



CHEMISTRY

BOOKS - VIKRAM PUBLICATION (ANDHRA PUBLICATION)

P-BLOCK ELEMENTS

Textual Examples

1. Though nitrogen exhibits +5 oxidation state, it does not form pentahalide. Give reason.



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2. PH_3 has lower boiling point than NH_3 . Why ?



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



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4. Why does NH_3 act as a Lewis base ?



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5. Why does NO_2 dimerise ?



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6. In what way can it be proved that PH_3 is basic in nature ?



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7. Why does PCl_3 fume in moisture ?



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8. Are all the five bonds in PCl_5 molecule equivalent ? Justify your answer.



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9. Halogens have maximum negative electron gain enthalpy in the respective periods of the

periodic table. Why ?



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10. Although electron gain enthalpy of fluorine is less negative as compared to chlorine, fluorine is a stronger oxidising agent than chlorine. Why ?



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



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12. Write the balanced chemical equation for the reaction of Cl_2 with hot and concentrated NaOH. Is this reaction a disproportionation reaction ? Justify.



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13. When HCl reacts with finely powdered iron, it forms ferrous chloride and not ferric chloride.

Why ?



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14. Discuss the molecular shape of BrF_3 on the basis of VSEPR theory.



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15. Why are the elements of group 18 known as noble gases ?



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16. Noble gases have very low boiling points.
Why ?



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17. Does the hydrolysis of XeF_6 lead to a redox reaction ?



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Group 15 Elements Very Short Answer Questions

1. Why does the reactivity of nitrogen differ from phosphorus ?



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2. How is nitrogen prepared in the laboratory ?

Write the chemical equations of the reactions involved.



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3. Nitrogen exists as diatomic molecule and phosphorus as P_4 - Why ?



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



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5. Nitrogen molecule is highly stable - Why ?



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6. Why are the compounds of bismuth more stable in +3 oxidation state ?





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7. What is allotropy ? Explain the different allotropic forms of phosphours.



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8. How do you account for the inert character of dinitrogen ?



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9. Explain the difference in the structures of white and red phosphorus.



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10. How is α - black phosphorus prepared from red phosphorus ?



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11. Write the difference between the properties of white phosphorus and red phosphorus.



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12. What is inert pair effect ?



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13. Explain why is NH_3 basic while BiH_3 is only feebly basic.





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14. Arrange the hydrides of group - 15 elements in the increasing order of basic strength and decreasing order of basic strength and decreasing order of reducing character.



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15. PH_3 is a weaker base than NH_3 - Explain.



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16. A hydride of group -15 elements dissolves in water to form a basic solution. This solution dissolves the AgCl precipitate. Name the hydride. Write the chemical equations involved.



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17. What happens when white phosphorus is heated with conc. NaOH solution in an inert atmosphere of CO_2 ?



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18. NH_3 forms hydrogen bonds but PH_3 does not - why ?



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19. The HNH angle is higher than HPH , $HAsH$ and $HSbH$ angles - Why ?



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20. How do calcium phosphide and heavy water react ?



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21. Ammonia is a good complexing agent -
Explain with an example.



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22. A mixture of Ca_3P_2 and CaC_2 is used in making Holme's signal - Explain.



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23. Which chemical compound is formed in the brown ring test of nitrate ions ?



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24. Give the resonating structures of NO_2 and N_2O_5 .



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25. Why does $R_3P = O$ exist but $R_3B = O$ does not (R = alkyl group) ?



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26. How is nitric oxide (NO) prepared ?





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27. Give one example each of normal oxide and mixed oxide of nitrogen.



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28. NO is paramagnetic in gaseous state but diamagnetic in liquid and solid states - Why ?



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29. Give an example of
acidic oxide of phosphorus



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30. Give an example of
neutral oxide of nitrogen.



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31. Explain the following

reaction of alkali with red phosphrous.



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32. Explain the following

reaction between PCl_3 and H_3PO_3 .



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33. How does PCl_3 react with

CH_3COOH



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34. How does PCl_3 react with

CH_3COOH



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35. How does PCl_3 react with water.



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36. PCl_3 can act as an oxidizing as well as a reducing agent - Justify.



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37. Which of the following are not known ?

PCl_3 , AsCl_3 , SbCl_3 , NCl_5 , BiCl_5 , PH_5



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38. Which of the following is more covalent -

SbCl_5 or SbCl_3 ?



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39. Write the oxidation states of phosphorus in solid PCl_5 .



