Q1 - 24 January - Shift 1

The magnetic moment of a transition metal compound has been calculated to be 3.87 B.M. The metal ion is

(1) Cr^{2+} (2) Mn^{2+}

(3) V^{2+} (4) Ti^{2+}

Space for your notes:

Q2 - 24 January - Shift 1

An ammoniacal metal salt solution gives a brilliant red precipitate on addition of dimethylglyoxime.

The metal ion is :

(1) Cu^{2+}

(2) Co^{2+}

(3) Fe^{2+}

(4) Ni^{2+}

Space for your notes:

Q3 - 24 January - Shift 2

Which one amongst the following are good oxidizing agents?

A. Sm^{2+} B. Ce^{2+}

C. Ce^{4+} D. Tb^{4+}

Choose the most appropriate answer from the options given below :

(1) C only

(2) D only

(3) A and B only

(4) C and D only

Space for your notes:

Q4 - 24 January - Shift 2

$K_2Cr_2O_7$ paper acidified with dilute H_2SO_4 turns green when exposed to
(1) Carbon dioxide
(2) Sulphur trioxide
(3) Hydrogen sulphide
(4) Sulphur dioxide

Space for your notes:

Q5 - 25 January - Shift 2

Potassium dichromate acts as a strong oxidizing agent in acidic solution. During this process, the oxidation state changes from
(1) + 3 to + 1 (2) + 6 to + 3

Space for your notes:

Q6 - 29 January - Shift 1

During the borax bead test with $CuSO_4$, a blue green colour of the bead was observed in oxidising flame due to the formation of
(1) Cu_3B_2 (2) Cu
(3) $Cu(BO_2)_2$ (4) CuO

Space for your notes:

Q7 - 29 January - Shift 2

The set of correct statements is:
(i) Manganese exhibits +7 oxidation state in its oxide.
(ii) Ruthenium and Osmium exhibit +8 oxidation in their oxides.
(iii) Sc shows +4 oxidation state which is oxidizing in nature.
(iv) Cr shows oxidising nature in +6 oxidation state.
(1) (ii) and (iii) (2) (i), (ii) and (iv)
(3) (i) and (iii) (4) (ii), (iii) and (iv)

Space for your notes:

Q8 - 29 January - Shift 2

A solution of CrO_5 in amyl alcohol has a….colour

(1) Green (2) Orange–Red

(3) Yellow (4) Blue

Space for your notes:

Q9 - 30 January - Shift 1

During the qualitative analysis of SO_3^{2-} using dilute H_2SO_4, SO_2 gas is evolved which turns $K_2Cr_2O_7$ solution (acidified with dilute H_2SO_4):

(1) Black (2) Red

(3) Green (4) Blue

Space for your notes:

Q10 - 31 January - Shift 1

When Cu^{2+} ion is treated with KI, a white precipitate, X appears in solution. The solution is titrated with sodium thiosulphate, the compound Y is formed. X and Y respectively are

(1) X = Cu_2I_2 Y=$Na_2S_4O_5$

(2) X=Cu_2I_2 Y=$Na_2S_4O_6$

(3) X=CuI_2 Y=$Na_2S_4O_3$

(4) X=CuI_2 Y=$Na_2S_4O_6$

Space for your notes:

Q11 - 31 January - Shift 1

The correct order of basicity of oxides of vanadium is

(1) $V_2O_3 > V_2O_4 > V_2O_5$

(2) $V_2O_3 > V_2O_5 > V_2O_4$

(3) $V_2O_5 > V_2O_4 > V_2O_3$

(4) $V_2O_4 > V_2O_3 > V_2O_5$

Space for your notes:

Q12 - 01 February - Shift 1

Highest oxidation state of Mn is exhibited in Mn_2O_7. The correct statements about Mn_2O_7 are

(A) Mn is tetrahedrally surrounded by oxygen atoms

(B) Mn is octahedrally surrounded by oxygen atoms

(C) Contains Mn-O-Mn bridge

(D) Contains Mn-Mn bond.

Choose the correct answer from the options given below

(1) A and C only (2) A and D only

(3) B and D only (4) B and C only

Space for your notes:

Q13 - 01 February - Shift 1

A solution of $FeCl_3$ when treated with $K_4[Fe(CN)_6]$ gives a prussiun blue precipitate due to the formation of

(1) $K[Fe_2(CN)_6]$

(2) $Fe[Fe(CN)_6]$

(3) $Fe_3[Fe(CN)_6]_2$

(4) $Fe_4[Fe(CN)_6]_3$

Space for your notes:

Q14 - 01 February - Shift 1

Which of the following are the example of double salt?

(A) $FeSO_4.(NH_4)_2SO_4.6H_2O$

(B) $CuSO_4.4NH_3.H_2O$

(C) $K_2SO_4.Al_2(SO_4)_3.24H_2O$

(D) $Fe(CN)_2.4KCN$

Choose the correct answer.

(1) A and C only

(2) A and B only

(3) A, B and D only

(4) B and D only

Space for your notes:

Q15 - 01 February - Shift 2

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

Assertion (A) : Cu^{2+} in water is more stable than Cu^{+}.

