	produced along with so ( <i>X</i> ) could be	lution which when reacte	ed with $CO_2$ gas produced a wl	nite turbidity. The substance		
	a) Ca	b) CaH <sub>2</sub>	c) $Ca(OH)_2$	d) $Ca(NO_3)_2$		
67.	Among Na <sup>+</sup> , Na, Mg and	Mg <sup>2+</sup> the largest particle	e is			
	a) Mg <sup>2+</sup>	b) Mg	c) Na	d) Na <sup>+</sup>		
68.	$\Delta G^{\circ}$ values (kJ mol <sup>-1</sup> ) for	or the following cases are	given below			
	$MCO_3 \rightarrow MO + CO_2$	_	-			
	Mg -1028.2 - 568.9 -	- 394.4				
	Ca -1129.2 - 603.4					
	Ba - 1134.4 - 520.4					
	In which case decompos	sition of MCO <sub>3</sub> is most sp	ontaneous?			
	a) MgCO <sub>3</sub>	b) CaCO <sub>3</sub>	c) BaCO <sub>3</sub>	d) Equally in all cases		
69.	Nitrolim is a					
	a) Mixture of calcium ca	arbide and nitrogen	b) Mixture of calcium cya	anamide and carbon		
	c) Mixture of calcium cy	vanide and carbon	d) Mixture of NH <sub>4</sub> CN and	l CaCN		
70.	Select the correct stater	nent(s)				
	a) Stability of peroxides	s and superoxides of alka	li metals increases with increa	se in size of the metal ion		
	b) NaOH does not form	hydrated salt				
	c) Increase in stability i	n (a) is due to stabilization	on of large anions by larger cat	tions through lattice energy		
	effects					
	d) The low solubility of	LiF is due to its high latti	ce energy whereas low solubil	ity of <i>CsI</i> is due to smaller		
	<sup>b</sup> hydration energy					
71.	Aqueous solution of Na	${}_{2}S_{2}O_{3}$ on reaction with C	<sub>2</sub> gives			
	a) $Na_2S_4O_6$	b) NaHSO <sub>4</sub>	c) NaCl	d) NaOH		
72.	Select the incorrect stat	ement				
	a) $Na_2CO_3$ is thermally stable while $Ag_2CO_3$ decomposes into Ag. $CO_2$ and $O_2$					
	b) Ag <sup>+</sup> forms complexe	s, Na <sup>+</sup> does not				
	c) NaCl is water soluble	e, AgCl is insoluble				
	d) NaCl and AgCl both g	ive colour in flame when	lignited			
73.	To an acidified dichrom	ate solution, a pinch of Na	$a_2O_2$ and ether is added and sl	naken. What is observed		
	a) Deep violet colour		b) Red colour changing to	o green		
	c) Copious evolution of	oxygen	d) Bluish-green precipita	ite		
74.	Na and Li are placed in	dry air. We get				
	a) NaUH, Na $_2$ O, Li $_2$ O	b) Na <sub>2</sub> 0, Li <sub>2</sub> 0	cj Na <sub>2</sub> O, Li <sub>2</sub> O, Li <sub>3</sub> N, NH <sub>3</sub>	a) Na <sub>2</sub> 0, $Li_3N$ , $Li_20$		
/5.						
	Which of the following i	s known as dead burnt?				

76.	A covalent chloride is			
	a) BeCl <sub>2</sub>	b) NaCl	c) MgCl <sub>2</sub>	d) CaCl <sub>2</sub>
77.	There is loss in weight wh	en mixture of $Li_2CO_3$ and $Li_2CO_3$	$Na_2CO_3 \cdot 10H_2O$	
	a) Li <sub>2</sub> CO <sub>3</sub>	b) Na <sub>2</sub> CO <sub>3</sub> · 10H <sub>2</sub> O	c) Both (a) and (b)	d) None of these
78.	Following are the ionization	on potential values of		
	$(I_1)$ 899 kJ mol <sup>-1</sup> , $(I_2)$ 1757	7 kJ mol <sup>-1</sup> ,		
	$(I_3)$ 15000 kJ mol <sup>-1</sup>			
	a) Na	b) K	c) Be	d) Ne
79.	II A (alkaline earth metals	) and II B (zinc family) res	emble	
	a) MgSO <sub>4</sub> $\cdot$ 7H <sub>2</sub> O is isomore	rphous with ZnSO <sub>4</sub> · 7H <sub>2</sub> O		
	b) II A and II B cations are	not precipitated by $H_2S$ in	acidic medium	
	c) Both (a) and (b)			
	d) None of the above			
80.	Which one among the follo	owing is the most soluble i	n water?	
	a) LiI	b) LiBr	c) LiCl	d) LiF
81.	$M_2O_3$ (sesquoxides) is par	ramagnetic is nature. It is d	ue to the presence of	
	a) Peroxide ion	b) Superoxide ion	c) Oxide ion	d) All of the above
82.	Which of the following is r	not an ore of magnesium		
	a) Carnallite	b) Magnesite	c) Dolomite	d) Gypsum
83.	The element whose electro	onic configuration is 1s <sup>2</sup> 2s	$s^2 2p^6 3s^2$ is	
	a) Non-metal	b) Noble gas	c) Metalloid	d) Metal
84.	Which is used to treat acid	l indigestion?		
	a) $Be(OH)_2$	b) KOH	c) $Mg(OH)_2$	d) $Ca(OH)_2$
85.	Which of the following is b	best CO <sub>2</sub> absorber as well a	is source of $O_2$ in submarin	ies?
	a) KO <sub>2</sub>	b) NaOH	с) КОН	d) LiOH
86.	Which is the incorrect stat	cement?		
	a) The heat of hydration o	f the dipositive alkaline ea	rth metal ions decrease wit	th an increase in their ionic
	size			
	b) NaNO <sub>3</sub> forms Na <sub>2</sub> O on I	neating		
	c) Hydration of alkali meta	al ion is le than that of II A		
	d) Alkaline earth metal lor	is, because of their much la	arger charge to size ratio, e	xert a much strönger
07	The activity of allvaling on	on the oxygen of water mo	necule surrounding them	
07.	a) Decreases from Bo to B	n in metals as reducing ager	IL	
	b) Increases from Bo to Ba	d		
	c) Increase form Be to Ca	i and decreases from Ca to F	80	
	d) Decreases form Be to Ca	and increases from Ca to I	Ba	
88	Which is not obtained whe	en metal carhides react wit	$h H_2 O?$	
00.	a) Al <sub>4</sub> C <sub>2</sub> + H <sub>2</sub> O $\rightarrow$ CH $\equiv$ C	H	b) $CaC_2 + H_2O \rightarrow CH \equiv C$	Н
	c) Mg <sub>4</sub> C <sub>2</sub> + H <sub>2</sub> O $\rightarrow$ CH <sub>2</sub> C =	= C	d) $\operatorname{Be}_2C + \operatorname{H}_2O \to \operatorname{CH}_4$	
89.	Which of the following is r	referentially formed on re	eaction of oxygen and potas	sium?
	a) K <sub>2</sub> O <sub>2</sub>	b) KO <sub>2</sub>	c) K <sub>2</sub> O	d) $K_2O_2$
90.	Which salt can be used to	identify coloured cation?	-)2 -	-)-2-3
	a) Borax	b) Microcosmic salt	c) Both (a) and (b)	d) None of these
91.	The stability of $K_20$ , $K_20a$	and $KO_2$ is in order $K_2 0 <$	$K_2O_2 < KO_2$ . This increase	ing stability at the size of
	metal ion increases is due	to stabilization of		_ •
	a) Larger cation by smalle	r anions through lattice en	ergy effects	
	b) Larger cation by larger	anions through lattice ene	rgy effects	
	c) Smaller cations by smal	ller anions through mp		