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



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41. Which oxide of nitrogen has oxidation number of N same as that in nitric acid ?



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42. Write the chemical reactions that occur in the manufacture of nitric acid.



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43. Iron becomes passive in conc. HNO_3 - Why ?





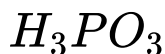
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44. Give the uses of a) nitric acid and b) ammonia.



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45. What are the oxidation states of phosphorus in the following ?



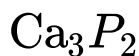
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46. What are the oxidation states of phosphorus in the following ?



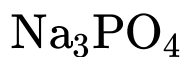
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47. What are the oxidation states of phosphorus in the following ?



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48. What are the oxidation states of phosphorus in the following ?



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49. What are the oxidation states of phosphorus in the following ?



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50. H_3PO_3 is diprotic while H_3PO_2 is monoprotic - Why ?



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51. Give the disproportionation reaction of H_3PO_3 .



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52. H_3PO_2 is a good reducing agent - Explain with an example.



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53. Draw the structures of
Hypo phosphoric acid



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54. Draw the structures of
Cyclic meta phosphoric acid.



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55. Give an example of
neutral oxide of nitrogen.



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56. Give the paramagnetic oxides of nitrogen.





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57. Why is white phosphorus is more reactive than red phosphorus ?



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58. Why does PCl_3 fume in moisture ?



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59. Explain the following

reaction of alkali with red phosphorous.



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60. Explain the following

reaction between PCl_3 and H_2O .



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Group 16 Elements Very Short Answer Questions

1. Why is dioxygen a gas but sulphur a solid ?



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2. What happens when

KClO_3 is heated with MnO_2



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3. What happens when

O_3 is passed through KI solution



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4. Give two examples each for amphoteric oxides and neutral oxides.



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5. Oxygen generally exhibits an oxidation state of -2 only while the other members of the group show oxidation states of +2, +4 and +6 also - explain.



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6. Write any two compounds, in which oxygen shows an oxidation state different from -2. Give the oxidation states of oxygen in them.



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7. Oxygen molecule has the formula O_2 while sulphur has S_8 - explain.



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8. Why is H_2O a liquid while H_2S is a gas ?



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9. H_2O is neutral while H_2S is acidic - explain.



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10. Name the most abundant element present in earth's crust.



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11. Which element of group-16 shows highest catenation ?



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12. Among the hydrides of chalcogens, which is most acidic and which is most stable ?



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13. Give the hybridization of sulphur in the following.



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14. Give the hybridization of sulphur in the following.



Watch Video Solution

15. Give the hybridization of sulphur in the following.



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16. Give the hybridization of sulphur in the following.



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17. Write the names and formulae of any two oxyacids of sulphur. Indicate the oxidation state of sulphur in them.



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18. Explain the structures of SF_4 and SF_6 .



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19. Give one example each for
a neutral oxide



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20. Give one example each for
a peroxide



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21. Give one example each for
a super oxide



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22. What is tailing of mercury ? How is it
removed ?



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23. Write the principle involved in the quantitative estimation of ozone gas.



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24. Write the structure of ozone.



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25. SO_2 can be used as an anti-chlor. Explain.



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26. How is ozone detected ?



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27. How does ozone react with Ethylene ?



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28. Out of O_2 and O_3 , which is paramagnetic ?



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29. Between O_3 and O_2 , ozone is a better oxidizing agent - why ?



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30. Write any two uses each for O_3 and H_2SO_4 .



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31. Which form of sulphur shows paramagnetism ?





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32. How is the presence of SO_2 detected ?



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33. Why are group - 16 elements called chalcogens ?



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34. Among chalcogens, which has highest electronegativity and which has highest electron gain enthalpy ?



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35. Which hydride of group - 16 hydrides water (H_2O) has high boiling point.

→ Among group - 16 hydrides water (H_2O) has weakest acidic character.



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36. Write any two compounds, in which oxygen shows an oxidation state different from -2. Give the oxidation states of oxygen in them.



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37. How does ozone react with Ethylene ?



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Group 17 Elements Very Short Answer Questions

1. Which halogen produces O_2 and O_3 on passing through water ?



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2. Interhalogen compounds are more reactive than the constituent halogens except fluorine - Explain.



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3. What is the use of ClF_3 ?



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4. Write two uses of ClO_2 .



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5. Why are halogens coloured ?



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6. Write the reaction of F_2 and Cl_2 with water.



