CHEMISTRY

BOOKS - OSWAAL PUBLICATION CHEMISTRY (KANNADA ENGLISH)

P - BLOCK ELEMENTS

Topic 1 Group 15 Elements Their Properties And Some Important Compounds Very Short Answer Type Questions

1. How is bond order related to stability of molecules ?

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2. Write the reaction of thermal decomposition of sodium azide.

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3. Why does ammonia acts as a lew is base ? Given an example.

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4. Why does PCl_3, fume in moist air?

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5. PCl_5 is ionic in nature in the solid state. Give reasons.

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6. H_3PO_3 is diprotic (or dibasic). Why?

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7. NCl_3 gets readily hydrolysed while NF_3 does not. Why?

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8. What is the basicity of H_3PO_3?

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9. Why does NH_3 act as a Lewis base?

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10. Why does PCl_3, fume in moist air?

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11. Though nitrogen exhibit +5 oxidiation state, it does not form pentahalide. Why?

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12. Write the structural formula of $PCl_{5\,(s)}$.

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13. Draw the structure of H_3PO_2 molecule.

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14. Which one of PCl_4^+ and PCl_4^- is not likely to exist and why?

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15. Of PH_3 and H_2S which is more acidic and why?

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16. What is the basicity of H_3PO_2 acid and why?

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17. Complete the following chemical reaction equations $P_4 + SO_2Cl_2 \rightarrow$

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18. Complete the following equation -

$Cu + HNO_3 \quad (\text{dilute}) \rightarrow$

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19. Complete the following chemical equations :

$NH_4Cl_{(aq)} + NaNO_{2(aq)} -$

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20. Which is a stronger reducing agent, SbH_3 or BiH_3 and Why?

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21. Complete the following chemical equation -

$HgCl_2 + PH_3 \rightarrow$

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22. What is the covalency of nitrogen in N_2O_5?

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23. Why does NO_2 dimerise?

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Topic 1 Group 15 Elements Their Properties And Some Important Compounds Short Answer Type Questions

1. How does concentrated H_2SO_4 react with PCl_5?

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2. Give the resonating structures of NO_2 and N_2O_5.

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3. Write main difference between the properties of white phosphorus and red phosphorus.

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4. Write a note on the anomalous properties of Nitrogen.

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5. The HNH angle value is higher than HPH, HASH and HSbH angles. Why ?

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6. Why does $R_3P = O$ exist but $R_3N = O$ does not (R = alkyl group) ?

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7. Explain why NH_3 is basic while BiH_3 is only feebly basic ?

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8. Nitrogen exist diatomic molecule and phosphorus as P_4. Why ?

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9. Why does nitrogen show catenation properties less than phosphorus ?

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10. Give reasons for the following :

(i) Nitric oxide becomes brown when released in air.

(ii) Solid phosphorus pentachloride exhibits some ionic character.

Or PCI_5 is ionic in nature in the solid state.

(iii) Ammonia is a good complexing agent.

Or Ammonia acts as a ligand

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11. What happens when PCl_5 is heated?

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12. Write a balanced equation for the hydrolytic reaction of PCl_5 with heavy water.

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13. Are all the five bonds of PCl_5 equivalent ? Justify your answer.

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14. For the manufacture of Ammonia by Haber's process, write the equation and optimum conditions for maximum yield of ammonia.

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15. How does ammonia reacts with a solution of Cu^{2+}?

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16. Give the disproportionation reaction of H_3PO_3.

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17. Complete the following chemical equations :

(i) $Ca_3P_2 + H_2O \rightarrow$

(ii) $Cu + H_2SO_4 \quad (\text{conc.}) \rightarrow$

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18. Arrange the following in the order of property indicated against each set :

(i) HF, HCl, HBr, Hl- increasing bond dissociation enthalpy.

(ii) H_2O, H_2SH_2Se, H_2Te- increasing acidic enthalpy.

(ii) $H_2O, H_2S, H_2SE, H_2Te -$ increasing acidic character.

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19. Complete the following equations :

(i) $P_4 + H_2O \rightarrow$

(ii) $XeF_4 + O_2F_2 \rightarrow$

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20. Complete the following equations :

(i) $Ag + PCl_5 \rightarrow$

(ii) $CaF_2 + H_2SO_4 \rightarrow$

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21. Explain the following :

(i) NO_2 readily forms a dimer.

(ii) $BiCl_3$ is more stable than $BiCl_5$.

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22. Explain the following facts giving appropriate reason in each case :

(i) NF_3 is an exothermic compound whereas NCl_3 is not.