d) Smaller cations by larger anions through mp

92.	In alkaline earth metal su	lphates, the value of hydrat	tion energy decrease down	the group because of the
	a) Decrease in size	b) Increase in size	c) Greater lattice energy	d) None of these
93.	Li <sub>2</sub> CO <sub>3</sub> is			
	a) Added to bauxite in the	e electrolytic production of	aluminium	
	b) Used to toughen glass			
	c) Used as medicine as it	affects the balance betweer	n Na <sup>+</sup> and K <sup>+</sup> , and Mg <sup>2+</sup> an	d Ca <sup>2+</sup>
	d) All of the above are con	rrect		
94.	Select the correct stateme	ent(s)		
	a) Mg <sup>2+</sup> ions are necessa	ry for the activation of phos	sphate transfer enzymes	
	b) Mg is present in chloro	phyll used in photosynthes	sis in green plants	
	c) Operation of $Na^+ - K^+$	pumps is biological		
	d) All of the above are con	rrect statements		
95.	Which one of the followin	ng is correct sequence follow	wed by molar ionic conduct	ance of the ions?
	a) $Li^+ < Na^+ < K^+ < Rb$	+	b) $Rb^+ < K^+ < Na^+ < Li$	+
	c) $Sr^{2+} < Ca^{2+} < Mg^{2+}$	< Be <sup>2+</sup>	d) $Na^{2+} < K^+ < Li^+ < Rb$	) <sup>+</sup>
96.	When NO is passed into k	XOH solution, products are	-	
	a) $N_2$	b) N <sub>2</sub> O	c) Both (a) and (b)	d) None of these
97.	Which of the following m	ixtures cannot be prepared	?	
	a) NaHCO <sub>3</sub> + Na <sub>2</sub> CO <sub>3</sub>	b) $Na_2CO_3 + NaOH$	c) NaHCO <sub>3</sub> + NaOH	d) $H_2CO_3$ + NaHCO_3
98.	Estimation of calcium and	d magnesium is done by	y 8	
	a) EDTA	b) Oxalate	c) Phosphate	d) None of these
99.	Mg and Li are similar in the	heir properties due to	<b>y</b>	,
	a) Same $e/m$ ratio	b) Same electron affinity	c) Same group	d) Same radius
100	. Select the correct stateme	ent(s)	, , , , , , , , , , , , , , , , , , , ,	,
	a) $Mg^{2+}$ ions are necessar	ry for the activation of phos	sphate transfer enzymes	
	b) Mg is present in chloro	phyll used in photosynthes	sis in green plants	
	c) Operation of Na <sup>+</sup> – K <sup>+</sup>	pumps is biological	5 1	
	d) All of the above are con	rrect statements		
101	. The commonn name, "cre	eam of tartar" refers to		
	a) $KHC_4H_4O_6$		b) K(SbO)C <sub>4</sub> H <sub>4</sub> O <sub>6</sub>	
	c) KNaC <sub>4</sub> H <sub>4</sub> O <sub>6</sub>		d) Mg <sub>2</sub> (OH) <sub>2</sub> (C <sub>4</sub> H <sub>4</sub> O <sub>6</sub> )H <sub>2</sub>	0
102	. The alkalide ion is		) 02 ( )2 ( 1 1 0) 2	
	a) Diamagnetic	b) Represented as $\overline{C}H_{2}$	c) Paramagnetic	d) Represented as $CH_2$
103	Which is the most stable	halide of alkali metal?	, 0	.)
100	a) Sodium fluoride	h) Sodium bromide	c) Sodium chloride	d) Sodium iodide
104	Choose the incorrect state	ement	ej bourant entorrae	aj bourant tourae
101	a) $BeCO_{a}$ is kent in the at	mosphere of $CO_{2}$ since it is	least thermally stable	
	h) Be dissolves in alkali fo	$rming [Be(OH)]^{2-}$	foust enormany studie	
	c) BeF <sub>2</sub> forms complex io	n with NaF in when Be goe	s with cation	
	d) BeF <sub>2</sub> forms complex io	n with NaF in which Be goe	es with anion	
105	Some of alkali metal salts	are coloured Na. CrO. —ve	ellow KMnO, —nink K. Mn	0. – green It is due to
105	a) Cations are coloured in	$are coloured. Wayer O_4 ye$	b) Anions are coloured in	ns
	c) Both (a) & (b) are corr	rect	d) None of the above is co	nrect
106	Which is a pair of parama	unatic spacies?	uj None of the above is ce	
100	2 $KO$ NO	$\mathbf{h} \mathbf{K} \mathbf{O} \mathbf{K} \mathbf{O}$		ала и о
107	a) $KO_2$ , $NO_2$ Following are the ionizati	$D_{1} K_{2} O_{2}, K O_{2}$	$C_{1} K_{2} O, NO_{2}$	$u_1 NO_2, N_2 O_2$
107	(I) 900 $[I]$ mol <sup>-1</sup> $(I)$ 177	$7 \text{ kI mol}^{-1}$		
	$(I_1)(J_2) \times J = I = I = I$	/ NJ IIIUI ,		
	$(I_3)I_3000$ KJ IIIOI –	h) K	c) Bo	d) No
100	aj Na Which is the incorrect sta	UJ K stomont?		uj ne
100	. withen is the meditect sta			

- a) The heats of hydration of the dipositive alkaline earth metal ions decrease with an increase in their ionic size
- b) NaNO<sub>3</sub> forms  $Na_2O$  on heating
- c) Hydration of alkali metal ion is less than that of II A

d) Alkaline earth metal ions, because of their much larger charge to size ratio, exert a much stronger electrostatic attraction on the oxygen of water molecule surrounding them

109. A basic refractory material among the following is

107. If basic remactory i	indeer far annong the following is	)	
a) $Al_2O_3$	b) SiO <sub>2</sub>	c) $Fe_2O_3$	d) CaO
110. Which has least mo	blar solubility in $H_2O$ ?		
a) LiCl	b) NaCl	c) KCl	d) CsCl
111. Which will give $N_2$	0 on heating?		
a) NH <sub>4</sub> NO <sub>2</sub>	b) NH <sub>4</sub> NO <sub>3</sub>	c) NaNO <sub>3</sub>	d) LiNO <sub>3</sub>
112. All alkali metals for	rm following compound except		
a) Amide, <i>M</i> NH <sub>2</sub>		b) Superoxide like KC	) <sub>2</sub>
c) Ionic 'salt-like' h	ydride <i>M</i> H	d) Basic oxides	
113. Which one of the fo	ollowing has magnesium?		
a) Vitamin B <sub>12</sub>	b) Chlorophyll	c) Haemocyanin	d) Carbonic anhydrase
114. CaCl <sub>2</sub> is used as			
a) Disinfectant	b) Desiccant agent	c) Medicine	d) None of these
115. Out of AgF, $CaF_2$ , B	eF <sub>2</sub> , MgF <sub>2</sub>		
a) AgF and BeF <sub>2</sub> ar	e soluble, and $CaF_2$ and $MgF_2$ a	are insoluble in water	
b) AgF is soluble, o	thers insoluble		
<li>c) AgF is insoluble,</li>	, others are soluble		
d) All of the above			
116. Nitrate can be conv	verted into metal oxide on heat	ing in case of	
a) Li	b) Na	c) Both (a) and (b)	d) None of these
117. Lattice energy (nu	merical value) of chloride of all	kali metals is in order	
a) LiCl $> NaCl > F$	KCl > RbCl > CsCl	b) LiCl $< NaCl < KCl$	l < RbCl < CsCl
c) NaCl $< KCl < L$	iCl < RbCl < CsCl	d) NaCl < <i>KCl</i> < <i>RbC</i>	Cl < CsCl < LiCl
118. Alkali metal dissolv	ve in liquid NH <sub>3</sub> , then which of	the following observation	are true?
a) H <sub>2</sub> gas is liberat	ed		
b) Solution is blue	due to the presence of solvated	lelectrons	
c) Solution is cond	ucting		
d) All of the above	are correct		
119. On strong heating	$MgCl_2 \cdot 6H_2O$ the product obtain	ned is	
a) MgCl <sub>2</sub>	b) MgO	c) $MgCl_2 \cdot 2H_2O$	d) $MgCl_2 \cdot 4H_2O$
120. Which one of the fo	ollowing hydroxide is insoluble	in water?	
a) Ca(OH) <sub>2</sub>	b) Ba(OH) <sub>2</sub>	c) B(OH) <sub>2</sub>	d) Mg(OH) <sub>2</sub>
121. The substance used	d as pigment in paint is		
a) Borax	b) Alumina	c) Lithophone	d) None of these
122. Intermediate form	ed by heating microcosmic salt	and which forms coloure	d bead with coloured cation
a) NH <sub>3</sub>	b) H <sub>3</sub> PO <sub>3</sub>	c) NaPO <sub>3</sub>	d) H <sub>2</sub> O
123. Lithopone is mixtu	re of		
a) ZnCO <sub>3</sub> , BaCO <sub>3</sub>	b) ZnS, Na <sub>2</sub> SO <sub>4</sub>	c) ZnSO <sub>4</sub> , BaSO <sub>4</sub>	d) ZnS, BaSO <sub>4</sub>
124. The correct order of	of increasing ionic character is		,,
a) $\operatorname{BeCl}_2 < \operatorname{BaCl}_2 <$	$< MgCl_2 < CaCl_2$	b) $\operatorname{BeCl}_2 < MgCl_2 < MgCl$	$BaCl_2 < CaCl_2$
c) $BeCl_2 < BaCl_2 < $	$< MgCl_2 < CaCl_2$	d) $\operatorname{BeCl}_2 < \operatorname{CaCl}_2 < N$	AgCl <sub>2</sub> < BeCl <sub>2</sub>
125. Which of the follow	ving changes is not realized in t	the laboratory?	
a) Absorption of N	0 by alkaline sodium sulphite t	o form a compound	
b) Combustion of n	netallic Mg in CO <sub>2</sub>		
c) Heating hydrate	d magnesium chloride to get th	ne anhydrous salt	