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7. With which neutral molecule, ClO^- is isoelectronic? Is that molecule a Lewis base?

(Hint : ClF , Yes)



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8. Arrange the following in the order of the property indicated for each set.

F_2, Cl_2, Br_2, I_2 - increasing bond dissociation enthalpy.



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9. Arrange the following in the order of the property indicated for each set.

HF, HCl, HBr, HI - increasing acidic strength



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10. Arrange the following in the order of the property indicated for each set.

HF, HCl, HBr, HI - increasing boiling points.



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 [Watch Video Solution](#)

11. Electron gain enthalpy of fluorine is less than that of chlorine - explain.



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12. HF is a liquid while HCl is a gas - explain.



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13. Bond dissociation enthalpy of F_2 is less than that of Cl_2 - explain.



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14. Write the formulae of the compounds, in which oxygen has positive oxidation states and mention the oxidation states of oxygen in them.



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15. What is the use of O_2F_2 and I_2O_5 ?



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16. Write two uses of hydrogen chloride.



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17. Explain the reactions of Cl_2 with NaOH.



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18. What happens when Cl_2 reacts with dry slaked lime ?



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19. Chlorine acts as an oxidizing agent - explain with two examples.



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20. What is aqua regia ? Write its reaction with gold and platinum.



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21. How is chlorine manufactured by Deacon's method ?



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22. Chlorine acts as a bleaching agent only in the presence of moisture - explain.



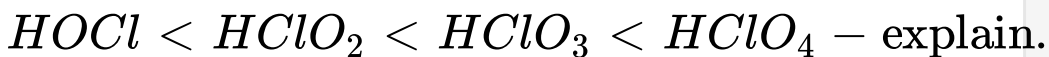
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23. The decreasing order of acidic character among hypohalogen acids is $HClO > HBrO > HIO$. Give reason.



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24. The acidic nature of the oxoacids of chlorine is



(Hint : $HA + H_2O \rightleftharpoons H_3O^+ + A^-$ conjugate

base, greater the stability of A^- , lesser will be

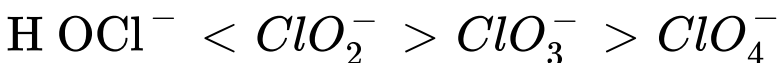
its basic strength or greater will be the

tendency of HA to release H^+ . In other words,

stronger will be the acid HA. Among the

conjugate bases of oxoacids of chlorine, the

stability order is



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25. What are interhalogen compounds ? Give two examples.



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26. Explain the structure of ClF_3 .



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27. OF_2 should be called oxygen difluoride and not fluorine oxide - Why ?



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28. Iodine is more soluble in KI than in water - Explain.



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29. Among the hydrides of halogens

Which is most stable ?



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30. Among the hydrides of halogens

Which is most acidic ?



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31. Among the hydrides of halogens

Which has lowest boiling point ?



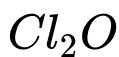
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32. Compare the bleaching action of Cl_2 and SO_2 .



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33. Give the oxidation states of halogens in the following :



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34. Give the oxidation states of halogens in the following :



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35. Give the oxidation states of halogens in the following :



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36. Give the oxidation states of halogens in the following :



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37. Describe the molecular shape of I_3^- .

(Hint : Central iodine is of sp^3 d. - linear)



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Dam Sure Vsaq 2 Marks

1. Interhalogen compounds are more reactive than the constituent halogens except fluorine - Explain.



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2. Write the reactions of F_2 and Cl_2 with water.



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3. Why is dry chlorine cannot act as a bleaching agent.



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4. Write the reaction of chlorine with hypo ($Na_2S_2O_3$).





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5. Give the bond dissociation order of halogens.



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6. I_2 is more soluble in KI give reason.



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7. What are interhalogen compounds ? Give two examples.



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8. How are XeF_2 , XeF_4 , XeF_6 prepared ? Give equation.



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Group 18 Elements Very Short Answer Questions

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





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2. Which of the following does not exist ?

a) $XeOF_4$ b) NeF_2 c) XeF_2 d) XeF_6



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



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4. List out the uses of Neon.



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5. Write any two uses of argon.



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6. In modern diving apparatus, a mixture of He and O_2 is used - Why ?



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7. Helium is heavier than hydrogen. Yet helium is used (instead of H_2) in filling balloons for meteorological observations - Why ?



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8. How is XeO_3 prepared ?



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9. Give the preparation of a) $XeOF_4$ and b) XeO_2F_2



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10. Explain the structure of XeO_3 .