(ii) All the bonds in SF_4 are not equivalent.

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23. Draw the structures of white phosphorus and red phosphorus. Which one of these two types of phosphorus is more reactive and why?

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24. Complete the following chemical reaction equations :

(i) $I_2 + HNO_3 \underset{(\text{conc.})}{\rightarrow}$

(ii) $HgCl_2 + PH_3 \rightarrow$

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Topic 1 Group 15 Elements Their Properties And Some Important Compounds Long Answer Type Questions I

1. Explain the principles involved in the manufacture of ammonia by Haber's process.

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2. (i) Write the structure and mention basicity of hypo phosphorous acid.

(ii) Which gas is liberated when zinc reacts with dil. HNO_3?

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3. Write the reactions that take place during the manufacture of nitric acid by Ostwald's process.

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4. White phosphorous is heated with excess of dry chlorine to get X. X on hydrolysis finally forms an oxoacid of phosphorous Y. What are X and Y?

What is the basicity of the acid ?

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5. In the manufacture of ammonia by Haber's process. Write the flow chart and chemical equations with optimum conditions.

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6. How is phosphine prepard in the laboratory?

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7. Explain the manufacture of nitric acid by Ostwald's process.

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8. Why does NH_3 form hydrogen bond but PH_3 does not?

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9. Illustrate how copper metal can give different products on reaction with HNO_3.

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10. How is nitrogen prepared in the laboratory ? Write the chemical equations of the reactions involved.

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11. Account for the following :

(i) Bi(V) is a stronger oxidizing agent than Sb(V).

(ii) $N-N$ single bond is weaker than $P-P$ single bond.

(iii) Noble gases have very low boiling points.

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12. Give reasons for the following :

(i) $(CH_3)_3P=O$ exists but $(CH_3)_3N=O$ does not.

(ii) Oxygen has less electron gain enthalpy with negative sign than sulphur.

(iii) H_3PO_2 is a stronger reducing agent than H_3PO_3.

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13. Suggest a possible reason for the following observations :

(i) In the solid state, PCl_5 behave as an ionic species.

(ii) H_2S is more acidic than water.

(iii) Fluorine forms the largest number of interhalogen compounds amongst the halogens.

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Topic 2 Group 15 Elements Their Properties And Some Important Compounds Long Answer Type

Questions

1. Why are the group - 16 elements called chalcogens?

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2. What is the outer shell electronic configuration of the chalcogens?

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3. Name the allotropes of oxygen.

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4. Which aerosols deplete ozone?

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5. In the preparation of H_2SO_4 by contact process, why is SO_3 not absorbed directly in water to form H_2SO_4?

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6. What happens when (i) Conc. H_2SO_4 is added to CaF_2. (ii) SO_3 is passed through water?

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7. Why does O_3 act as a powerful oxidizing agent?

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8. Draw the structure of $H_2S_2O_8$.

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9. Write the structure of oleum $(H_2S_2O_7)$

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10. Predict the shape and the asked angle $(90^\circ \text{ or more or less})$ in the following case SO_3^{2-} and the angle $O-S-O$.

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11. Oxygen shows catenation behaviour less than sulphur.

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12. Sulphur has greater tendency for catenation than oxygen why?

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13. Oxygen is a gas but sulphur a solid. Explain.

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14. Why are the two $S-O$ bonds in SO_2 molecule of equal strength?

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15. Draw the structure of O_3 molecule.

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16. Write the valence shell electronic configuration group - 16 elements.

17. How does atomic and ionic radii changes with in the group - 16 elements?

18. Ionisation enthalphy of group - 16 elements decreases down the group Why?

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19. Group - 16 elements have lower ionisation enthalpy values compared to those group - 15 elements in the corresponding periods. Give reason.

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20. Out of O and S which has higher negative electron gain enthalpy and why ?

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21. How does electronegativity of group - 16 elements changes down the g roup?

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22. Oxygen and sulphur have difference in their melting point and boiling points. Give reason.

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23. Explain the reactivity of group - 16 elements with oxygen.

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24. How is oxygen prepared in the laboratory?

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25. Name the catalyst used in the preparation of oxygen from $KClO_3$ or decomposition of potassium chlorate.

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Topic 2 Group 16 Elements Their Properties And Some Important Compounds Short Answer Type Questions

1. What happens when concentrated sulphuric acid is heated with oxalic acid ?

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2. Mention two uses of sulphuric acid.

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3. How does hot and concentrated sulphuric acid react with aluminium metal.

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4. Group - 16 elements have lower ionisation enthalpy values compared to those group - 15 elements in the corresponding periods. Give reason.