d) 'Displacement' of chlor	rine fromKClO <sub>3</sub> by iodine t	o form KIO <sub>3</sub>	
Molten sodium chloride c	onducts electricity due to t	he presence of	
a) Free electrons	b) Ions	c) Na atom	d) Cl atom
Which is/are not the corr	ect configuration of <i>s</i> -block	k elements?	
a) [Ar]3d <sup>10</sup> 4s <sup>2</sup>	b) [Ar]3d <sup>10</sup> 4s <sup>1</sup>	c) Both (a) and (b)	d) None of these
The pair of amphoteric hy	/droxide is		
a) Al(OH) <sub>3</sub> , LiOH	b) Be(OH) <sub>2</sub> , Mg(OH) <sub>2</sub>	c) $B(OH)_3$ , $Be(OH)_2$	d) $Be(OH)_2$ , $Zn(OH)_2$
Lithium shows similaritie	s with magnesium in its ch	emical behavior because	
a) Similar size, greater ele	ectronegativity and lower p	olarizing powder	
b) Similar size, same elect	tronegativity and lower po	larizing power	
c) Similar size, same elect	tronegativity and similar h	igh polarizing power	
d) None of the above			
Alkali metals resemble IB	(copper family) in the foll	owing respects	
a) +1 valency		b) Sulphates are water so	luble
c) Oxides are strong base	S	d) Oxides are strong acids	S
The alkali metals dissolve	e in liquid NH <sub>3</sub> , it is found t	hat	
a) The dilute solutions ar	e blue but the colour chang	es to bronze with increasing	ng concentration
b) The blue colour is due	to the presence of solvated	electrons	
c) The blue solutions are	paramagnetic but the bron	ze-coloured solutions are o	liamagnetic
d) All of the facts given at	oove are found		
$MO_3$ on hydrolysis forms	( <i>M</i> is an alkali metal)		
a) MOH and H <sub>2</sub>	b) $MOH$ and $O_2$	c) $MOH$ and $M_2O_2$	d) $MOH$ and $H_2O_2$
Mg and Zn do not resemb	le in following properties		
a) Oxides are amphoteric		b) Carbonates o heating f	orm metal oxides
c) Widely used as electro	des	d) Used to prevent corros	sion
In water			
a) Temporary harden is d	lue to the bicarbonates of (	Ca <sup>2+</sup> and Mg <sup>2+</sup>	
b) Permanent harness is o	due to chlorides and sulpha	ates of Ca <sup>2+</sup> and Mg <sup>2+</sup>	
c) Hardness can be remov	ved by adding phosphates		
d) All of the above proper	ties are true		
Which is used to treat aci	d indigestion?		
a) Be(OH) <sub>2</sub>	b) KOH	c) Mg(OH) <sub>2</sub>	d) Ca(OH) <sub>2</sub>
When SO <sub>2</sub> gas is passed in	nto aqueous Na <sub>2</sub> CO <sub>3</sub> produ	ct formed is	
a) NaHSO4	b) Na <sub>2</sub> SO <sub>4</sub>	c) NaHSO <sub>3</sub>	d) Na <sub>2</sub> SO <sub>3</sub>
Following compounds are	e used in fire-works		
a) LiNO <sub>3</sub>	b) BaCl <sub>2</sub>	c) $(NH_4)_2 Cr_2 O_7$	d) All of these
In polymeric $(BeCl_2)_n$ , the	ere are		
a) Three centre two-elect	ron bonds	b) Three centre three-ele	ctron bonds
c) Two centre three-elect	rons bonds	d) Two centre two-electr	on bonds
The product obtained on	fusion of BaSO <sub>4</sub> and Na <sub>2</sub> CO	D <sub>3</sub> is	
a) BaCO <sub>3</sub>	b) BaO	c) Ba(OH) <sub>2</sub>	d) BaHSO <sub>4</sub>
NaOH is not used in			
a) Paper industry	b) Soap industry	c) Rayon industry	d) Plastic industry
The first ionization poten	tial of Na is 5.1 eV. The value	ue of electron gain enthalpy	y of Na <sup>+</sup> will be
a) –2.55 eV	b) –5.1 eV	c) -10.2 eV	d) +2.55 eV
Select the correct stateme	ent(s)		
a) Li <sub>2</sub> CO <sub>3</sub> decomposes int	to oxides while other alkali	carbonates are thermally s	stable
b) LiCl is predominantly of	covalent	, i i i i i i i i i i i i i i i i i i i	
c) $Li_3N$ is stable			
	d) 'Displacement' of chlor Molten sodium chloride c a) Free electrons Which is/are not the corr a) $[Ar]3d^{10}4s^2$ The pair of amphoteric hy a) Al(OH) <sub>3</sub> , LiOH Lithium shows similaritie a) Similar size, greater elect b) Similar size, same elect c) Similar size, same elect d) None of the above Alkali metals resemble IB a) +1 valency c) Oxides are strong base The alkali metals dissolve a) The dilute solutions are b) The blue colour is due c) The blue colour is due c) The blue solutions are d) All of the facts given at $MO_3$ on hydrolysis forms a) $MOH$ and H <sub>2</sub> Mg and Zn do not resemb a) Oxides are amphoteric c) Widely used as electro In water a) Temporary harden is d b) Permanent harness is d c) Hardness can be remov d) All of the above proper Which is used to treat aci a) Be(OH) <sub>2</sub> When SO <sub>2</sub> gas is passed in a) NaHSO <sub>4</sub> Following compounds are a) LiNO <sub>3</sub> In polymeric (BeCl <sub>2</sub> ) <sub>n</sub> , th a) Three centre two-elect c) Two centre three-elect The product obtained on a) BaCO <sub>3</sub> NaOH is not used in a) Paper industry The first ionization poten a) Li2CO <sub>3</sub> decomposes int b) LiCl is predominantly of c) Li <sub>3</sub> N is stable	d) 'Displacement' of chlorine fromKClO <sub>3</sub> by iodine to Molten sodium chloride conducts electricity due to to a) Free electrons b) Ions Which is/are not the correct configuration of s-blocd a) $[Ar]3d^{10}4s^2$ b) $[Ar]3d^{10}4s^1$ The pair of amphoteric hydroxide is a) Al(OH) <sub>3</sub> , LiOH b) Be(OH) <sub>2</sub> , Mg(OH) <sub>2</sub> Lithium shows similarities with magnesium in its ch a) Similar size, greater electronegativity and lower poil c) Similar size, same electronegativity and similar hid d) None of the above Alkali metals resemble IB (copper family) in the foll a) +1 valency c) Oxides are strong bases The alkali metals dissolve in liquid NH <sub>3</sub> , it is found t a) The dilute solutions are blue but the colour chang b) The blue colour is due to the presence of solvated c) The blue solutions are paramagnetic but the brond d) All of the facts given above are found $MO_3$ on hydrolysis forms ( <i>M</i> is an alkali metal) a) MOH and H <sub>2</sub> b) MOH and O <sub>2</sub> Mg and Zn do not resemble in following properties a) Oxides are amphoteric c) Widely used as electrodes In water a) Temporary harden is due to the bicarbonates of C b) Permanent harness is due to chlorides and sulpha c) Hardness can be removed by adding phosphates d) All of the above properties are true Which is used to treat acid indigestion? a) Be(OH) <sub>2</sub> b) KOH When SO <sub>2</sub> gas is passed into aqueous Na <sub>2</sub> CO <sub>3</sub> produ a) NaHSO <sub>4</sub> b) Na <sub>2</sub> SO <sub>4</sub> Following compounds are used in fire-works a) LiNO <sub>3</sub> b) BaCl <sub>2</sub> In polymeric (BeCl <sub>2</sub> ) <sub>n</sub> , there are a) Three centre two-electron bonds c) Two centre three-electrons bonds The product obtained on fusion of BaSO <sub>4</sub> and Na <sub>2</sub> CO a) BaCO <sub>3</sub> b) BaO NaO4 is not used in a) Paper industry b) Soap industry The first ionization potential of Na is 5.1 eV. The value a) $-2.55 eV$ b) $-5.1 eV$ S	d) 'Displacement' of chlorine fromKClO <sub>3</sub> by iodine to form KlO <sub>3</sub> Molten sodium chloride conducts electricity due to the presence of a) Free electrons b) Ions c) Na atom Which is/are not the correct configuration of s-block elements? a) $[Ar]3d^{10} 4s^2$ b) $[Ar]3d^{10} 4s^1$ c) Both (a) and (b) The pair of amphoteric hydroxide is a) Al(OH) <sub>3</sub> , LiOH b) Be(OH) <sub>2</sub> , Mg(OH) <sub>2</sub> c) B(OH) <sub>3</sub> , Be(OH) <sub>2</sub> Lithium shows similarities with magnesium in its chemical behavior because a) Similar size, greater electronegativity and lower polarizing power c) Similar size, same electronegativity and lower polarizing power d) None of the above Alkali metals resemble IB (copper family) in the following respects a) a) +1 valency b) Sulphates are water so c) Oxides are strong bases d) Oxides are strong acid. The alkali metals dissolve in liquid NH <sub>3</sub> , it is found that a) The dilute solutions are blue but the colour changes to bronze with increasin b) The blue colour is due to the presence of solvated electrons c) The blue solutions are paramagnetic but the bronze-coloured solutions are of d) All of the facts given above are found $MO_3$ on hydrolysis forms ( <i>M</i> is an alkali metal) a) OXides are amphoteric b) Carbonates oheating f c) Widely used as electrodes due to the bicarbonates of Ca <sup>2+</sup> and Mg <sup>2+</sup> b) Permanent harness is due to the bicarbonates of Ca <sup>2+</sup> and Mg <sup>2+</sup> c) Hardness can be removed by adding phosphates d) All of the above properties are true Which is used to treat acid indigestion? a) Be(OH) <sub>2</sub> b) KOH c) Mg(OH) <sub>2</sub> When SO <sub>2</sub> gas is passed into aqueous Na <sub>2</sub> CO <sub>3</sub> product formed is a) NaHSO <sub>4</sub> b) Na <sub>2</sub> SO <sub>4</sub> c) NaHSO <sub>3</sub> Following compounds are used in fire-works d) LiNO <sub>3</sub> b) BaCl <sub>2</sub> c) (NH <sub>4</sub> ) <sub>2</sub> Cr <sub>2</sub> O <sub>7</sub> In polymeric (Bcl2) <sub>2</sub> , there are a) Three centre two-electron bonds b) Three centre three-elect c) Two centre three-electrons bonds d) Two centre three-elect c) Two centre three-electrons bonds d) Two centre three-elect c) Two centre three-electrons bonds d) Two centre three-elect c) Two centre three-electrons bonds

143	. Mixture of MgCl <sub>2</sub> and Mg	O is called						
	a) Portland cement	b) Sorel's cement	c) Double salt	d) None of these				
144	. Be and Al show diagonal	relationship hence, both ha	ave					
	a) Same degree of electro	onegativity	b) Amphoteric nature of	oxides				
	c) Approximately same of	charge/radius ratio	d) All the properties abov	/е				
145	Which of the following ca	arbonate decompose most	easily on heating?					
	a) Rb <sub>2</sub> CO <sub>3</sub>	b) K <sub>2</sub> CO <sub>3</sub>	c) Na <sub>2</sub> CO <sub>3</sub>	d) MgCO <sub>3</sub>				
146	. Going down to II A group	o, following properties incre	ease except					
	a) Solubility of hydroxide	es in H <sub>2</sub> O	b) Hydration energy					
	c) Thermal stability of ca	arbonates	d) Ionic radius					
147	. Which of the following h	alide of calcium is insoluble	e in water?					
	a) CaCl <sub>2</sub>	b) CaI <sub>2</sub>	c) CaF <sub>2</sub>	d) CaBr <sub>2</sub>				
148	. Be in BeCl <sub>2</sub> undergoes							
	a) Linear hybridization		b) Trigonal hybridization	l				
	c) Tetrahedral hybridiza	tion	d) No hybridisation					
149	. The right order of the so	lubility of sulphates of alka	line earth metals in water					
	a) Be > $Ca > Mg > Ba$	> Sr	b) Mg > <i>Be</i> > <i>Ba</i> > <i>Ca</i> >	> Sr				
	c) Be > $Mg$ > $Ca$ > $Sr$ >	> Ba	d) Mg > <i>Ca</i> > <i>Ba</i> > <i>Be</i> >	> Sr				
150	A colourless solid (X) on	heating evolved CO <sub>2</sub> and a	lso gave a white residue, so	luble in water. Residue also				
	gave $CO_2$ when treated w	with dilute acid. $(X)$ is						
	a) Na <sub>2</sub> CO <sub>3</sub>	b) CaCO <sub>3</sub>	c) $Ca(HCO_3)_2$	d) NaHCO <sub>3</sub>				
151	Bleaching action of CaOC	ll <sub>2</sub> is due to						
	a) Nascent oxygen	b) Chlorine	c) HClO	d) HCl				
152	. Ripening of fruits can be	carried out in presence of						
	a) Na <sub>2</sub> SO <sub>4</sub>	b) NaCl	c) CaCl <sub>2</sub>	d) CaC <sub>2</sub>				
153	. Select the correct statem	ent(s)						
	a) Li <sub>2</sub> CO <sub>3</sub> is only sparing	ly soluble in water and no	LiHCO <sub>3</sub> has been isolated					
	b) K <sub>2</sub> CO <sub>3</sub> cannot be mad	e by a method similar to th	e ammonia-soda process					
	c) $Li_2CO_3$ and $MgCO_3$ bo	th are thermally stable						
	d) $Na_2CO_3 \cdot NaHCO_3 \cdot 2H$	I <sub>2</sub> 0 is a mineral called trona	а					
154	The solubilities of carbor	nates decrease down the m	agnesium group due to a de	ecrease in				
	a) Lattice energies of sol	ids	b) Hydration energies of	cations				
	c) Interionic attractions		d) Entropy of solution for	rmation				
155.	Which is not the <i>s</i> -block	element?						
	a) [Ar]4s <sup>2</sup> 3d <sup>10</sup> 4p <sup>6</sup> 5s <sup>1</sup>	b) 1 <i>s</i> <sup>2</sup> 2 <i>s</i> <sup>2</sup> 2 <i>p</i> <sup>1</sup>	c) $1s^2 2s^1 2p^1$	d) $[Ar]4s^{1}4p^{1}$				
156	Bleaching powder loses i	its power on keeping for a l	ong time because					
	a) It changes into calcium	n hypochlorate						
	b) It changes into calcium	n chloride and calcium hyd	roxide					
	c) It absorbs moisture							
	d) It changes into calcium	n chloride and calcium						
157.	$\operatorname{BaC}_2 + \operatorname{N}_2 \xrightarrow{\Delta} (A)$							
	$CaC_2 + N_2 \xrightarrow{\Delta} (B)$							
	(A) and (B) are							
	a) BaCN <sub>2</sub> , CaCN <sub>2</sub>	b) Ba(CN) <sub>2</sub> , Ca(CN) <sub>2</sub>	c) Ba(CN) <sub>2</sub> , CaCN <sub>2</sub>	d) None is correct				
			· · - <b>-</b>					
	Multinle Correct Answers Type							