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11. Noble gases are inert - explain.



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12. Write the name and formula of the first noble gas compound prepared by Bertlett.



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13. Explain the shape of XeF_4 on the basis of VSEPR theory.



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14. Give the outer electronic configuration of noble gases.



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



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16. How is XeOF_4 prepared ? Describe its molecular shape.



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17. What is the major source of helium ?



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18. Which noble gas is radioactive ? How is it formed ?





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19. Name the following :

most abundant noble gas in atmosphere



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20. Name the following :

radioactive noble gas



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21. Name the following :

noble gas with least boiling point



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22. Name the following :

noble gas forming large number of compounds



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23. Name the following :

noble gas not present in atmosphere



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Group 15 Elements Short Answer Questions

1. Discuss the general characteristics of Group - 15 elements with reference to their electronic configuration, oxidation state, atomic size, ionization enthalpy and electronegativity.



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2. Discuss the trends in chemical reactivity of group 15 elements



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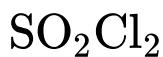
3. How does P_4 react with the following ?

$SOCl_2$



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4. How does P_4 react with the following ?



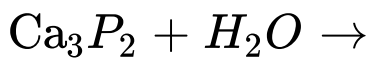
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5. Explain the anomalous nature of nitrogen in group - 15.



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6. Complete the following reactions.



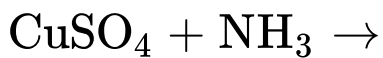
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7. Complete the following reactions.



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8. Complete the following reactions.



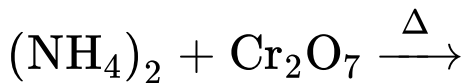
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9. Complete the following reactions.



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10. Complete the following reactions.



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11. Complete the following reactions.

Decomposition of nitrous acid



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12. How does PCl_5 react with the following ?

Water



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13. How does PCl_5 react with the following ?

$\text{C}_2\text{H}_5\text{OH}$



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14. How does PCl_5 react with the following ?

CH_3COOH



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15. How does PCl_5 react with the following ?

Ag



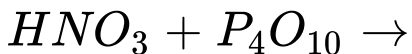
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16. Complete the following.



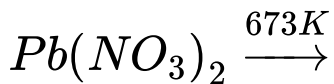
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17. Complete the following.



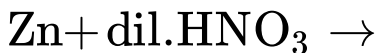
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18. Complete the following.



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19. Complete the following.



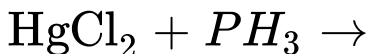
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20. Complete the following.



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21. Complete the following.



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Group 16 Elements Short Answer 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 states and hydride formation.



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2. Describe the manufacture of H_2SO_4 by contact process.



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3. How is ozone prepared ? How does it react with the following ?

PbS



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4. How is ozone prepared ? How does it react with the following ?

KI



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5. How is ozone prepared ? How does it react with the following ?

Hg



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6. How is ozone prepared ? How does it react with the following ?

Ag



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7. Write a short note on the allotropy of sulphur.



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8. How does SO_2 react with the following ?



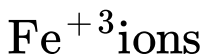
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9. How does SO_2 react with the following ?



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10. How does SO_2 react with the following ?



Watch Video Solution

11. How does SO_2 react with the following ?



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12. Starting from elemental sulphur, how is

H_2SO_4 prepared ?



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13. Describe the structures (shapes) of SO_4^{-2} and SO_3 .



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14. Which oxide of sulphur can act as both oxidizing and reducing agent ? Give one example each.



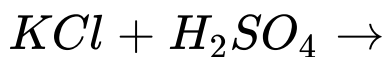
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15. Explain the conditions favourable for the formation of SO_3 from SO_2 in the contact process of H_2SO_4 .



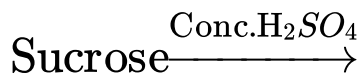
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16. Complete the following



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17. Complete the following



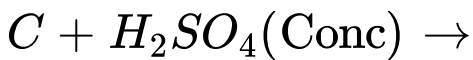
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18. Complete the following



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19. Complete the following



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20. Which is used for drying ammonia ?



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21. Why conc H_2SO_4 , P_4O_{10} and anhydrous

$CaCl_2$ cannot be used to dry ammonia ? (Hint :

ammonia reacts with them forming

$(NH_4)_2SO_4$, $(NH_4)_3PO_4$ and $CaCl_2 \cdot 8NH_3$

)



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Group 17 Elements Short Answer Questions

1. How can you prepare Cl_2 from HCl and HCl from Cl_2 ? Write the reactions.



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2. Write balanced equations for the following.