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5. Complete the following reactions :

(i) $C_2H_4 + O_2 \rightarrow$

(ii) $4Al + 3O_2$

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6. Why does O_3 act as a powerful oxidizing agent?

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7. Why is H_2O a liquid and H_2S a gas?

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8. What are basic oxides ? Give example.

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9. What are amphoteric oxides ? Give examples.

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10. How ozone is formed from atmospheric oxygen in the atmosphere/ What is the use of it in the atmosphere?

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11. How is ozone prepared? What happens when ozone react with lead sulphide?

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12. Give reasons : A silent electric discharge is used in the preparation of ozone.

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13. How do you estimate ozone quantitatively?

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14. What is an acidic oxide? Give examples.

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Topic 2 Group 16 Elements Their Properties And Some Important Compounds Long Answer Type Questions I

1. Complete the following equations :

(i)

$5SO_2 + 2MnO_4^- + 2H_2O \rightarrow 5SO_4^{2-} + 4H^+ + ?$

(ii) $SO_3 + \text{Conc. } H_2SO_4 \rightarrow ?$

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2. Draw the flow chart for the manufacture of sulphuric acid by Contact process.Name the catalyst used in the process.

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3. (i) What happens when potassium chlorate is heated in presence of MnO_2, write the equation for the reactions also.

(ii) Draw the structure of sulphuric acid.

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4. Describe the preparation of Ozonised oxygen with an equation. Name the ozonised product obtained when the ozone reacts with lead-sulphide.

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5. Explain charring action of concentrated sulphuric acid on carbohydrate. Give the equation.

(ii) Complete the equation :

$2PbO_2(s) \xrightarrow{\Delta} \ldots\ldots\ldots\ldots\ldots + \ldots\ldots\ldots\ldots\ldots\ldots$

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6. Complete the following equations :

(i) $2KClO_3 \xrightarrow[\text{Heat}]{MnO_2}$

(ii) $SO_{2(g)} + Cl_{2(g)} \rightarrow$

(iii) $SO_3 + \text{conc. } H_2SO_4 \rightarrow$

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7. Mention three anomalouos behaviour of oxygen.

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8. Complete the following equations

i) $CH_4 + 2O_2 \rightarrow$

ii) $2Fe^{3+} + SO_2 + 2H_2O \rightarrow$

iii) $C_{12}H_{22}O_{11} + H_2SO_4 \ (\text{conc}) \rightarrow$

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9. Write the equation for

i) The action of SO_2 with chlorine in the presence of charcoal

ii) The actionof SO_3 with concentrated sulphuric acid

iii) The action of ozone with lead sulphide.

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10. Write the equations involved in the manufacture of sulphuric acid in contact process.

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11. 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.

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12. Oxygen is a gas but sulphur a solid. Explain.

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13. Write balanced chemical equations for the following :

(i) $NaCl$ is heated with sulphuric acid in the presence of MnO_2.

(ii) Chlorine gas is passed into a solution of NaI in water.

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14. Account for the following :

(i) PCl_5 is more covalent than PCl_3.

(ii) Iron on reaction with HCl forms $FeCl_2$ and not $FeCl_3$.

(iii) The two $O-O$ bond lengths is the ozone molecule are equal.

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15. Account for the following :

(i) PCl_5 can act as an oxidising agent but not as a reducing agent.

(ii) Halogens are coloured.

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16. How would you account for the following :

(i) H_2S is more acidic than H_2O ?

(ii) The $N-O$ bond in NO_2^- is shorter than the $N-O$ bond in NO_3^-.

(iii) Both O_2 and F_2 stabilize high oxidation

states but the ability of oxygen to stabilize the higher oxidation state exceeds that of fluorine.

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17. Account for the following :

(i) Ammonia is more basic than phosphine.

(ii) Elements of Group - 16 generally show lower value of first ionisation enthalpy compared to the elements in the corresponding periods of Group - 15.

(iii) Electron pair gain enthalpy with $(-)ve$ sign for fluorine is less than that for chlorine.

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18. How would you account for the following :

(i) The electron gain enthalpy with negative sign is less for oxygen than that for sulphur.

(ii) Phosphorus shows greater tendency for catenation than nitrogen.

(iii) Fluorine never acts as the central atom in polyatomic interhalogen compounds.

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Topic 3 Group 17 Elements Their Properties And Some Important Compounds Very Short Answer Type Questions

1. HF is a weaker acid than HCl why?

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2. Draw the structure of BrF_3 molecule.

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3. What is the gas liberated at anode during the manufacture of caustic soda using Nelson's cell?