Reason (R) : Enthalpy of hydration for Cu^{2+} is much less than that of Cu^{+}.

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

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

(2) **(A)** is correct but **(R)** is not correct.

(3) **(1)** is not correct but **(R)** is correct.

(4) Both **(A)** and **(R)** are correct but **(R)** is **not** the correct explanation of **(A)**.

Space for your notes:

Q16 - 01 February - Shift 2

Which element is not present in Nessler's reagent ?

(1) Mercury

(2) Potassium

(3) Iodine

(4) Oxygen

Space for your notes:

Answer Key

(As per Official NTA Key released on 2 Feb)

Q1 (3)	**Q2** (4)	**Q3** (4)	**Q4** (4)
Q5 (2)	**Q6** (3)	**Q7** (2)	**Q8** (4)
Q9 (3)	**Q10** (2)	**Q11** (1)	**Q12** (1)
Q13 (4)	**Q14** (1)	**Q15** (1)	**Q16** (4)

Q1 (3)

Cr^{+2} : [Ar], $3d^4$, $4s^0$ $n = 4$, $\mu = \sqrt{4(4+2)} = \sqrt{24}$

$= 4.89$ BM

Mn^{+2} : [Ar], $3d^5$, $4s^0$ $n = 5$, $\mu = \sqrt{5(5+2)} = \sqrt{35}$

$= 5.91$ BM

V^{+2} : [Ar], $3d^3$, $4s^0$ $n = 3$, $\mu = \sqrt{3(3+2)} = \sqrt{15}$

$= 3.87$ BM

Ti^{+2} : [Ar], $3d^2$, $4s^0$ $n = 2$, $\mu = \sqrt{2(2+2)} = \sqrt{8}$

$= 2.82$ BM

Q2 (4)

$$Ni^{+2} + 2DMG \longrightarrow [Ni(DMG)_2]$$

Rosy Red complex

Q3 (4)

Ce^{+4} and Tb^{+4} act as oxidising agent

Q4 (4)

$$3SO_2 + Cr_2O_7^{2-} + 2H^+ \rightarrow 3SO_4^{2-} + 2Cr^{+3} + H_2O$$

green

Q5 (2)

(3) + 2 to + 1 (4) + 6 to + 2

$$14H^+ + 6e^- + \underset{+6}{Cr_2O_7^{-2}} \longrightarrow 2\underset{+3}{Cr^{+3}} + 7H_2O$$

Q6 (3)

Blue green colour is due to formation of $Cu(BO_2)_2$

$CuSO_4 \xrightarrow{\Delta} CuO + SO_3$

$CuO + B_2O_3 \rightarrow Cu(BO_2)_2$

Q7 (2)

(i), (ii) and (iv) correct.

Manganese exhibits +7 oxidation state in its oxide. (Mn_2O_7)

Ru & Os from RuO_4 & OsO_4 oxide in +8 oxidation state

Cr in +6 oxidation act is oxidizing.

Sc does not show +4 oxidation state.

Q8 (4)

A solution of CrO_5 in amyl alcohol has a blue colour. So, option (4) is correct.

Q9 (3)

$$Cr_2O_7^{2-} + SO_3^{2-} \xrightarrow{H^+} Cr^{3+} + SO_4^{2-}$$

Q10 (2)

$$Cu^{2+} + 2KI \longrightarrow \underset{\text{Unstable}}{CuI_2} \downarrow + 2K^+$$

I^- is strong R.A it reduces Cu^{2+} to Cu

$$2CuI_2 \longrightarrow \underset{\text{(White) 'X'}}{Cu_2I_2} \downarrow + I_2$$

$$KI + I_2 \longrightarrow K^+I_3^- \text{(Brown solution)}$$

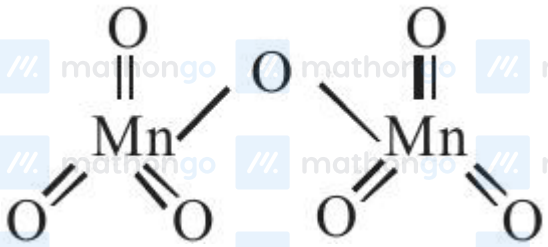
$$I_3^- \rightleftharpoons I_2 + I^-$$

$$KI_3 + Na_2S_2O_3 \rightarrow KI + \underset{(Y)}{Na_2S_4O_6}$$

Q11 (1)

With increase in % of oxygen acidic nature of oxide of an element increase and basic nature decreases

Q12 (1)



Q13 (4)

Formation of Prussian blue complex takes place

Q14 (1)

Double salt contain's two or more types of salts.

$CuSO_4.4NH_3.H_2O$ and $Fe(CN)_2.4KCN$ are complex compounds.

Q15 (1)

$2Cu^{+} \rightarrow Cu^{2+} + Cu$

The stability of $Cu^{2+}(aq)$ rather than $Cu^{+}(aq)$, is due to the much more negative $\Delta_{hyd}H$ of $Cu^{2+}(aq)$ than $Cu^{+}(aq)$, which more than compensates for the second ionisation enthalpy of Cu.

Q16 (4)

(Nessler's Reagent $\rightarrow K_2[HgI_4]$