## Multiple Correct Answers Type

158. The reagent(s) used	for softening the tempor	ary hardness of water is (are	e)
a) $Ca_3(PO_4)_2$	b) Ca(OH) <sub>2</sub>	c) Na <sub>2</sub> CO <sub>3</sub>	d) NaOCl

159. Select the correct statement(s)

- a) Alkali metals-ozonides are coloured and paramagnetic
- b) Alkali metals-ozonides are colourless and diamagnetic
- c) Sesquoxides of alkali metals are peroxides disuperoxides  $(M^+)_4(0^{2-}_2)(0^-_2)_2$
- d) Sesquoxides are paramagnetic due to presence of superoxide ion  $0_2^-$
- 160. Which are true statements about *s*-block elements?
  - a) Metals are obtained by the electrolysis of fused chlorides
  - b) Oxides are basic except BeO
  - c) +1 valency by alkali metals and +2 valency by alkaline earth metals is shown
  - d) Carabonates are thermally stable
- 161. LiAlH<sub>4</sub> can reduce
  - a) Carbonyl compounds into alcohols
  - c) -CHO group into  $-CH_3$
- d) Either into alcohols

b) Alkenes into alkanes

- 162. Sesquoxides  $(M_2O_3)$  of alkali metals
  - a) Have been prepared by careful thermal decomposition of  $MO_2$
  - b) Are dark-coloured paramagnetic substances
  - c) Are colourless diamagnetic substances
  - d) Are coloured diamagnetic substances
- 163. Select the correct statement(s)
  - a) Radius of hydrated Li<sup>+</sup> ion is smaller than that of hydrated Cs<sup>+</sup> ion
  - b) Ionic mobility of hydrated Li<sup>+</sup> ion is smaller than that of hydrated Cs<sup>+</sup> ion
  - c) Hydrated Cs<sup>+</sup> is more conducting that hydrated Na<sup>+</sup> ion

  - d) Ionic mobility of hydrated Cs<sup>+</sup> >  $Rb^+$  > K<sup>+</sup> >  $Na^+$  >  $Li^+$
- 164. Select the correct alternate(s)
  - a) In NaHCO<sub>3</sub>, the HCO $_3^-$  ions are linked into infinite chain
  - b) In KHCO<sub>3</sub>, a dimer is formed by H-bonding
  - c) In NaHCO<sub>3</sub>, a dimer is formed by H-bonding
  - d) In KHCO<sub>3</sub>, the HCO $_3^-$  ions are linked into infinite chain
- 165. Recently sodium naphthenide ( $C_{10}H_7Na$ ) has been used as reductant in complex formation.  $C_{10}H_7Na$  is b) Deep-green in colour c) Diamagnetic d) colourless
- a) Paramagnetic
- 166. Select the correct alternate(s)
  - a) All alkali metals form solid bicarbonates
  - b) Except LiHCO<sub>3</sub>, all alkali metals bicarbonates are solid
  - c) Li<sub>3</sub>CO<sub>3</sub> decomposes into CO<sub>2</sub> and Li<sub>2</sub>O
  - d) Na<sub>2</sub>CO<sub>3</sub> decomposes into CO<sub>2</sub> and Na<sub>2</sub>O
- 167. Select the correct statement(s)
  - a)  $MO_2$  contains the paramagnetic ion  $O_2^-$
  - b) O<sub>2</sub><sup>-</sup> is stable only in the presence of large cations as K, Rb and Cs
  - c) KO<sub>2</sub> is paramagnetic and has orange colour
  - d)  $K_2$  0 has antifluorite structure
- 168. Which is/are true statement(s)?
  - a) The heats of hydration of the dipositive alkaline earth metal ions decrease with an increase in their ionic size
  - b) Hydration of alkali metal ion is less than that of IIA
  - c) Alkaline earth metal ions, because of their much larger charge to size ratio exert a much stronger electrostatic attraction on the oxygen of water molecular surrounding them
  - d) None of the above statements is correct
- 169. Na<sup>+</sup> and Ag<sup>+</sup> differ in
  - a) Na<sub>2</sub>CO<sub>3</sub> is thermally stable while  $Ag_2CO_3$  decomposes into Ag,  $CO_2$  and  $O_2$

b) Ag<sup>+</sup> forms complexes, Na<sup>+</sup> does not

c) NaCl is water soluble, AgCl is insoluble

d) NaCl and AgCl both give colour in flame when ignited

170. Select the correct alternate(s)

a) Solid LiNO3 and NaNO3 and deliquescent

- b) KNO<sub>3</sub> is used in preference to NaNO<sub>3</sub> in gun powder
- c) NaNO<sub>3</sub> is used in preference to NaNO<sub>3</sub> in gun powder
- d) NH<sub>4</sub>HCO<sub>3</sub> exists in solid state

### Assertion - Reasoning Type

This section contain(s) 0 questions numbered 171 to 170. Each question contains STATEMENT 1(Assertion) and STATEMENT 2(Reason). Each question has the 4 choices (a), (b), (c) and (d) out of which **ONLY ONE** is correct.

a) Statement 1 is True, Statement 2 is True; Statement 2 is correct explanation for Statement 1

b) Statement 1 is True, Statement 2 is True; Statement 2 is not correct explanation for Statement 1

c) Statement 1 is True, Statement 2 is False

d) Statement 1 is False, Statement 2 is True

### 171

**Statement 1:** S block elements are highly electropositive.

Statement 2: The valance electrons present in s orbital are loosely held.

### 172

- **Statement 1:** Group 1 elements are known as the alkali elements.
- **Statement 2:** S orbital can accommodate only two electrons.

#### 173

- **Statement 1:** Gypsum is added to cement to increase its rate of setting.
- **Statement 2:** Gypsum is calcium sulphate hemihydrates.

#### 174

- **Statement 1:** Radium is most abundant s block elements.
- **Statement 2:** S block elements are non radioactive in nature.

#### Matrix-Match Type

This section contain(s) 0 question(s). Each question contains Statements given in 2 columns which have to be matched. Statements (A, B, C, D) in **columns I** have to be matched with Statements (p, q, r, s) in **columns II**.

175. Match Column I (compounds) with Column II (associated uses)

Column-I

Column- II

(A)	KO <sub>2</sub>				(1)	Baking
<b>(B)</b>	NaHCO <sub>3</sub>				(2)	Photovoltaic cell
(C)	LiCl				(3)	Submarine
(D)	Cs				(4)	Humidity control
COD	DES :					
	Α	В	C	D		
a)	2	3	1	4		
b)	4	2	3	1		
c)	3	1	4	2		
d)	1	4	2	3		
176. Mat	ch the miner	ral nam	es (in Colur	nn I) with	n the chemical	formulae (in Column II)
		C	olumn-I			Column- II
(A)	Magnesite				(1)	$KCl \cdot MgCl_2 \cdot 6H_2O$

	(A)	magnesi	le			(1)	) KU Mgu <sub>2</sub> $On_2O$	
	<b>(B)</b>	Dolomite	е			(2)	) MgSO <sub>4</sub> · H <sub>2</sub> O	
	(C)	Kieserite	e			(3)	) MgCO <sub>3</sub>	
	(D)	Carnallit	æ			(4)	) $MgCO_3 \cdot CaCO_3$	
	COD	ES :						
		Α	В	С	D			
	a)	3	4	2	1			
	b)	2	1	3	4			
	c)	4	2	1	3			
	d)	1	3	4	2			
77	. Seleo	ct the met	als (in Col	umn I) w	vith the spe	cific propert	ies of the compounds (i	n Col

17 Column II) s (in Column I) with the specific properties of the compounds (i

	Column-I	Column- II
<b>(A)</b> Li		(1) Supper oxide
<b>(B)</b> Na		(2) Lewis acid – a chloride
<b>(C)</b> K		(3) Most negative value of $E_{\text{redn}}^{0}$
<b>(D)</b> Be		(4) Thermally stable carbonate
<b>(E)</b> Mg		(5) No flame colouration of the chloride
CODES :		

