**Q1 - 25 July - Shift 1**

Match List - I with List - II

| List - I | | List - II | |
|---|---|---|---|
| (A) | $N_2(g)+3H_2(g) \rightarrow 2NH_3(g)$ | (I) | Cu |
| (B) | $CO(g)+3H_2(g) \rightarrow CH_4(g)+H_2O(g)$ | (II) | $Cu/ZnO-Cr_2O_3$ |
| (C) | $CO(g)+H_2(g) \rightarrow HCHO(g)$ | (III) | $Fe_xO_y+K_2O+Al_2O_3$ |
| (D) | $CO(g)+2H_2(g) \rightarrow CH_3OH(g)$ | (IV) | Ni |

Choose the correct answer from the options given below :

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

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

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

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

*Space for your notes:*

**Q2 - 25 July - Shift 1**

The geometry around boron in the product 'B' formed from the following reaction is

$$BF_3 + NaH \xrightarrow{450K} A + NaF$$

$$A + NMe_3 \rightarrow B$$

(A) trigonal planar (B) tetrahedral

(C) pyramidal (D) square planar

*Space for your notes:*

**Q3 - 26 July - Shift 1**

Borazine, also known as inorganic benzene, can be prepared by the reaction of 3-equivalents of "X" with 6-equivalents of "Y". "X" and "Y", respectively are :

(A) $B(OH)_3$ and $NH_3$ (B) $B_2H_6$ and $NH_3$

(C) $B_2H_6$ and $HN_3$ (D) $NH_3$ and $B_2O_3$

*Space for your notes:*

**Q4 - 26 July - Shift 2**

The metal that has very low melting point and its periodic position is closer to a metalloid is :

(A) Al (B) Ga

(C) Se (D) In

*Space for your notes:*

**Q5 - 26 July - Shift 2**

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

**Assertion A :** Boric acid is a weak acid

**Reason R :** Boric acid is not able to release $H^+$ ion on its own. It receives $OH^-$ ion from water and releases $H^+$ ion.

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

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

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

(C) A is correct but R is not correct

(D) A is not correct but R is correct

*Space for your notes:*

**Q6 - 27 July - Shift 1**

Given below are two statements:

**Statement I :** The chlorides of Be and Al have Cl-bridged structure. Both are soluble in organic solvents and act as Lewis bases.

**Statement II:** Hydroxides of Be and Al dissolve in excess alkali to give beryllate and aluminate ions.

In the light of the above statements. Choose the correct answer from the options given below.

(A) Both statement I and Statement II are true

(B) Both statement I and Statement II are false

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

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

*Space for your notes:*

Q7 - 27 July - Shift 2

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

**Assertion (A) :** Boron is unable to form $BF_6^{3-}$

**Reason (R) :** Size of B is very small.

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

(A) Both **(A)** and **(R)** are true and **(R)** is the correct explanation of **(A)**

(B) Both **(A)** and **(R)** are true but **(R)** is **not** the correct explanation of **(A)**

(C) **(A)** is true but **(R)** is false

(D) **(A)** is false but **(R)** is true

*Space for your notes:*

**Q8 - 29 July - Shift 2**

When borax is heated with CoO on a platinum loop, blue coloured bead formed is largely due to :

(A) $B_2O_3$ (B) $Co(BO_2)_2$

(C) $CoB_4O_7$ (D) $Co[B_4O_5(OH)_4]$

*Space for your notes:*

# Answer Key

**Q1** (C) **Q2** (B) **Q3** (B) **Q4** (B)

**Q5** (A) **Q6** (D) **Q7** (B) **Q8** (B)

Q1 (C)

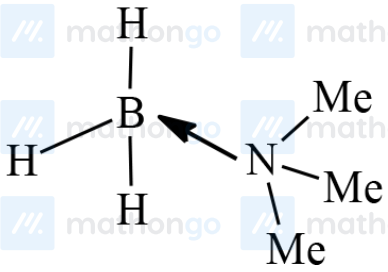
**Factual**

Q2 (B)

$$BF_3 + NaH \xrightarrow{450K} \underset{\text{(diborane)}}{B_2H_6} + NaF$$

$$B_2H_6 + NMe_3 \longrightarrow 2\left[BH_3 \leftarrow NMe_3\right]$$

symmetrical cleavage




Q3 (B)

$$3B_2H_6 + 6NH_3 \xrightarrow{\Delta} 2B_3N_3H_6 + 12\,H_2$$

Q4 (B)

**Melting point**

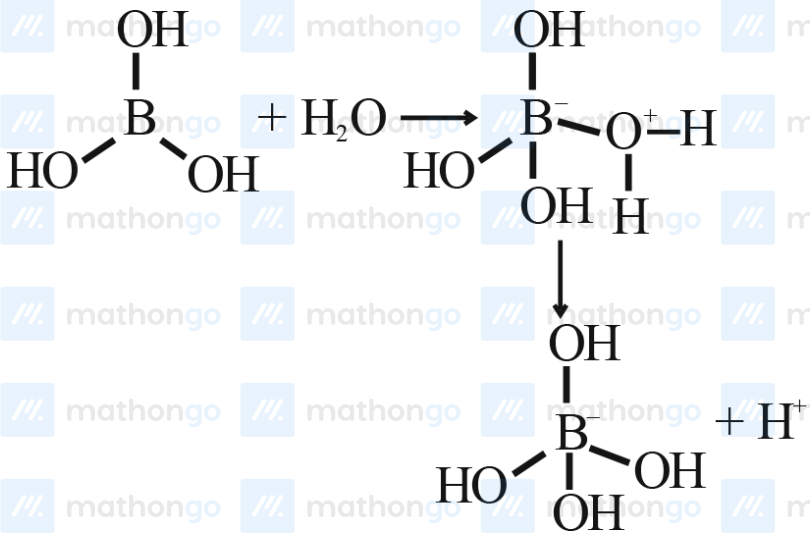
Al → 933 K

Ga → 303 K

In → 430 K

Se → 490 K

Q5 (A)



**Q6 (D)**

$Be_2Cl_4$ is lewis acid and $Al_2Cl_6$ has complete octet.

Be and Al are amphoteric metals therefore dissolve in acid as well as alkaline solution and form beryllate and aluminate ions in excess alkali.

**Q7 (B)**

**Assertion (A):** True

**Reason (R):** True but not correct explanation.

**Correct explanation:** Expansion of octet not possible for 'B'.

**Q8 (B)**

$$Na_2B_4O_7 \cdot 10H_2O \xrightarrow{\Delta} Na_2B_4O_7 + 10H_2O$$

$$Na_2B_4O_7 \xrightarrow{\Delta} 2NaBO_2(\text{sodium meta borate}) + B_2O_3$$

$$B_2O_3 + CoO \rightarrow Co(BO_2)_2(\text{cobalt (II) meta borate})$$

Blue Bead