TEST-B

SOLVED

Time: 1 hr. **Max. Marks: 30**

SECTION-A

Tick the correct option:

1. In the reaction $MnO_2 \xrightarrow[\text{with air or } KNO_3]{\text{fuse with KOH oxidise}} A$. What is A? **[1]**

   (i) MnO_4^- (ii) MnO_4^{2-} (iii) Mn^{2+} (iv) $Mn(OH)_4^{2-}$

2. The incorrect statement is **[1]**

   (i) The stability of higher oxidation states increases down the group in d-block

   (ii) $K_2Cr_2O_7$ is a stronger oxidising agent than K_2CrO_4

   (iii) In the 3d series, magnanese has the lowest melting point.

   (iv) In the 3d series, only copper is known to show + 1 oxidation state

3. When H_2S gas is passed through acidified potassium permanganate **[1]**

   (i) MnO_2 is formed (ii) Colloidal sulphur is formed

   (iii) $MnSO_4$ is formed (iv) K_2MnO_4 is formed

Assertion-Reason type Questions:

(i) If assertion and reason both are correct and reason is the correct explanation of assertion.

(ii) If assertion and reason both are correct and reason is not the correct explanation of assertion.

(iii) If assertion is correct and reason is wrong.

(iv) If assertion is wrong and reason is correct.

4. Assertion: 5d series elements have higher enthalpy of atomisation than 3d or 4d series elements. **[1]**

   Reason: There exist more frequent metal-metal bond as we move down the group in the d-block.

5. Assertion: $E^o_{Cr^{3+}/Cr^{2+}}$ is much greater than $E^o_{Fe^{3+}/Fe^{2+}}$ **[1]**

   Reason: Cr^{3+} ion has half-filled t_{2g}^3 configuration, more stable than $3d^5$ configuration in Fe^{3+}.

One word /One Sentence type Questions.

6. Name one oxometal anion in which the oxidation state of the metal is same as its group number. **[1]**

7. Which divalent cation in the 3d series has highest value of the magnetic moment? and how much? **[1]**

SECTION-B

8. Account for the following: **[2]**
   (i) Zr and Hf occur together in the earth crust in their minerals
   (ii) Zn, Cd and Hg are not considered as transition metals.
9. Give reason: **[2]**
   (i) Lu^{3+} and La^{3+} both are colourless and diamagnetic ions
   (ii) All 5d series elements have a higher ionisation enthalpy than 3d or 4d series elements.
10. (i) Calculate the magnetic moment of a divalent cation whose atomic number is 28. **[2]**
    (ii) Given: $E^{o}_{Mn^{3+}/Mn^{2+}} = +1.50\,V,\ E^{o}_{Cr^{3+}/Cr^{2+}} = -0.9V < E^{o}_{Fe^{3+}/Fe^{2+}} = +0.77V$

    Arrange the metals in order of increasing stability of +3 oxidation state.
11. Explain the following: **[2]**
    (i) Tranistion metals are used in the formation of interstitial compounds.
    (ii) Of all the divalent cation of 3d series, only copper has a positive E° value. i.e., $E^{o}_{Cu^{2+}/Cu} = +0.34\,V$
12. What happens when (give chemical equations only) **[3]**
    (i) Pyrolusite ore is fused with caustic potash.
    (ii) green colour solution of potassium manganate is being acidified.
    (iii) sulphur dioxide is passed through acidified potassium dichromate solution.
13. Account for the following: **[3]**
    (i) Transition metals are used in the alloy formation.
    (ii) Eu(II) compounds are strongly reducing.
    (iii) $E^{o}_{M^{2+}/M}$ values in the 3d series do not follow regular trend.
14. (i) An atom forms an ion by the loss of three electrons. The electronic configuration of the ion is $1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^6\ 3d^6$. What is the symbol of the ion? **[3]**
    (ii) Transition metals shows their highest oxidation states in oxides and fluorides. Explain.
    (iii) Which element in the 3d series shows a highest oxidation state and in which compound?
15. (a) Chromite ore (A) on fusion with sodium carbonate gives a yellow colour solution (B) which on acidification with dil.H_2SO_4 turns orange due to formation of compound (C). What are (A), (B) and (C)? Write all possible chemical equation involved.
    (b) Arrange the following in order of increasing oxidising power:

    $CrO_4^{2-},\ Cr_2O_7^{2-},\ VO_2^{+},\ MnO_4^{-}$

    (c) Why is cupric iodide unstable? **[3+1+1]**