	Α	В	С	D	Ε
a)	3	4	1	2	5
b)	2	3	4	5	5
c)	1	2	5	3	5
d)	5	1	3	4	5

178. Match the species in Column I with given property (ies) in Column II

		Co	olumn-I			Column- II
(A)	Li <sub>3</sub> N				(1)	Paramagnetic
(B)	LiCl				(2)	Ether soluble
(C)	KO <sub>2</sub>				(3)	Humidity control
(D)	$Rb_2O_3$				(4)	Coloured compounds
COD	DES :					
	Α	В	С	D		
a)	2,3	4,5	2,1	1,5		
b)	1,5	2	2,3	4,5		
c)	1,2	1,5	4,5	2,3		
d)	4,5	2,3	1,5	1,5		

179. Match compounds (in Column I) with the specific properties of the compounds (in Column II)

	Co	olumn-I			Column- II
BeCO <sub>3</sub>				(1)	Temporary hardness
BaCl <sub>2</sub>				(2)	Permanent hardness
MgSO <sub>4</sub>				(3)	Decomposes readily
Ca(HCO <sub>3</sub>	3)2			(4)	
DES :					
Α	В	С	D		
2	3	1	4		
3	4	2	1		
1	2	4	3		
4	1	3	2		
	BeCO <sub>3</sub> BaCl <sub>2</sub> MgSO <sub>4</sub> Ca(HCO <sub>3</sub> <b>DES :</b> A 2 3 1 4	BeCO3       Image: Comparison of the compari	Column-I         BeCO3         BaCl2         MgSO4         Ca(HCO3)2         A       B       C         2       3       1         3       4       2         1       2       4         4       1       3	Column-I         BeCO3         BaCl2         MgSO4         Ca(HCO3)2         A       B       C       D         2       3       1       4         3       4       2       1         1       2       4       3       2	<t< th=""></t<>

### Linked Comprehension Type

This section contain(s) 14 paragraph(s) and based upon each paragraph, multiple choice questions have to be answered. Each question has atleast 4 choices (a), (b), (c) and (d) out of which **ONLY ONE** is correct. **Paragraph for Question Nos. 180 to -180** 

 $(A) \xrightarrow{\Delta} (B)(\text{oxide}) + CO_2$   $(B) + H_2O \rightarrow (C)$   $(C) + CO_2 \rightarrow (A)(\text{milky})$   $(C) + NH_4Cl \xrightarrow{\Delta} (D)\text{gas}$   $(D) + H_2O + CO_2 \rightarrow (E)$   $(E) + NaCl \rightarrow (F)$  $(F) \xrightarrow{\Delta} Na_2CO_3 + CO_2 + H_2O$ 

180. Name of the process is

a) Solvay

b) Ammonia-soda

c) Both (a) & (b) correct d) None is correct

### Paragraph for Question Nos. 181 to - 181

Read the following passage and answer the questions at the end of it

Dilute solutions of alkali metals in liquid  $NH_3$  are blue. It is the ammoniated electron which is responsible for the blue colour of the solution, and the electrical conductivity is due to the ammoniated cation,  $[M(NH_3)_x]^+$  as well as the ammoniated electron,  $[e(NH_3)_y]^-$ , values of x and y depend on the extent of salvation (by  $NH_3$ ). Dilute solutions are paramagnetic due to free electrons

181. What happens if alkali metal is allowed to react with concentrated ammonia solution?

- a) Paramagnetic character of solvated electrons is retained
- b) Solvated electrons associate to form electron-pairs and paramagnetic character decreases
- c) Reducing character is increased
- d) Reducing character is not affected

### Paragraph for Question Nos. 182 to - 182

Questions given below are based on the following values of hydration energy and lattice energy

Hydra	ation energy	Lattice energy		
$\Delta H_{\rm hy}$	<sub>dr.</sub> (kJ mol <sup>-1</sup> )	$\Delta H_{\rm U}$ (kJ mol <sup>-1</sup> )		
Li <sup>+</sup>	- 499	LiCl	- 840	
Na <sup>+</sup>	- 390	NaCl	- 776	
K <sup>+</sup>	- 305	KCl	- 703	
Cl-	- 382			

