The s-Block Elements

1. The number of types of bonds between two carbon atoms in calcium carbide is **[AIEEE-2011]**

   (1) Two sigma, two pi

   (2) One sigma, two pi

   (3) One sigma, one pi

   (4) Two sigma, one pi

2. What is the best description of the change that occurs when $Na_2O(s)$ is dissolved in water? **[AIEEE-2011]**

   (1) Oxidation number of oxygen increases

   (2) Oxidation number of sodium decreases

   (3) Oxide ion accepts sharing in a pair of electrons

   (4) Oxide ion donates a pair of electrons

3. The products obtained on heating $LiNO_3$ will be **[AIEEE-2011]**

   (1) $Li_2O + NO + O_2$ (2) $LiNO_2 + O_2$

   (3) $Li_2O + NO_2 + O_2$ (4) $Li_3N + O_2$

4. Which of the following on thermal-decomposition yields a basic as well as an acidic oxide? **[AIEEE-2012]**

   (1) $KClO_3$ (2) $CaCO_3$

   (3) NH_4NO_3 (4) $NaNO_3$

5. The correct statement for the molecule, CsI_3, is **[JEE (Main)-2014]**

   (1) It is a covalent molecule

   (2) It contains Cs^+ and I_3^- ions

   (3) It contains Cs^{3+} and I^- ions

   (4) It contains Cs^+, I^- and lattice I_2 molecule

6. Which one of the following alkaline earth metal sulphates has its hydration enthalpy greater than its lattice enthalpy? **[JEE (Main)-2015]**

   (1) $CaSO_4$ (2) $BeSO_4$

   (3) $BaSO_4$ (4) $SrSO_4$

7. The main oxides formed on combustion of Li, Na and K in excesss of air are, respectively: **[JEE (Main)-2016]**

   (1) LiO_2, Na_2O_2 and K_2O

   (2) Li_2O_2, Na_2O_2 and KO_2

   (3) Li_2O, Na_2O_2 and KO_2

   (4) Li_2O, Na_2O and KO_2

8. Both lithium and magnesium display several similar properties due to the diagonal relationship, however, the one which is incorrect, is **[JEE (Main)-2017]**

   (1) Both form nitrides

   (2) Nitrates of both Li and Mg yield NO_2 and O_2 on heating

   (3) Both form basic carbonates

   (4) Both form soluble bicarbonates

9. The alkaline earth metal nitrate that does not crystallise with water molecules, is **[JEE (Main)-2019]**

   (1) $Ba(NO_3)_2$

   (2) $Ca(NO_3)_2$

   (3) $Mg(NO_3)_2$

   (4) $Sr(NO_3)_2$

10. The metal that forms nitride by reacting directly with N_2 of air, is **[JEE (Main)-2019]**

    (1) Li (2) Rb

    (3) Cs (4) K

11. The metal used for making X-ray tube window is **[JEE (Main)-2019]**

    (1) Ca (2) Na

    (3) Mg (4) Be

12. Sodium metal on dissolution in liquid ammonia gives a deep blue solution due to the formation of **[JEE (Main)-2019]**

(1) Ammoniated electrons

(2) Sodium-ammonia complex

(3) Sodium ion-ammonia complex

(4) Sodamide

13. NaH is an example of **[JEE (Main)-2019]**

(1) Metallic hydride

(2) Electron-rich hydride

(3) Molecular hydride

(4) Saline hydride

14. The amphoteric hydroxide is **[JEE (Main)-2019]**

(1) $Mg(OH)_2$ (2) $Be(OH)_2$

(3) $Sr(OH)_2$ (4) $Ca(OH)_2$

15. Match the following items in column I with the corresponding items in column II. **[JEE (Main)-2019]**

	Column-I		**Column-II**
(i)	$Na_2CO_3.10H_2O$	(A)	Portland cement ingredient
(ii)	$Mg(HCO_3)_2$	(B)	Castner-Kellner process
(iii)	NaOH	(C)	Solvay process
(iv)	$Ca_3Al_2O_6$	(D)	Temporary hardness

(1) (i)(B), (ii)(C), (iii)(A), (iv)(D)

(2) (i)(C), (ii)(D), (iii)(B), (iv)(A)

(3) (i)(D), (ii)(A), (iii)(B), (iv)(C)

(4) (i)(C), (ii)(B), (iii)(D), (iv)(A)

16. A metal on combustion in excess air forms X. X upon hydrolysis with water yields H_2O_2 and O_2 along with another product. The metal is **[JEE (Main)-2019]**

(1) Rb (2) Li

(3) Mg (4) Na

17. The correct order of hydration enthalpies of alkali metal ions is **[JEE (Main)-2019]**

(1) $Na^+ > Li^+ > K^+ > Rb^+ > Cs^+$

(2) $Li^+ > Na^+ > K^+ > Cs^+ > Rb^+$

(3) $Na^+ > Li^+ > K^+ > Cs^+ > Rb^+$

(4) $Li^+ > Na^+ > K^+ > Rb^+ > Cs^+$

18. Magnesium powder burns in air to give **[JEE (Main)-2019]**

(1) $Mg(NO_3)_2$ and Mg_3N_2

(2) MgO and $Mg(NO_3)_2$

(3) MgO and Mg_3N_2

(4) MgO only

19. The structures of beryllium chloride in the solid state and vapour phase, respectively, are **[JEE (Main)-2019]**

(1) Chain and dimeric

(2) Dimeric and dimeric

(3) Dimeric and chain

(4) Chain and chain

20. A hydrated solid X on heating initially gives a monohydrated compound Y. Y upon heating above 373 K leads to an anhydrous white powder Z. X and Z, respectively are : **[JEE (Main)-2019]**

(1) Baking soda and dead burnt plaster.

