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D and F Block Elements-Assignment

1) Which of the following element will exhibit similar magnetic behaviour and why? Magnesium, Iron, chromium and Molybdenum

2) Which of the following elements will forms white salts and why? Zinc, Scandium, Nickel and Vanadium

3) Give reasons for the following statements

i) Copper does not displace hydrogen from its acids

ii) Transitions metals and most of their compounds shows paramagnetic behaviour

iii) Zn, Cd and Hg are soft metals

iv) Zinc is not regarded as transition element

v) Cr^{2+} is reducing while Mn^{3+} is oxidising though both have d^4 configuration

vi) Transition metals and their compounds are known for their catalytic activity

vii) Give two similar properties of Zic and Scandium

viii) Standard electrode potentials of Ni, Fe and Zn is -0.25 ,-0.44 and -0.76V

4) **Answer the following**

i) Why is the E0 (M3+| M2+) value for vanadium is comparatively low

ii) Why HCl is not used in the titration of potassium permanganate

iii) What is the effect of PH on dichromate solution

iv) The highest oxidation state of a metal is shown in its oxides and fluoride only. Justify the statement

v) Mn2+ is much more resistant than Fe2+ for oxidation

vi) Chromium has higher melting point than Magnese

vii) Ti(IV) is more stable than Ti(II) and Ti (III)

viii) Transition metals acts as a good catalyst

ix) First IE of first of 5d elements are higher than those of 3d and 4d elements

5) Which one of the following would feel more attraction when placed in magnetic field? Co2+, Ag+, Ti^{4+},Zn^{2+}

6) Cu+ ion is not stable in aqueous solution

7) La (OH)3 is stronger base than Lu (OH)3

8) D block elements formed coloured ions. Explain

9) Complete the following chemical equations

(i) MnO_4 (aq) + $S_2O_3^{2-}$ (aq) + H_2O (1) →

(ii) $Cr_2O_7^{2-}$ (aq) + Fe_{2+} (aq) + H_+ (aq) →

10) What are Misch metals and coinage metals

11) Discuss method of preparation of Potassium Dichromate and Potassium Permanganate
12) Silver atom has completely filled d orbitals ($4d^{10}$) in its ground state. How can you say that it is a transition element?
13) Which of the 3d series of the transition metals exhibits the largest number of oxidation states and why?
14) How would you account for the irregular variation of ionization enthalpies (first and second) in the first series of the transition elements?
15) Calculate the 'spin only' magnetic moment of $M^{2+}(aq)$ ion (Z = 27).
16) Actinoid contraction is greater from element to element than lanthanoid contraction. Why?
17) To what extent do the electronic configurations decide the stability of oxidation states in the first series of the transition elements? Illustrate your answer with examples.
18) Name the oxometal anions of the first series of the transition metals in which the metal exhibits the oxidation state equal to its group number.
19) What is lanthanoid contraction? What are the consequences of lanthanoid contraction?
20) In what way are the electronic configuration of the transition elements different from non-transition elements?
21) What are the different oxidation states exhibited by the lanthanoids?
22) Explain giving reasons:
    (i)Transition metals and many of their compounds show paramagnetic behaviour.
    (ii)The enthalpies of atomisation of the transition metals are high.
    (iii)The transition metals generally form coloured compounds.
    (iv)Transition metals and their many compounds act as good catalyst
23) For M^{2+}/M and M^{3+}/M^{2+} systems the E° values
    for some metals are as follows:
    Cr^{2+}/Cr –> -0.9 V
    Mn^{2+}/Mn –> -1.2V
    Fe^{2+}/Fe –> -0.4 V
    Cr^{3+}/Cr^{2+} –> -0.4 V
    Mn^{3+}/Mn^{2+} –>+ 1.5V
    Fe^{3+}/Fe^{2+} –>+ 0.8V
    (ii)the ease with which iron can be oxidised as compared to a similar process for either chromium or manganese metal.
24) What is meant by disproportionation? Give two examples of disproportionation reaction in aqueous solution

25) Calculate the number of unpaired electrons in the following gaseous ions : Mn^{3+}, Cr^{3+}, V^{3+} and Ti^{3+}. Which one of these is the most stable in aqueous solution.

26) Give examples and suggest reasons for the following features of the transition metal chemistry:

(i) The lowest oxide of transition metal is basic the highest is amphoteric/ acidic.

(ii) A transition metal exhibits highest oxidation state ih oxides and fluorides.

(iii) The highest oxidation state is exhibited in oxoanions of a metal.

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