182. Which salt has maximum heat of hydration?
--

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a) LiCl b) NaCl
```

c) KCl

d) LiCl and KCl equally

### Paragraph for Question Nos. 183 to - 183

Answer the questions based on the following flow-sheet



- 183. This flow-sheet represents
  - a) Solvay process of NaOH
  - c) Dow process of Na<sub>2</sub>CO<sub>3</sub>

b) Solvay process of Na<sub>2</sub>CO<sub>3</sub>

d) None of the above is correct

### Paragraph for Question Nos. 184 to - 184

Reduction potentials of group 1 (alkali metals) are given below:

Element	E°U
$Li^+ + e^- \rightarrow Li$	-3.045
$Na^+ + e^- \rightarrow Na$	-2.714
$K^+ + e^- \rightarrow K$	-2.925
$Rb^+ + e^- \rightarrow Rb$	-2.925
$Cs^+ + e^- \rightarrow Cs$	-2.923

Answer the following questions

184. Which is the best reducing agent?						
a) Li	b) Na	c) Rb	d) Cs			

### Paragraph for Question Nos. 185 to - 185

"Calcium oxide, CaO, is used to remove  $SO_2$  from power plant exhaust" Based on the above statement, answer the following questions

185. In what form CaO	removes SO <sub>2</sub> ?		
a) CaSO <sub>3</sub>	b) CaSO <sub>4</sub>	c) $Ca(HSO_3)_2$	d) Ca(HSO <sub>4</sub> ) <sub>2</sub>

### Paragraph for Question Nos. 186 to - 186

Based on following analytical data, answer the questions

A mineral which can be represented by the formula  $Mg_xBa_y(CO_3)_z$ , was analysed as described below A sample of the mineral was dissolved in excess hydrochloric acid and the solution made up to 100 cm<sup>3</sup> with water. During the process 48 cm<sup>3</sup> of carbon dioxide, measured at 25°C and 1 atmosphere pressure, were evolved

A 25.0 cm<sup>3</sup> portion of the resulting solution required 25.0 cm<sup>3</sup> of EDTA solution of concentration 0.2 mol dm<sup>3</sup> to reach an end-point. A further 25.0 cm<sup>3</sup> portion gave a precipitate of barium sulphate of mass 0.058 g on treatment with excess dilute sulphuric acid. You may assume that group-2 metal ions from 1:1 complexes with EDTA

Ba - 1134.4 - 520.4219.6 Answer the following question

188. Maximum value of  $\Delta G^{\circ}$  is for the reaction when *M* is a) Mg b) Ca c) Ba d) Equal for all cases

# **Integer Answer Type**

- 189. Magnesium allyide is  $Mg_2C_x$  where x is....
- 190. Potassium superoxide has..... unpaired electron(s)
- 191. Bleaching powder has two types of chlorine one with oxidation number -1 and other with oxidation number.....
- 192. Cl<sub>2</sub> disproportionates to NaCl and NaClO<sub>3</sub> on passing into hot NaOH solution. In this process each mole of Cl<sub>2</sub> consumes ..... mole(s) of NaOH
- 193. When LiNO<sub>3</sub> in heated, change in oxidation number of N is.....
- 194. When NaNO<sub>3</sub> is heated, change in oxidation number of N is.....
- 195. One mole of  $Ca(HCO_3)_2$  is neutralized by mole(s) of KOH
- 196. 96 g of Mg is burnt in air in a closed chamber. On analysis 25% of Mg is converted into oxide and remaining Mg into other possible product. Residue is dissolving in H<sub>2</sub>O and neutralized by H<sub>2</sub>SO<sub>4</sub>. Number of moles of H<sub>2</sub>SO<sub>4</sub> required is.....
- 197. Number of *s*-electrons in Na<sup>-</sup> is.....
- 198. When one mole of Na<sub>2</sub>CO<sub>3</sub> is heated, CO<sub>2</sub> obtained is ..... mole
- 199. Number of neutrons in  ${}^{9}_{4}\text{Be}^{3+}$  is.....
- 200. Epsom salt contains..... water molecules (of hydration)
- 201. Magnesium is coordinated to N-atoms in chlorophyll. Number of rings in chlorophyll is.....

# Molar volume of any gas at 25°C and 1 atmosphere pressure = $24 \text{ dm}^3$ )

Questions given below are based on the following enthal	py values
The standard enthalpy of formation $\Delta H_f^0$ , of hypothetical	CaCl(s) theoretically found to be –188 kJ mol <sup>–1</sup> and
that of $CaCl_2(s) - 795 \text{ kJ mol}^{-1}$	
187. Which of the following compounds is more stable?	
a) CaCl(s)	b) CaCl <sub>2</sub> (s)
c) Both (a) & (b) are equally stable	d) Nothing can be said

c) MgBa( $CO_3$ )<sub>3</sub>

d)  $Mg_2Ba(CO_3)_4$ 

a) MgBa( $CO_3$ )<sub>4</sub> b) MgBa( $CO_3$ )<sub>2</sub>

186. Formula of the mineral is

Paragraph for Question Nos. 187 to - 187

Paragraph for Question Nos. 188 to - 189

 $CO_2$ 

 $MCO_3 \rightarrow MO +$ 

Mg -1028.2 - 568.9

Ca -1129.2 - 603.4165.9

-394.4

 $\Delta G^{\circ}$  values (kJ mol<sup>-1</sup>) for the following cases can given

64.9

202. Number of elements in second period showing diagonal relationship is.....

203. Na<sub>2</sub>CO<sub>3</sub> removes permanent hardness

 $CaSO_4 + Na_2CO_3 \rightarrow Na_2SO_4 + CaCO_3$ 

10 L of hard water required 0.0848 g Na<sub>2</sub>CO<sub>3</sub>. Thus, harden in ppm of CaCO<sub>3</sub> is.....

204. Number of  $HCO_3^-$  ions joined by H-bonding in  $KHCO_3$  is....

- 205. Bond order of oxide in sodium peroxide is.....
- 206. Hydrated sodium sulphite has 50% H<sub>2</sub>O. Number of molecules of hydration is.....
- 207. Magnesium nitride is  $Mg_x N_y$  where (x + y) is.....
- 208. Number of electrons in magnesium ion formed by three steps ionization of magnesium is.....
- 209.  $E_{M^{2+}/M}^{o}$  values of some metals are

Be : -1.85 V

Mg: -2.37 V

- Ca: -2.87 V
- Sr: -2.89 V
- Cu: +0.34 V
- Hg: 0.80 V

Number of metals which can displace H<sub>2</sub> gas from acid is.....

- 210. Coordination number of complexes of beryllium is.....
- 211. In question (7), x + y + z = ....
- 212. One mole of lithium nitride is decomposed by H<sub>2</sub>O and resultant solution is neutralized by HCl. Number of moles of HCl required is....
- 213. Magnesium is coordinated to ..... N atoms in chlorophyll
- 214. Potassium sesquoxide has actually ..... 0 atoms
- 215.  $Mg_x Ba_y (CO_3)_z$  has 8.54% Mg, 48.75% Ba and remaining carbonate. 0.281 kg is decomposed by  $H_2SO_4$ .  $CO_2$  formed is ..... mole(s)
- 216. When Cl<sub>2</sub> is passed into hot alkali solution, products formed have two types of chlorine. Difference in oxidation number of two chlorine atoms is.....
- 217. Number of water molecules in gypsum is.....
- 218. Unpaired electron(s) in superoxide ion....
- 219.  $KO_2$  is  $CO_2$  absorber and  $O_2$  producer as shown

 $4\text{KO}_2 + \text{CO}_2 \rightarrow \text{K}_2\text{CO}_3 + \text{xO}_2$ Values of *x* is.....

220. Number of radioactive elements in *s*-block is.....

## **10.THE S-BLOCK ELEMENTS**

A HNOW ENCLET           1)         c         2)         b         3)         d         4)         d         125)         c         126)         b         127)         c         128)         d           5)         d         6)         c         7)         a         8)         c         129)         c         130)         a         131)         d         132)         b           9)         d         10)         b         111)         c         121         b         133)         a         134)         d         135)         c         136)         d         144)         b         144)         d         132)         b         1440)         d         1433         b         1440)         d         1433         b         1440)         d         151)         c         1521         d         149)         a         150)         d         151,         c         152)         d         153         c         154,         a         155)         b         156)         d           29)         a         30)         d         31)         a         321)         c         153)         c         <																
1)       c       2)       b       3)       d       4)       d       125)       c       126)       b       127)       c       128)       d         5)       d       6)       c       7)       a       8)       c       120)       c       130)       a       131)       d       132)       b         9)       d       10)       b       111)       c       120       b       133)       a       131)       d       132)       b       134)       d       131)       d       132)       b       140)       d         17)       b       180       c       190       c       200       a       141)       b       142)       d       143)       b       144)       d         21)       a       260       c       271       a       280       c       149)       a       140       d       143)       a       150)       d       141,       a       150       d       147)       c       152)       d       150       d       150,       d       156)       d       153)       a       150,       d       150,       d       150,							: ANJ	VV.								ļ
5)d6)c7)a8)c129c130a131d132b9)d10)b11)c12)b133)a134)d135)c136)d13)d14)a15)d16)c137)d138)a139)b140)d17)b18)c19)c20)a141)b142)d143)b144)d21)a22)a23)c24)c145)d146)b147)c148)a25)a26)c27)a28)c149)a150)d151)c152)d29)a30)d31)a320b153)c153)c153)b156)d33)a34)c35)c160157)c10b,cd2)a,cd3)a41)a420b43)d444a5)a,bc40a110a,bc12)a,cd12)433)a46)c477b481da,bc10a,bc,d11a,bc12)4411a420bc50d60b,cd11a,bc12)44 <td>1)</td> <td>C</td> <td>2)</td> <td>b</td> <td>3)</td> <td>d</td> <td>4)</td> <td>d</td> <td>125)</td> <td>С</td> <td>126)</td> <td>b</td> <td>127)</td> <td>C</td> <td>128)</td> <td>d</td>	1)	C	2)	b	3)	d	4)	d	125)	С	126)	b	127)	C	128)	d
9)         d         10)         b         11)         c         12)         b         133         a         134         d         135)         c         136)         d           13)         d         14)         a         15)         d         160         c         137)         d         138)         a         139)         b         140         d           17)         b         180         c         190         c         200         a         141         b         142)         d         143         b         1440         d           21)         a         220         a         230         c         1449         a         150         d         147)         c         148         a           25)         a         260         c         277         a         320         d         157         c         10         b,cd         20         a,cd         30         d         327         a         380         d         320         d         157         c         110         b,cd         70         a,cd         30         a         160         a,cd         10         a,cd         10	5)	d	6)	C	7)	а	8)	C	129)	С	130)	a	131)	d	132)	b
