**Holiday home Work for autumn break**

**Class XII**

**p- block**

Q1. Do NCERT example and intext questions.

Q2. Do the following questions.

1. Justify the placement of O, S, Se, Te and Po in the same group of the periodic table in terms of electronic configuration, oxidation state and hydride formation.
2. Why is dioxygen a gas but sulphur a solid?
3. Knowing the electron gain enthalpy values for O O– and O O2– as –141 and 702 kJ mol–1 respectively, how can your account for the formation of a large number of oxides having O2– species and not O–?  
   (Consider lattice energy factor in the formation of compounds).
4. Which aerosols deplete ozone?
5. Describe the manufacture of H2SO4 by contact process?
6. How is SO2 an air pollutant?
7. Why are halogens strong oxidising agents?
8. Explain why fluorine forms only one oxoacid, HOF.
9. Explain why inspite of nearly the same electronegativity, nitrogen forms hydrogen bonding while chlorine does not.
10. Write two uses of ClO2.
11. Why are halogens coloured?
12. Write the reactions of F2 and Cl2 with water.
13. How can you prepare Cl2 from HCl and HCl from Cl2? Write reactions only.
14. What inspired N. Bartlett for carrying out reaction between Xe and PtF6?
15. What are the oxidation states of phosphorus in the following:  
    (i) H3PO3 (ii) PCl3 (iii) Ca3P2 (iv) Na3PO4 (v) POF3?
16. Write balanced equations for the following:  
    (i) NaCl is heated with sulphuric acid in the presence of MnO2.  
    (ii) Chlorine gas is passed into a solution of NaI in water.
17. How are xenon fluorides XeF2, XeF4 and XeF6 obtained?
18. With what neutral molecule is ClO– isoelectronic? Is that molecule a Lewis base?
19. How are XeO3 and XeOF4 prepared?
20. Arrange the following in the order of property indicated for each set:  
    (i) F2, Cl2, Br2, I2 - increasing bond dissociation enthalpy.  
    (ii) HF, HCl, HBr, HI - increasing acid strength.  
    (iii) NH3, PH3, AsH3, SbH3, BiH3 – increasing base strength.
21. Which one of the following does not exist?  
    (i) XeOF4 (ii) NeF2 (iii) XeF2 (iv) XeF6
22. Give the formula and describe the structure of a noble gas species which is isostructural with:  
    (i) ICl4– (ii) IBr2– (iii) BrO3–
23. Why do noble gases have comparatively large atomic sizes?
24. List the uses of neon and argon gases.

**d- and f- block**

Q1. Do NCERT example and intext questions.

Q2. Do the following questions.

1. Write down the electronic configuration of:  
   (i) Cr3+ (iii) Cu+ (v) Co2+ (vii) Mn2+ (ii) Pm3+ (iv) Ce4+ (vi) Lu2+ (viii) Th4+
2. Why are Mn2+ compounds more stable than Fe2+ towards oxidation to their +3 state?
3. Explain briefly how +2 state becomes more and more stable in the first half of the first row transition elements with increasing atomic number?
4. 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.
5. What may be the stable oxidation state of the transition element with the following *d* electron configurations in the ground state of their atoms : 3*d*3, 3*d*5, 3*d*8 and 3*d*4?
6. 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.
7. What is lanthanoid contraction? What are the consequences of lanthanoid contraction?
8. What are the characteristics of the transition elements and why are they called transition elements? Which of the *d*-block elements may not be regarded as the transition elements?
9. In what way is the electronic configuration of the transition elements different from that of the non transition elements?
10. What are the different oxidation states exhibited by the lanthanoids?
11. 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.
12. What are interstitial compounds? Why are such compounds well known for transition metals?
13. How is the variability in oxidation states of transition metals different from that of the non transition metals? Illustrate with examples.
14. Describe the preparation of potassium dichromate from iron chromite ore.What is the effect of increasing pH on a solution of potassium dichromate?
15. Describe the oxidising action of potassium dichromate and write the ionic equations for its reaction with:  
    (i) iodide (ii) iron(II) solution and (iii) H2S
16. Describe the preparation of potassium permanganate. How does the acidified permanganate solution react with (i) iron(II) ions (ii) SO2 and (iii) oxalic acid? Write the ionic equations for the reactions.
17. For M2+/M and M3+/M2+ systems the *E*V values for some metals are as follows:  
    Cr2+/Cr -0.9V Cr3/Cr2+ -0.4 V  
    Mn2+/Mn -1.2V Mn3+/Mn2+ +1.5 V  
    Fe2+/Fe -0.4V Fe3+/Fe2+ +0.8 V

Use this data to comment upon:  
(i) the stability of Fe3+ in acid solution as compared to that of Cr3+ or Mn3+ and  
(ii) the ease with which iron can be oxidised as compared to a similar process  
for either chromium or manganese metal.

1. Predict which of the following will be coloured in aqueous solution? Ti3+, V3+, Cu+, Sc3+, Mn2+, Fe3+ and Co2+. Give reasons for each.
2. Compare the stability of +2 oxidation state for the elements of the first transition series.
3. Compare the chemistry of actinoids with that of the lanthanoids with special reference to:  
   (i) electronic configuration (iii) oxidation state (ii) atomic and ionic sizes and (iv) chemical reactivity.
4. How would you account for the following:  
   (i) Of the *d*4 species, Cr2+ is strongly reducing while manganese(III) is strongly oxidising.  
   (ii) Cobalt(II) is stable in aqueous solution but in the presence of complexing reagents it is easily oxidised.  
   (iii) The *d*1 configuration is very unstable in ions.
5. What is meant by ‘disproportionation’? Give two examples of disproportionation reaction in aqueous solution.
6. Which metal in the first series of transition metals exhibits +1 oxidation state most frequently and why?
7. Calculate the number of unpaired electrons in the following gaseous ions: Mn3+, Cr3+, V3+ and Ti3+. Which one of these is the most stable in aqueous solution?
8. 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 in oxides and fluorides.  
   (iii) The highest oxidation state is exhibited in oxoanions of a metal
9. Indicate the steps in the preparation of:  
   (i) K2Cr2O7 from chromite ore. (ii) KMnO4 from pyrolusite ore.
10. What are alloys? Name an important alloy which contains some of the lanthanoid metals. Mention its uses.
11. What are inner transition elements? Decide which of the following atomic numbers the atomic numbers of the inner transition elements are: 29, 59, 74, 95, 102, 104.
12. The chemistry of the actinoid elements is not as smooth as that of the lanthanoids. Justify this statement by giving some examples from the oxidation state of these elements.
13. Which is the last element in the series of the actinoids? Write the electronic configuration of this element. Comment on the possible oxidation state of this element.