INDIAN SCHOOL DARSAIT

DEPARTMENT OF CHEMISTRY

Subject: Chemistry Topic : d and f Block Elements Date of Worksheet: 26.11.2017

Resource Person: SREEKALA M Date of Submission:_____

Name of the Student: _____ Class &Division: XII Roll Number: _____

1.	Compare the relative stability of +2 oxidation states in aqueous solutions of the metals having in their atoms the outer electron configurations, $3d^3\ 4s^2$, $3d^6\ 4s^2$ and $3d^5 4s^2$	1
2.	How many unpaired electrons are present in Mn^{2+} ion? (At. No. of Mn =25). How does it influence magnetic behavior of Mn^{2+} ions?	1
3.	Out of Ag_2SO_4, CuF_2, MgF_2, and CuCl, which compound will be coloured and why?	1
4.	What is Misch metal ? Mention two of its important uses.	1
5.	Calculate the spin only magnetic moment of M^{2+} ion. (Z=27)	1
6.	Complete the following chemical equations.. i) $Cr_2O_7^{2-} + H^+ + Fe^{2+} \rightarrow$ ii) $MnO_4^- + I^- + H^+ \rightarrow$ iii) $Cr_2O_7^{2-}(aq) + C_2O_4^{2-}(aq) + H^+(aq) \rightarrow$ iv) $MnO_4^-(aq) + Fe^{2+}(aq) + H^+(aq) \rightarrow$ v) $Cr_2O_7^{2-}(aq) + H_2S + H^+(aq) \rightarrow$ vi) $CrO_4^{2-} + H^+ \xrightarrow{\text{heat}}$ vii) $KMnO_4$ ---------->	1 each
7.	Describe the preparation of i) Potassium dichromate from sodium chromate ii) $KMnO_4$ from K_2MnO_4	2
8.	What is lanthanoid contraction? State the cause and two consequences of lanthanoid contraction.	2

9.	Transition metal can act as catalyst because these can change their oxidation state. How does Fe(III) catalyse the reaction between iodide and persulphate ions?	2
10.	Write chemical equations for the following reactions. i)Oxidation of nitrite ion by MnO_4^- in acidic medium. ii)Acidification of potassium chromate solution. iii)Disproportionation of manganese(VI) in acidic solution.	3
11.	A mixed oxide of iron and Chromium is fused with sodium carbonate in the presence of air to form a coloured compound A. On acidification the compound (A) forms an orange coloured compound (B), which is a strong oxidizing agent. i) Identify the compounds(A) and (B) ii)Write balanced chemical equation for each step	3
12.	Compare actinoids and lanthanoids with reference to their i) Electronic configuration of atoms ii) Oxidation states of elements iii) General chemical reactivity of elements.	3
13.	a) Which is stronger reducing agent Cr^{2+} or Fe^{2+} and why? b) Describe the oxidizing property of $KMnO_4$ in neutral or faintly alkaline medium for its reaction with iodide ions and thiosulphate ions.	5
14.	a)A blackish brown coloured solid 'A' when fused with alkali metal hydroxides in the presence of air, produces a dark green coloured compound 'B' which on electrolytic oxidation in alkaline medium gives a dark purple coloured compound C. Identify A,B,C and write the reactions involved. b) What happens when an acidic solution of the green compound (B) is allowed to stand for some time? Give the equation involved. What is this type of reaction called?	5

Account for the following:

1.	The transition elements have great tendency for complex formation
2.	There is a gradual decrease in the atomic sizes of transition elements in a series with increasing atomic numbers.
3.	Lanthanum and Lutetium do not show colouration in solutions.
4.	The enthalpies of atomization of transition elements are quite high.
5.	There is a greater horizontal similarity in the properties of the transition elements than of the main group elements.
6.	Transition metals acts as catalyst
7.	Chromium group elements have the highest melting points in their respective series.
8.	Transition metals form coloured complexes.
9.	With the same d-orbital configuration (d^4) Cr^{2+} ion is a reducing agent while Mn^{3+} ion is an oxidizing agent.
10.	Cu^{+} ion is not stable in aqueous solution.
11.	Among the 3d series of transition elements, the largest number of oxidation states are exhibited by manganese.
12.	Metal-metal bonding is more extensive in the 4d and 5d series of transition elements than the 3d series.
13.	Mn(III) undergoes disproportionation reaction easily.
14.	Co(II) is easily oxidized in the presence of strong ligands.
15.	Zr and Hf have identical sizes.
16.	The lowest oxidation state of manganese is basic while the highest is acidic.
17.	Mn(II) shows maximum paramagnetic character amongst the divalent ions of the first transition series.
18.	Ce^{+4} a strong oxidizing agent
19.	Oxidising power in the series $VO^{2+} < Cr_2O_7^{2-} < MnO_4$
20.	Actinoid contraction is greater from element to element than lanthanoid contraction.
21.	Oxo anions of a metal show higher oxidation state.
22.	Europium(II) is more stable than Cerium(II)
23.	In the titration of $FeSO_4$ with $KMnO_4$, in the acidic medium, why dilute H_2SO_4 used instead of HCl.
24.	Transition metals from a number of interstitial compounds.
25.	Zn^{2+} salts are white while Cu^{2+} salts are blue.
26.	Among the lanthanoids, Ce(III) is easily oxidized to Ce(IV).
27.	Fe^{3+}/Fe^{2+} redox couple has less positive electrode potential than Mn^{3+}/Mn^{2+} couple.
28.	Copper (I) has d^{10} configuration, while Cu(II) has d^9 configuration, still Cu(II) is more stable in aqueous solution than Cu(I).
29.	The second and third transition series elements have almost similar atomic radii.