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21)a22)a23)c24)c145)d146)b147)c148)a25)a26)c27)a28)c149)a150)d151)c152)d29)a30)d31)a32)b153)c150)d155)b156)d33)a34)c35)c36)d157)c1)b,c,d2)a,c,d3)b37)a38)d39)c40)ca,b,c4)a,da,c,d3)b151)c110a,c,d3)a,c,d3)a-40)ca,b,c4)a,da,c,d3)a-40)ca,b,c4)a,da,c,d3)a-40)c-a,b,c4)a,d <td< td=""><td>17)</td><td>b</td><td>18)</td><td>С</td><td>19)</td><td>С</td><td>20)</td><td>а</td><td>141)</td><td>b</td><td>142)</td><td>d</td><td>143)</td><td>b</td><td>144)</td><td>d</td></td<>	17)	b	18)	С	19)	С	20)	а	141)	b	142)	d	143)	b	144)	d
25)       a       26)       c       27)       a       28)       c       149)       a       150)       d       151)       c       152)       d         29)       a       30)       d       31)       a       32)       b       153)       c       154)       a       151)       c       152)       d         33)       a       34)       c       35)       c       36)       d       157)       c       154)       a       155)       b       156)       d         37)       a       38)       d       39)       c       400       c       a,bc, 4)       a,d       .	21)	а	22)	а	23)	С	24)	С	145)	d	146)	b	147)	С	148)	a
29)       a       30)       d       31)       a       32)       b       153)       c       154)       a       155)       b       156)       d         33)       a       34)       c       35)       c       36)       d       157)       c       1)       b,c,d       2)       a,c,d       3)         37)       a       38)       d       39)       c       40)       c       a,b,c       4)       a,d       -       -       a,b,c       10       a,b,c,d       7)       a,b,c       12)       -	25)	a	26)	C	27)	а	28)	C	149)	а	150)	d	151)	C	152)	d
33)a34)c35)c36)d157)c1)b,c,d2)a,c,d3)37)a38)d39)c40)c $a,b,c$ 4) $a,d$ <td< td=""><td>29)</td><td>а</td><td>30)</td><td>d</td><td>31)</td><td>а</td><td>32)</td><td>b</td><td>153)</td><td>С</td><td>154)</td><td>a</td><td>155)</td><td>b</td><td>156)</td><td>d</td></td<>	29)	а	30)	d	31)	а	32)	b	153)	С	154)	a	155)	b	156)	d
37a $38$ d $39$ c $40$ c $a,b,c$ $4$ $a,d$ $41$ a $42$ b $43$ d $44$ a $5$ $a,b$ $6$ $b,c,d$ $7$ $a,b$ $8$ $45$ a $46$ c $47$ b $48$ d $a,b,c$ $10$ $a,b,c,d$ $7$ $a,b$ $8$ $49$ c $50$ a $51$ c $52$ $a$ $9$ $b,c$ $10$ $a,b,c,d$ $11$ $a,b,c$ $12$ $53$ a $54$ c $55$ $d$ $56$ $a$ $a,b,c$ $10$ $a,b,c,d$ $11$ $a,b,c$ $12$ $57$ a $58$ a $59$ $a$ $60$ $d$ $13$ $a,b,d$ $1$ $a$ $2$ $b$ $3$ $d$ $61$ c $62$ c $63$ $d$ $64$ $d$ $4$ $d$ $d$ $   b$ $3$ $a$ $4$ $d$ $61$ c $62$ c $63$ $d$ $64$ $d$ $d$ $  -$	33)	а	34)	C	35)	С	36)	d	157)	C	1)	b,c,d	2)	a,c,d	3)	
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65)       d       66)       b       67)       c       68)       a       1)       c       2)       a       3)       a       4)       d         69)       b       70)       b       71)       b       72)       d       5)       b       1)       a       2)       b       3)       a       4)       d         73)       a       74)       d       75)       c       76)       a       4)       b       . <td>61)</td> <td>C</td> <td>62)</td> <td>C</td> <td>63)</td> <td>d</td> <td>64)</td> <td>d</td> <td></td> <td>4)</td> <td>d</td> <td></td> <td>-</td> <td></td> <td></td> <td></td>	61)	C	62)	C	63)	d	64)	d		4)	d		-			
69)       b       70)       b       71)       b       72)       d       5)       b       1)       a       2)       b       3)       a         73)       a       74)       d       75)       c       76)       a       4)       b	65)	d	66)	b	67)	С	68)	a	1)	C	2)	а	3)	a	4)	d
73)       a       74)       d       75)       c       76)       a       4)       b         77)       c       78)       c       79)       c       80)       a       5)       a       6)       a       7)       b       8)       b         81)       b       82)       d       83)       d       84)       c       9)       c       1)       3       2)       1       3)       1         85)       a       86)       b       87)       b       88)       a       4)       2	69)	b	70)	b	71)	b	72)	d	5)	b	1)	а	2)	b	3)	а
77)       c       78)       c       79)       c       80)       a       5)       a       6)       a       71       b       81       b         81)       b       82)       d       83)       d       84)       c       9)       c       1)       3       2)       1       3)       1         85)       a       86)       b       87)       b       88)       a       4)       2	73)	а	7 <b>4</b> )	d	75)	С	76)	а		4)	b					
81)       b       82)       d       83)       d       84)       c       9)       c       1)       3       2)       1       3)       1         85)       a       86)       b       87)       b       88)       a       4)       2	77)	C	78)	С	79)	С	80)	a	5)	а	6)	a	7)	b	8)	b
85)       a       86)       b       87)       b       88)       a       4)       2         89)       b       90)       c       91)       b       92)       b       5)       1       6)       2       7)       2       8)       5         93)       d       94)       d       95)       a       96)       c       9)       6       10)       0       11)       5       12)       7         97)       c       98)       a       99)       d       100)       d       13)       8       14)       3       15)       8       16)       2         101)       b       102)       a       103)       a       104)       c       17)       1       18)       7       19)       5       20)       9         105)       b       106)       a       107)       c       108)       b       21)       4       22)       4       23)       4       24)       4         109)       d       110)       c       111)       b       112)       b       25)       4       26)       6       27)       2       28)       8 </td <td>81)</td> <td>b</td> <td>82)</td> <td>d</td> <td>83)</td> <td>d</td> <td>84)</td> <td>С</td> <td>9)</td> <td>C</td> <td>1)</td> <td>3</td> <td>2)</td> <td>1</td> <td>3)</td> <td>1</td>	81)	b	82)	d	83)	d	84)	С	9)	C	1)	3	2)	1	3)	1
89)       b       90)       c       91)       b       92)       b       5)       1       6)       2       7)       2       8)       5         93)       d       94)       d       95)       a       96)       c       9)       6       10)       0       11)       5       12)       7         97)       c       98)       a       99)       d       100)       d       13)       8       14)       3       15)       8       16)       2         101)       b       102)       a       103)       a       104)       c       17)       1       18)       7       19)       5       20)       9         105)       b       106)       a       107)       c       108)       b       21)       4       22)       4       23)       4       24)       4         109)       d       110)       c       111)       b       112)       b       25)       4       26)       6       27)       2       28)       8         113)       b       114)       b       115)       a       116)       c       29) <t< td=""><td>85)</td><td>a</td><td>86)</td><td>b</td><td>87)</td><td>b</td><td>88)</td><td>a</td><td></td><td>4)</td><td>2</td><td>_</td><td></td><td>_</td><td></td><td>_</td></t<>	85)	a	86)	b	87)	b	88)	a		4)	2	_		_		_
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97)       c       98)       a       99)       d       100)       d       13)       8       14)       3       15)       8       16)       2         101)       b       102)       a       103)       a       104)       c       17)       1       18)       7       19)       5       20)       9         105)       b       106)       a       107)       c       108)       b       21)       4       22)       4       23)       4       24)       4         109)       d       110)       c       111)       b       112)       b       25)       4       26)       6       27)       2       28)       8         113)       b       114)       b       115)       a       116)       c       29)       2       30)       1       31)       3       32)       2         117)       a       118)       d       119)       b       120)       c       124)       a       124)       124)       124)	93)	d	94)	d	95)	a	96)	С	9)	6	10)	0	11)	5	12)	7
101)       b       102)       a       103)       a       104)       c       17)       1       18)       7       19)       5       20)       9         105)       b       106)       a       107)       c       108)       b       21)       4       22)       4       23)       4       24)       4         109)       d       110)       c       111)       b       112)       b       25)       4       26)       6       27)       2       28)       8         113)       b       114)       b       115)       a       116)       c       29)       2       30)       1       31)       3       32)       2         117)       a       118)       d       119)       b       120)       c         121)       c       122)       c       123)       d       124)       a	97)	С	98)	а	99)	d	100)	d	13)	8	14)	3	15)	8	16)	2
105)       b       106)       a       107)       c       108)       b       21)       4       22)       4       23)       4       24)       4         109)       d       110)       c       111)       b       112)       b       25)       4       26)       6       27)       2       28)       8         113)       b       114)       b       115)       a       116)       c       29)       2       30)       1       31)       3       32)       2         117)       a       118)       d       119)       b       120)       c       121)       c       122)       c       123)       d       124)       a	101)	b	102)	а	103)	а	104)	C	17)	1	18)	7	19)	5	20)	9
109)       d       110)       c       111)       b       112)       b       25)       4       26)       6       27)       2       28)       8         113)       b       114)       b       115)       a       116)       c       29)       2       30)       1       31)       3       32)       2         117)       a       118)       d       119)       b       120)       c         121)       c       122)       c       123)       d       124)       a	105)	b	106)	a	107)	С	108)	b	21)	4	22)	4	23)	4	24)	4
113)       b       114)       b       115)       a       116)       c       29)       2       30)       1       31)       3       32)       2         117)       a       118)       d       119)       b       120)       c         121)       c       122)       c       123)       d       124)       a	109)	d	110)	С	111)	b	112)	b	25)	4	26)	6	27)	2	28)	8
117) a 118) d 119) b 120) c 121) c 122) c 123) d 124) a	113)	b	114)	b	115)	а	116)	С	29)	2	30)	1	31)	3	32)	2
121) c 122) c 123) d 124) a	117)	а	118)	d	119)	b	120)	С								
