Q1 - 24 January - Shift 2

Given below are two statements, one is labelled as **Assertion A** and the other is labelled as **Reason R.**

Assertion A : Beryllium has less negative value of reduction potential compared to the other alkaline earth metals.

Reason R : Beryllium has large hydration energy due to small size of Be^{2+} but relatively large value of atomization enthalpy.

In the light of the above statements, choose the most appropriate answer from the options given below.

(1) A is correct but R is not correct

(2) Both A and R are correct and R is the correct explanation of A.

(3) A is not correct but R is correct

(4) Both A and R are correct and R is NOT the correct explanation of A.

Space for your notes:

Q2 - 25 January - Shift 2

Given below are two statements, one is labelled as **Assertion A** and the other is labelled as **Reason R**

Assertion A :- Carbon forms two important oxides – CO and CO_2. CO is neutral whereas CO_2 is acidic in nature.

Reason R :- CO_2 can combine with water in a limited way to form carbonic acid, while CO is sparingly soluble in water.

In the light of the above statements, choose the most appropriate answer from the options given below :-

(1) Both A and R are correct but R is NOT the correct explanation of A.

(2) Both A and R are correct and R is the correct explanation of A.

(3) A is not correct but R is correct.

(4) A is correct but R is not correct.

Space for your notes:

Q3 - 29 January - Shift 2

Given below are two statements:

Statement I : The decrease in first ionization enthalpy from B to Al is much larger than that from Al to Ga.

Statement II : The d orbitals in Ga are completely filled.

In the light of the above statements, choose the most appropriate answer from the options given below

(1) Statement I is incorrect but statement II is correct.

(2) Both the statements I and II are correct

(3) Statement I is correct but statement II is incorrect

(4) Both the statements I and II are incorrect

Space for your notes:

Q4 - 30 January - Shift 1

Lithium aluminium hydride can be prepared from the reaction of

(1) LiCl and Al_2H_6

(2) LiH and Al_2Cl_6

(3) LiCl, Al and H_2

(4) LiH and $Al(OH)_3$

Space for your notes:

Q5 - 30 January - Shift 2

Boric acid in solid, whereas BF_3 is gas at room temperature because of

(1) Strong ionic bond in Boric acid

(2) Strong van der Waal's interaction in Boric acid

(3) Strong hydrogen bond in Boric acid

(4) Strong covalent bond in BF_3

Space for your notes:

Q6 - 31 January - Shift 2

The Lewis acid character of boron tri halides follows the order :

(1) $BBr_3 > BI_3 > BCl_3 > BF_3$

(2) $BCl_3 > BF_3 > BBr_3 > BI_3$

(3) $BF_3 > BCl_3 > BBr_3 > BI_3$

(4) $BI_3 > BBr_3 > BCl_3 > BF_3$

Space for your notes:

Q7 - 01 February - Shift 2

The correct order of bond enthalpy (kJ mol^{-1}) is

(1) Si – Si > C – C > Sn – Sn > Ge – Ge

(2) Si – Si > C – C > Ge – Ge > Sn – Sn

(3) C – C > Si – Si > Sn – Sn > Ge – Ge

(4) C – C > Si – Si > Ge – Ge > Sn – Sn

Space for your notes:

Answer Key

(As per Official NTA Key released on 2 Feb)

Q1 (2) **Q2** (2) **Q3** (2) **Q4** (2)

Q5 (3) **Q6** (4) **Q7** (4)

Q1 (2)

Be has less negative value compared to other AEM. However it's reducing nature is due to large hydration energy associated with the small size of Be^{2+} ion and relatively large value of the atomization enthalpy of metal.

Q2 (2)

The oxide which form acid on dissolving in water is acidic oxide.

Q3 (2)

The first ionization energies (as in NCERT) are as follows:

B : 801 kJ/mol

Al : 577 kJ/mol

Ga : 579 kJ/mol

Ga : $[Ar]3d^{10}4s^2 4p^1$

Q4 (2)

$$8LiH + Al_2Cl_6 \longrightarrow 2\,LiAlH_4 + 6\,LiCl$$

Q5 (3)

Boric acid has strong hydrogen bonding while BF_3

Q6 (4)

Extent of back bonding, reduces down the group leading to more Lewis acidic strength

$$\underset{(2p-2p)}{BF_3} > \underset{(2p-3p)}{BCl_3} > \underset{(2p-4p)}{BBr_3} > \underset{(2p-5p)}{BI_3}\ (\text{extent of back bonding})$$

$$BF_3 < BCl_3 < BBr_3 < BI_3\ (\text{lewis acidic nature})$$

Q7 (4)

(Bond enthalpy order

$C - C > Si - Si > Ge - Ge > Sn - Sn$)