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4. Write the reaction of F_2 with water.

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5. Write the reaction of Cl_2 with water.

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6. write the balanced equation when Chlorine gas is passed into a solution of NaI in water.

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7. Reaction of Cl_2 with slaked lime. (only reaction)

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8. Give the reason for bleaching action of Cl_2.

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9. Name one poisonous gas which can be prepared from chlorine gas.

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10. Arrange $HClO, HBrO$ and HIO in order of decreasing acidic strength giving reason.

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11. Why interhalogens are more reactive than halogens?

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12. Name the halogen which does not exhibit positive oxidation state .

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13. Can FCI_3 exist ? Comment.

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14. Name the most electronegative element in the periodic table.

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15. Name the element which has highest electron affinity or electron gain enthalpy.

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16. Halogens have maximum negative electron gain enthalpy in the respective periods of the periodic table. Why ?

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17. Mention the colour of halogens.

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18. Although electron gain enthalpy of fluorine is less negative as compared to chlorine. Fluorine is a stronger oxidizing agent than chlorine. Why ?

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19. Fluorine exhibits only - 1 oxidation state , whereas other halogens exhibit $+1, +3, +5$ and $+7$ oxidation states . Explain.

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20. Bond enthalpy of fluorine is lower than that of chlorine why ?

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21. Give reason for the following :

F_2 is more reactive than CIF_3 but CIF_3 is more reactive than Cl_2.

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22. Bond entnalpy of F_2 is less than of Cl_2.

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23. Give reason for the following :

$PbCl_4$ is more covalent than $PbCl_2$.

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Topic 3 Group 17 Elements Their Properties And Some Important Compounds Short Answer Type Questions

1. Explain the action of conc. HCl on $KMnO_4$ crystals.

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2. Explain why fluorine forms only, one oxo - acid, HOF?

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3. Write two uses of ClO_2?

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4. Why are halogens strong oxidizing agents?

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5. Give the reason for bleaching action of Cl_2.

(with reaction)

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6. HCl When reacts with finely powdered iron.

It forms ferrous chloride not ferric chloride

why?

7. Find the oxidation state of the halogens in the following compounds.

(a) Cl_2O

(b) ClO_2

(c) $KBrO_3$

8. Give one reason to explain why ClF_3 exists but FCl_3 does not exist?

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9. SF_6 is known but SCl_6 is not. Why?

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10. How do you prepare HCl in the laboratory?

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11. Complete the following reactions equations :

(i) $2XeF_{2(s)} + 2H_2O_{(l)} \rightarrow$

(ii) $NaOH \quad (\text{cold and dilute}) + Cl_2 \rightarrow$

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Topic 3 Group 17 Elements Their Properties And Some Important Compounds Long Answer Type Questions I

1. (a) Give two reasons for the anomalous behaviour of fluorine.

(b) Give one example of interhalogen compounds.

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2. (i) How is chlorine prepared by using MnO_2

(ii) Complete the reaction.

$NH_3(\text{excess}) + Cl_2 \rightarrow$

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3. Complete the following equations.

(i) $2F_2 + 2H_2O \rightarrow$

(ii) $H_2 + Cl_2 \rightarrow$

(iii) $8NH_3 \ \ (\text{excess}) + 3Cl_2 \rightarrow$

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4. Name the gas liberated when concentrated HCI is heated with MnO_2 Give the equation for the reaction. Name the reagent used to obtain bleaching powder from chlorine.

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5. Mention any two resons for anomalous behaviour of Fluorine.

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6. Inter halogen compounds are more reactive than halogens . Why ?

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7. Which is the strongest acid among the hydrogen halides? Give one reason

[X=F,Cl,Br,I]

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8. Complete the following equation :

i) $\underset{\text{(Cold and dilute)}}{2NaOH} + Cl_2 \rightarrow$

ii) $2FeSO_4 + H_2SO_4 + Cl_2 \rightarrow$

iii) $Cl_2 + \underset{\text{(Excess)}}{3F_2} \rightarrow$

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9. With the help of a neat diagram, describe the manufacture of caustic soda by Nelson's process.

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10. Give the formula and describe the structure of a noble gas species which is isostructural with : (i) ICl_4^- (ii) Ibr_2^- (iii) BrO_3^-.

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11. How are the following interhalogen compounds prepared?

(i) ClF_3 (ii) ICl (iii) BrF_5.