	121)	С	122)	С	123)	d	124)	а								

# : HINTS AND SOLUTIONS :

5 (d)  $Ca(OH)_2 + Cl_2 \rightarrow CaOCl_2 + CaCl_2$ 7 (a) Due to low (IE) and most negative  $E^{\circ}$  values 8 (c)  $2Na_2O_2 + 2CO_2 \rightarrow 2Na_2CO_3 + O_2$ 40 **(c)** 9 (d) HCHO is used as preservatives of dead biological 42 **(b)** specimen 11 (c) size of  $BeO + 2NaOH + H_2O \rightarrow Na_2 [Be(OH)_4]$  $Be + 2NaOH + 2H_2O \rightarrow Na_2[Be(OH)_4] + H_2$ 12 **(b)** Chlorides are Lewis acids 14 (a)  $Al + NaOH + H_2O \rightarrow NaAlO_2 + 1\frac{1}{2}H_2$ 44 (a) 16 (c)  $Be_2C + H_2O \rightarrow Be(OH)_2 + CH_4$ 18 (c) 47 **(b)** Mg does not react with NaOH 20 (a) 50 (a) Na<sub>2</sub>CO<sub>3</sub> is thermally stable 22 (a) 51 (c)  $CaCO_3 + H_2O + CO_2 \rightarrow Ca(HCO_3)_2$ soluble 24 (c)  $KO_2$  is paramagnetic due to  $O_2^ K_2O_3$  is actually  $K_4O_6$  $K_4(0^{2-}_2)(0^{-}_2)_2$ 52 (a)  $\uparrow\uparrow$ Peroxide superoxide Thu, it also paramagnetic 30 (d) BeCl<sub>2</sub> sp 56 (a)  $AlCl_3 sp^2$ Be 33 (a)  $Kl + l_2 \rightleftharpoons Kl_3$  $1s^2 2s^2$ 38 (d) He (a)  $Na_2CO_3 \xrightarrow{\Delta} no CO_2$ 11 (b)  $CaCO_3 \longrightarrow CaO + CO_2$  $\begin{array}{|c|c|c|c|} & & & & \\ \hline H_2O & & & \\ \hline HCl & & & & \\ \hline HCl & & & & & \\ \hline & & & & & & \\ \hline \end{array}$ 61 (c) (c)  $Ca(HCO_3)_2 \rightarrow CaCO_3 + H_2O + CO_2$ Insoluble

in  $H_2O$ (d)  $2NaHCO_3 \longrightarrow Na_2CO_3 + H_2O + CO_2$  $| \xrightarrow{\text{HCl}} \text{CO}_2 \uparrow$ Na<sub>2</sub>CO<sub>3</sub> is water soluble  $Ca(OH)_2 + Cl_2 \rightarrow CaOCl_2 + H_2O$ Smaller the size of cation, larger the hydration;  $Li^{+} < Na^{+} < K^{+} < Rb^{+} < Cs^{+}$ Thus, Cs<sup>+</sup> is least hydrated Thus, I is incorrect Li has closed packed structure. Thus, II is correct Only Li forms nitride. Thus, III is correct Thus, II and III are correct Smaller the size of cation, larger the hydration, hence, larger the stability of hydrated ion  $2Na_2O \rightarrow Na_2O_2 + 2Na_2O_2$ It involved hydration hence exothermic (a)  $Li + N_2 \rightarrow Li_3N$  $Mg + O_2 \rightarrow MgO$ O<sub>2</sub> and N<sub>2</sub> are removed (b)  $NaOH + CO_2 \rightarrow Na_2CO_3$ CO<sub>2</sub> is removed  $CaCO_3 + CO_2 + H_2O \rightarrow Ca(HCO_3)_2$  $Na_2CO_3 \xrightarrow{\Delta} x$  $\text{Li}_2\text{CO}_3 \xrightarrow{\Delta} \text{Li}_2\text{O} + \text{CO}_2$ CaCl<sub>2</sub>/CaSO<sub>4</sub> make permanent hardness 11 11 Due to stable electronic configuration tendency to gain electron is minimum

 $Na_2S_2O_3$  (as fixer) dissolves unreacted AgBr as  $2Na_2S_2O_3 + AgBr \rightarrow Na_3[Ag(S_2O_3)_2] + NaBr$ 

95 (a) 67 **(c)**  $Mg^{2+} < Na^{+}$ Mg < Na68 (a)  $\Delta G^{\circ}$  (Mgsalt) = -568.9 - 394.4 (-1028.2) = -963.3 + 1028.2 = 64.9 kJ $\Delta G^{\circ}(\text{Ca salt}) = -603.4 - 394.4 - (-1129.2)$ 97 = -997.8 + 1129.2 = 131.4(c)  $\Delta G^{\circ} = -520.4 - 394.4 - (-1134.4)$ = -914.8 + 1134.4 = 219.6 $\Delta G^{\circ}$  of MgCO<sub>3</sub> is minimum, thus decomposition of MgCO<sub>3</sub> is most feasible 69 **(b)** 101 **(b)**  $(CaCN_2 + C)$ 71 (b) 102 (a) Sodium thiosulphate,  $Na_2S_2O_3$  gets oxidised by chlorine water.  $Na_2S_2O_3 + 4Cl_2 + 5H_2O \rightarrow 2NaHSO_4 + 8HCl$ 72 (d) NaCl – golden yellow AgCl - no flame 104 (c) 73 (a)  $Na_2O_2 + 2H^+Cl^- \rightarrow H_2O_2 + 2NaCl$  $H_2O_2 + Cr_2O_7^{2-} + 2H^+ \rightarrow CrO_5$ 105 **(b)** Deep violet soluble in ether 74 (d)  $Na + O_2 \rightarrow Na_2O$  $Li + 0_2 \rightarrow Li_20$  $Li + Ni \rightarrow Li_3N$ 77 (c) 106 (a)  $Li_2CO_3 \rightarrow Li_2O + CO_2 \uparrow$  $Na_2CO_3$ .  $10H_2O \rightarrow Na_2CO_3 + 10H_2O \uparrow$ 78 (c) 107 (c) Third IE  $(l_3)$  is very high, thus it represents alkali earth metal (Be) 81 **(b)**  $M_2O_3$  actually exists as  $M_4O_6[M_4(O_2^{2-})(O_2^{-})_2]O_2$  is 108 (b) paramagnetic 82 (d) 110 (c) Gypsum is  $CaSO_4 \cdot 2H_2O$ 85 (a)  $4\mathrm{KO}_2 + 2\mathrm{H}_2\mathrm{O} + 4\mathrm{CO}_2 \rightarrow 4\mathrm{KHCO}_3 + 3\mathrm{O}_2$ 86 **(b)**  $2NaNO_3 \xrightarrow{\Delta} 2NaNO_2 + O_2$ 88 (a)  $Al_4C_3 + H_2O \rightarrow CH_4$ 111 **(b)** 89 (b)  $KO_2$  is stable due to larger anion  $O_2^-$  which 112 **(b)** polarises K<sup>+</sup>

Smaller cation larger hydration thus smaller molar ionic conductance **Ionic size** $Li^+ < Na^+ < K^+ < Rb^+$ HydrationLi<sup>+</sup> > Na > K<sup>+</sup> >  $Rb^+$ Size of hydration ion $Li^+ > Na^+ > K^+ > Rb^+$ Molar ionic conductance  $Li^+ < Na^+ < K^+ < Rb^+$ NaHCO<sub>3</sub> is acidic and decomposed by NaOH forming Na<sub>2</sub>CO<sub>3</sub>  $NaHCO_3 + NaOH \rightarrow Na_2CO_3 + H_2O$ acid base Potassium antimonyl tartrate (a) Na<sup>+</sup> is alkalide ion  $Na(1s^22s^22p^64s^1) \leftarrow Paramagnetic due to$ unpaired electrons  $Na^{-}(1s^{2}2s^{2}2p^{6}3s^{2}) \leftarrow Diamagnetic due to paired$ electrons  $2NaF + BeF_2 \rightarrow Na_2[BeF_4] \rightleftharpoons 2Na^+ + [BeF_4]^{2-}$ anion Alkali salts are colourless NaCl colourless  $Na_2CrO_4$  –yellow since  $CrO_4^{3-}$  is vellow KCl colourless  $K_2CrO_4$  – yellow  $KMnO_4 - pink since MnO_4^-$  is pink  $K_2MnO_4$  – green since  $MnO_4^{2-}$  is green  $KO_2$  ( $O_2^-$  is paramagnetic due to one unpaired electron)  $NO_2$  (is paramagnetic due to one unpaired electron on N)  $(IE)_3$  is very high indicates +2 oxidation state. Thus, Be  $2NaNO_3 \rightarrow 2NaNO_2 + O_2$ Molar solubility is in mol  $L^{-1}$  (Reference Concise) inorganic Chemistry J.D. Lee) LiCl = 19.6NaCl = 6.2KCl = 4.8RbCl = 7.5CsCl = 11.0 $NH_4NO_3 \rightarrow N_2O + 2H_2O$ 

Li and Na do not form superoxide  $MO_2$ 

115 **(a)** 

Solution 46-49 CaCO<sub>3</sub>  $\rightarrow$  CaO + CO<sub>2</sub> (A) (B) CaO + H<sub>2</sub>O  $\rightarrow$  Ca(OH)<sub>2</sub> (C) Ca(OH)<sub>2</sub> + CO<sub>2</sub>  $\rightarrow$  CaCO<sub>3</sub> (A) Ca(OH)<sub>2</sub> + NH<sub>4</sub>Cl  $\rightarrow$  NH<sub>3</sub> (D) NH<sub>3</sub> + CO<sub>2</sub> + H<sub>2</sub>O  $\rightarrow$  NH<sub>4</sub>HCO<sub>3</sub> (E) NH<sub>4</sub>HCO<sub>3</sub> + NaCl  $\rightarrow$  NaHCO<sub>3</sub> + NH<sub>4</sub>Cl (F)

116 **(c)** 

$$2\text{LiNO}_3 \rightarrow \text{Li}_2\text{O} + 2\text{NO}_2 + \frac{1}{2}\text{O}_2$$
$$\text{Mg(NO}_3)_2 \rightarrow \text{MgO} + 2\text{NO}_2 + \frac{1}{2}\text{O}_2$$

117 (a)

Smaller cation polarizes anion to a greater extent hence larger covalent nature and thus lattice energy

### 119 **(b)**

 $MgCl_2 \cdot 6H_2O \xrightarrow{\Delta} Mg(OH)_2 \xrightarrow{\Delta} MgO$ 

126 **(b)** 

In molten state NaCl(l)  $\rightleftharpoons$  Na<sup>+</sup> + Cl<sup>-</sup> 127 (c) (a)  $[Ar]3d^{10}4s^2$  – Last filling is in 3*d* thus it is *d*-

(a) [A7]  $3u^{-4s} = Last ming is in 5u thus it is t$ block element $(b) [Ar] <math>3d^{10}4s^1$  – same as (a)

Thus, both are d-block element

## 128 (d)

Be(OH)<sub>2</sub> + 2HCl → BeCl<sub>2</sub> + 2H<sub>2</sub>O basic Zn(OH)<sub>2</sub> + 2HCl → ZnCl<sub>2</sub> + 2H<sub>2</sub>O basic Be(OH)<sub>2</sub> + 2NaOH → Na<sub>2</sub>[Be(OH)<sub>4</sub>] acidic

 $Zn(OH)_2 + 2NaOH \rightarrow Na_2[Zn(OH)_4]$ acidic

### 130 **(a)**

IA (Alkali)	IB (Coinage)
(a) NaCl	CuCl + 1 valency
	thus true
(b) Na <sub>2</sub> SO <sub>4</sub> soluble	CuSO <sub>4</sub> , Ag <sub>2</sub> SO <sub>4</sub>
	less soluble
(c) Na <sub>2</sub> 0 + H <sub>2</sub> 0 →	$Cu_20 + H_20$
2NaOH	$\rightarrow$ Cu(OH) <sub>2</sub>
Strong base	Weak base
(d) also false	Thus, false

133 (a) MgO basic oxide ZnO amphoteric oxide Thus, Mg and Zn do not resemble in this behaviour 136 (d)  $Na_2CO_3 + SO_2 \rightarrow Na_2SO_3 + CO_2$ 137 (d) LiNO<sub>3</sub> on ignition imparts crimson red  $BaCl_2 \rightarrow green$  $(NH_4)_2 Cr_2 O_7 \rightarrow green (due to Cr_2 O_3)$ 139 (b)  $BaSO_4 + Na_2CO_3 \rightarrow Na_2SO_4 + BaCO_3$  $BaCO_3 \xrightarrow{\Delta} BaO + CO_2$ 142 (d) (a)Li<sub>2</sub>CO<sub>3</sub>  $\xrightarrow{\Delta}$  Li<sub>2</sub>O + CO<sub>2</sub>  $Na_2CO_3 \xrightarrow{\Delta} x$ Thus, (a) is true NaCl insoluble (b)LiCl solublein in ether but ether thus covalent soluble in H<sub>2</sub>O Thus, (b) is true thus ionic Na (c)Li forms nitride does not form Thus, (c) is true nitride 145 (d) Alkali metal carbonate are not decomposed on heating  $MgCO_3 \xrightarrow{\Delta} MgO + CO_2$ 146 **(b)** Larger the size, smaller the hydration energy 148 (a) *sp*-linear 150 (d) (d)  $2NaHCO_3 \xrightarrow{\Delta} Na_2CO_3 + H_2O + CO_2$ soluble in water HC1  $NaCl + H_2O + CO_2$  $Na_2CO_3 \xrightarrow{\Delta}$  no effect of heat  $CaCO_3 \xrightarrow{\Delta} CaO + CO_2$ HCl no  $CO_2$  $Ca(HCO_3)_2 \rightarrow CaCO_3$  $+ H_2 0 + C 0_2$ insoluble in water 151 (c)  $CaOCl_2 + H_2O \rightarrow Ca(OH)_2 + Cl_2$  $Cl_2 + H_2O \rightarrow HClO + HCl$ 152 (d)  $CaC_2 + H_2O \rightarrow Ca(OH)_2 + CH \equiv CH$ used to ripen fruits 153 (c)

 $Li_2CO_3$  and  $MgCO_3$  are decomposed by heating  $Li_2CO_3 \rightarrow Li_2O + CO_2$  $MgCO_3 \rightarrow MgO + CO_2$ 

# 155 **(b)**

(a) (s-block) (b) (p-block) (c)  $1s^2 2s^2$  in ground state – (s-block) and  $1s^2 2s^1 2p^1$  in excited state (d)  $[Ar]4s^2$  – ground state  $[Ar]4s^1 4p^1$  – excited state Thus, s-block

## 156 **(d)**

 $6CaOCl_2 \rightarrow 5CaCl_2 + Ca(ClO_3)_2$ 

# 171 **(a)**

The loosely held *s*-electron in the outermost valence shell of these elements makes them, the most electropositive metals which readily give ion's  $M^+$  or  $M^{2+}$ .

# 172 **(b)**

- 1. If Assertion is True, Reason is True, Reason is correct explanation of 1
- 2. If Assertion is True, Reason is True, Reason is not correct explanation of 1
- 3. If Assertion is True, Reason is False
- 4. If Assertion is False, Reason is True

## 173 **(d)**

Gypsum is added to coment to decrease its rate of

setting.

Gypsum is calcium sulphate dehydrate.

## 174 **(d)**

Radium is rarest of all *s*-block elements. Francium is radioactive. Its long lived isotope  $Fr^{223}$  has a half-life of only 21 min.

# 180 **(a)**

Solution 46-49 CaCO<sub>3</sub>  $\rightarrow$  CaO + CO<sub>2</sub> (A) (B) CaO + H<sub>2</sub>O  $\rightarrow$  Ca(OH)<sub>2</sub> (C) Ca(OH)<sub>2</sub> + CO<sub>2</sub>  $\rightarrow$  CaCO<sub>3</sub> (A) Ca(OH)<sub>2</sub> + NH<sub>4</sub>Cl  $\rightarrow$  NH<sub>3</sub> (D) NH<sub>3</sub> + CO<sub>2</sub> + H<sub>2</sub>O  $\rightarrow$  NH<sub>4</sub>HCO<sub>3</sub> (E) NH<sub>4</sub>HCO<sub>3</sub> + NaCl  $\rightarrow$  NaHCO<sub>3</sub> + NH<sub>4</sub>Cl (F)