(2) Baking soda and soda ash.

(3) Washing soda and soda ash.

(4) Washing soda and dead burnt plaster.

21. The correct sequence of thermal stability of the following carbonates is : **[JEE (Main)-2019]**

(1) $MgCO_3 < CaCO_3 < SrCO_3 < BaCO_3$

(2) $BaCO_3 < SrCO_3 < CaCO_3 < MgCO_3$

(3) $MgCO_3 < SrCO_3 < CaCO_3 < BaCO_3$

(4) $BaCO_3 < CaCO_3 < SrCO_3 < MgCO_3$

22. The INCORRECT statement is **[JEE (Main)-2019]**

(1) Lithium is least reactive with water among the alkali metals.

(2) $LiNO_3$ decomposes on heating to give $LiNO_2$ and O_2.

(3) Lithium is the strongest reducing agent among the alkali metals.

(4) LiCl crystallises from aqueous solution as $LiCl.2H_2O$.

23. When gypsum is heated to 393 K, it forms **[JEE (Main)-2020]**

(1) Anhydrous $CaSO_4$

(2) Dead burnt plaster

(3) $CaSO_4 \cdot 5H_2O$

(4) $CaSO_4 \cdot 0.5H_2O$

24. Among the statements (a)-(d), the correct ones are

(a) Lithium has the highest hydration enthalpy among the alkali metals.

(b) Lithium chloride is insoluble in pyridine.

(c) Lithium cannot form ethynide upon its reaction with ethyne.

(d) Both lithium and magnesium react slowly with H_2O. **[JEE (Main)-2020]**

(1) (a), (c) and (d) only (2) (b) and (c) only

(3) (a), (b) and (d) only (4) (a) and (d) only

25. The metal mainly used in devising photoelectric cells is **[JEE (Main)-2020]**

(1) Na (2) Rb

(3) Li (4) Cs

26. Two elements A and B have similar chemical properties. They don't form solid hydrogencarbonates, but react with nitrogen to form nitrides. A and B, respectively, are **[JEE (Main)-2020]**

(1) Li and Mg (2) Cs and Ba

(3) Na and Rb (4) Na and Ca

27. If you spill a chemical toilet cleaning liquid on your hand, your first aid would be **[JEE (Main)-2020]**

(1) Aqueous NaOH

(2) Aqueous $NaHCO_3$

(3) Aqueous NH_3

(4) Vinegar

28. On combustion of Li, Na and K in excess of air, the major oxides formed, respectively, are **[JEE (Main)-2020]**

(1) Li_2O, Na_2O_2 and K_2O

(2) Li_2O_2, Na_2O_2 and K_2O_2

(3) Li_2O, Na_2O_2 and KO_2

(4) Li_2O, Na_2O and K_2O_2

29. An alkaline earth metal 'M' readily forms water soluble sulphate and water insoluble hydroxide. Its oxide MO is very stable to heat and does not have rock-salt structure. M is **[JEE (Main)-2020]**

(1) Ca (2) Mg

(3) Sr (4) Be

30. The equation that represents the water-gas shift reaction is **[JEE (Main)-2020]**

(1) $CH_4(g)+H_2O(g)\xrightarrow[Ni]{1270\ K}CO(g)+3H_2(g)$

(2) $CO(g)+H_2O(g)\xrightarrow[Catalyst]{673\ K}CO_2(g)+H_2(g)$

(3) $2C(s)+O_2(g)+4N_2(g)\xrightarrow{1273\ K}2CO(g)+4N_2(g)$

(4) $C(s)+H_2O(g)\xrightarrow{1270\ K}CO(g)+H_2(g)$

31. Among the sulphates of alkaline earth metals, the solubilities of $BeSO_4$ and $MgSO_4$ in water, respectively, are **[JEE (Main)-2020]**

(1) Poor and poor (2) Poor and high

(3) High and poor (4) High and high

32. Match the following compounds (Column-I) with their uses (Column-II)

S.No.	Column-I	S.No.	Column-II
(I)	$Ca(OH)_2$	(A)	casts of statues
(II)	NaCl	(B)	white wash
(III)	$CaSO_4\cdot\frac{1}{2}H_2O$	(C)	antacid
(IV)	$CaCO_3$	(D)	washing soda preparation

[JEE (Main)-2020]

(1) (I)-(B), (II)-(C), (III)-(D), (IV)-(A)

(2) (I)-(B), (II)-(D), (III)-(A), (IV)-(C)

(3) (I)-(C), (II)-(D), (III)-(B), (IV)-(A)

(4) (I)-(D), (II)-(A), (III)-(C), (IV)-(B)

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