Q1. 21 January Shift 1

Consider the following reactions.

$PbCl_2 + K_2CrO_4 \rightarrow A + 2KCl$

(Hot solution)

$A + NaOH \rightleftharpoons B + Na_2CrO_4$

$PbSO_4 + 4CH_3COONH_4 \rightarrow (NH_4)_2SO_4 + X$

In the above reactions, A, B and X are respectively.

(1) $Na_2[Pb(OH)_2], PbCrOO_4$ and $(NH_4)_2[Pb(CH_3COO)_4]$

(2) $Na_2[Pb(OH)_2], PbCrO_4$ and $[Pb(NH_3)_4]SO_4$

(3) $PbCrO_4, Na_2[Pb(OH)_4]$ and $(NH_4)_2[Pb(CH_3COO)_4]$

(4) $PbCrO_4, Na_2[Pb(OH)_4]$ and $[Pb(NH_3)_4]SO_4$

Q2. 21 January Shift 1

Given below are two statements :

Statement I : The number of pairs among $[SiO_2, CO_2]$, $[SnO, SnO_2]$, $[PbO, PbO_2]$ and $[GeO, GeO_2]$, which contain oxides that are both amphoteric is 2.

Statement II: BF_3 is an electron deficient molecule, can act as a Lewis acid, forms adduct with NH_3 and has a trigonal planar geometry.

In the light of the above statements, choose the correct answer from the options given below :

(1) Statement I is true but Statement II is false

(2) Both Statement I and Statement II are true

(3) Both Statement I and Statement II are false

(4) Statement I is false but Statement II is true

Q3. 22 January Shift 2

Given below are two statements :

Statement I: Elements ' X ' and ' Y ' are the most and least electronegative elements, respectively among N, As, Sb and P. The nature of the oxides X_2O_3 and Y_2O_3 is acidic and amphoteric, respectively.

Statement II : BCl_3 is covalent in nature and gets hydrolysed in water. It produces $[B(OH)_4]^-$ and $[B(H_2O)_6]^{3+}$ in aqueous medium.

In the light of the above statements, choose the correct answer from the options given below :

(1) Both Statement I and Statement II are false

(2) Both Statement I and Statement II are true

(3) Statement I is true but Statement II is false

(4) Statement I is false but Statement II is true

Q4. 23 January Shift 1

The correct statements from the following are :

A. Ionic radii of trivalent cations of group 13 elements decreases down the group.

B. Electronegativity of group 13 elements decreases down the group.

C. Among the group 13 elements, Boron has highest first ionisation enthalpy.

D. The trichloride and triiodide of group 13 elements are covalent in nature.

Choose the correct answer from the options given below :

(1) C and D Only (2) A and D Only (3) A and C Only (4) B and D Only

Q5. 23 January Shift 2

It is noticed that Pb^{2+} is more stable than Pb^{4+} but Sn^{2+} is less stable than Sn^{4+}. Observe the following reactions.

$PbO_2 + Pb \rightarrow 2PbO; \Delta_r G^\circ(1)$

$SnO_2 + Sn \rightarrow 2SnO; \Delta_r G^\circ(2)$

Identify the correct set from the following

(1) $\Delta_r G^\circ(1) < 0; \Delta_r G^\circ(2) < 0$ (2) $\Delta_r G^\circ(1) > 0; \Delta_r G^\circ(2) > 0$

(3) $\Delta_r G^\circ(1) < 0; \Delta_r G^\circ(2) > 0$ (4) $\Delta_r G^\circ(1) > 0; \Delta_r G^\circ(2) < 0$

Q6. 28 January Shift 2

Consider the following reactions

$Na_2B_4O_7 \xrightarrow{\Delta} 2X + Y$

$CuSO_4 + Y \xrightarrow{\text{Non-Luminous flame}} Z + SO_3$

$2Z + 2X + \text{Carbon} \xrightarrow{\text{Luminous flame}} 2Q + Na_2B_4O_7 + CO$

The oxidation states of Cu in Z and Q, respectively are :

(1) +1 and +1 (2) +2 and +2 (3) +1 and +2 (4) +2 and +1

ANSWER KEYS

1. (3) **2.** (2) **3.** (3) **4.** (1) **5.** (3) **6.** (4)