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12. Complete the following equatious:

i) $2Al + 3Cl_2 \rightarrow$

ii) $H_2S + Cl_2 \rightarrow$

iiii) $\underset{(\text{excess})}{8NH_3} + 3Cl_2 \rightarrow$

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13. Account for the following :

(i) ICl is more reactive than I_2.

(ii) Fluorine never acts as the central atom in polyatomic interhalogen compounds.

(iii) Halogens are strong oxidising agents.

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14. Name the types of interhalogen compounds ? Give examples.

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Topic 4 Group 18 Elements Their Properties And Some Important Compounds Very Short Answer Type Questions

1. Name the noble gas that is radioactive?

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2. Which noble gas does not occur in nature?

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3. Complete the reaction $XeF_4 + O_2F_2 \rightarrow A + O_2$. Identify A.

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4. $XeF_6 + 3H_2O \rightarrow P + 6HF$

What is P?

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5. Name the main commercial source of helium.

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6. Noble gases have very low boiling point. Why ?

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7. Give reason for chemical inertness of noble gases.

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8. Name the method used for isolation of noble gas mixture from air.

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9. Why do boiling points of noble gases increase from helium to radon?

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10. Why do not helium, neon and argon form chemical compounds.

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11. What is the shape of XeF_6 molecule ?

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12. Why has it been difficult to study the chemistry of radon ?

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13. Helium and neon do not form compounds with fluorine. Why ?

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14. Why are the elements of Group - 18 known as noble gases?

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15. Neon is generally used for warning signals. Why ?

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16. Why do noble gases form compounds with fluorine and oxygen only?

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17. What prompted Bartlett to the discovery of noble gas compounds.

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18. Noble gases have very high ionisation enthalpy. Why ?

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19. Ionisation enthalpy decreases down the group in noble gases. Why ?

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20. How does atomic radii changes in group - 18 elements ?

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21. Noble gases have large positive values of electron gain enthalpy. Why ?

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22. Name the first noble gas compound prepared by Neil Bartlett?

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23. Give common names of noble gases.

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24. How is $XePtF_6$ prepared ?

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25. How is radon obtained ?

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26. What is the percentage of noble gases in the atmospheric air ?

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27. Which noble gas in most abundant in atmospheric dry air?

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28. Why noble gases are called rare gases ?

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29. Why are the elements of Group - 18 known as noble gases?

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30. Why the noble gases are called inert gases ?

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31. Write the general electronic configuration of noble gases.

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32. Draw the structure of XeF_2 molecule.

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33. What inspired N. Bartlett for carrying out reaction between Xe and PtF_6 ?

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34. Helium is used in diving equipment.

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35. Draw the molecular structure of XeF_6.

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36. Complete the following chemical equation -

$XeF_4 + SbF_5 \rightarrow$

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Topic 4 Group 18 Elements Their Properties And Some Important Compounds Short Answer Type Questions

1. Draw the structure and predict the shape of (i) XeO_3, and (ii) BrF_3.

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2. How is helium separated from noble gas mixture by Dewar's adsorption method?

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3. How is $XePtF_6$ prepared ?

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4. Why do noble gases have comparatively large atomic sizes ?

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5. List the uses of neon and argon gases.

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6. Give reasons :

(i) Xenon does not form fluorides such as XeF_3 and XeF_5.

(ii) Out of noble gases, only xenon is known to form established chemical compounds.

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7. Noble gases are chemically inert. Give one reason

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Topic 4 Group 18 Elements Their Properties And Some Important Compounds Long Answer Type Questions I

1. How is xenon separated from mixture of argon- krypton-xenon adsorbed on coconut charcoal by Dewar's method.

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2. Give any 4 properties of group -18 elements.

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3. Draw the structure of following molecules:

(i) XeF_4,

(ii) $HOClO_3$ (Perchloric acid)

(iii) BrF_3

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Topic 4 Group 18 Elements Their Properties And Some Important Compounds Long Answer Type Questions Ii

1. Write the structures of $XeO_3, XeF_6, XeF_4, XeOF_4, XeF_2$

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2. (i) Write the balanced reaction for obtaining XeO_3 and $XeOF_4$ from XeF_6.

(ii) XeF_2 reacts with water.

(iii) XeF_6 reacts with water.

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3. Complete the following chemical reaction equations :

(i) $P_4 + SO_2Cl_2 \rightarrow$

(ii) $XeF_6 + H_2O \rightarrow$

(b) Predict the shape and the asked angle $(90^\circ \text{ or more or less})$ in each of the following cases :

(i) SO_3^{2-} and the angle $O - S - O$

(ii) ClF_3 and the angle $F - Cl - F$

(iii) XeF_2 and the angle $F - Xe - F$

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