NaCl is heated with Conc. H_2SO_4 in the presence of MnO_2 .



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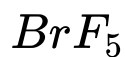
3. Write balanced equations for the following.

Chlorine is passed into a solution of NaI in water.



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4. Explain the structures of



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5. Explain the structures of



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6. Write a short note on the hydrides of halogens.



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7. How is chlorine obtained in the laboratory ?

How does it react with the following ?

cold dil. NaOH



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8. How is chlorine obtained in the laboratory ?

How does it react with the following ?

excess NH_3



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9. How is chlorine obtained in the laboratory ?

How does it react with the following ?

KI



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10. What are interhalogen compounds ? Give some examples to illustrate the definition. How are they classified ?



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Dam Sure Saq 4 Marks

1. How is chlorine prepared by electrolytic method ? Explain its reaction with NaOH



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2. How is chlorine prepared by electrolytic method ? Explain its reaction with NH_3 under different conditions.



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3. Explain the structure of XeO_3 .



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4. Explain the structure of



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5. Write the preparations of Xenon fluorides.



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6. Write the preparations of Xenon Oxides.



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7. Write any two uses of Helium.



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Group 18 Elements Short Answer Questions

1. How are Xenon fluorides XeF_2 , XeF_4 and XeF_6 obtained ?



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2. How are XeO_3 and $XeOF_4$ prepared ?



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3. Give the formulae and describe the structures of a noble gas species, isoelectronic with



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4. Give the formulae and describe the structures of a noble gas species, isoelectronic with



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5. Give the formulae and describe the structures of a noble gas species, isoelectronic with



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6. Explain the reaction of the following with water.



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7. Explain the reaction of the following with water.



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8. Explain the reaction of the following with water.



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9. Explain the structures of



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10. Explain the structures of



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11. Explain the structures of



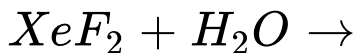
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12. Explain the structures of



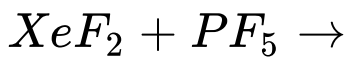
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13. Complete the following.



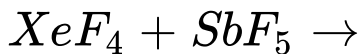
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14. Complete the following.



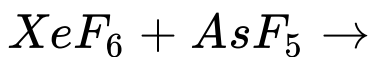
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15. Complete the following.



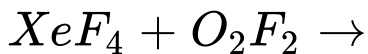
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16. Complete the following.



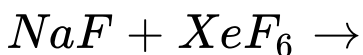
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17. Complete the following.



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18. Complete the following.



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19. How are XeF_2 and XeF_4 prepared ? Give their structures.



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Group 15 Elements Long Answer Questions

1. How is ammonia manufactured by Haber's process ? Explain the reactions of ammonia with



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2. How is ammonia manufactured by Haber's process ? Explain the reactions of ammonia with



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3. How is ammonia manufactured by Haber's process ? Explain the reactions of ammonia with



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4. How is nitric acid manufactured by Ostwald's process ? How does it react with the following ?
Copper



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5. How is nitric acid manufactured by Ostwald's process ? How does it react with the following ?

Zn



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6. How is nitric acid manufactured by Ostwald's process ? How does it react with the following ?

S_8



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7. How is nitric acid manufactured by Ostwald's process ? How does it react with the following ?

P_4



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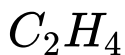
Group 16 Elements Long Answer Questions

1. Explain in detail the manufacture of sulphuric acid by contact process.



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2. How is ozone prepared from oxygen ? Explain its reaction with



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3. How is ozone prepared from oxygen ? Explain its reaction with



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4. How is ozone prepared from oxygen ? Explain its reaction with

Hg



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5. How is ozone prepared from oxygen ? Explain its reaction with

PbS.



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Dam Sure Laq 8 Marks

1. Write the structures of oxoacids of sulphur.



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2. Write any two oxidation and any two reduction properties of ozone with equations.



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1. How is ClF_3 prepared ? How does it react with water ? Explain its structure.



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2. How is chlorine prepared in the laboratory ?
How does it react with the following ?

Iron



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3. How is chlorine prepared in the laboratory ?

How does it react with the following ?

hot, conc. NaOH



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4. How is chlorine prepared in the laboratory ?

How does it react with the following ?

acidified $FeSO_4$



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5. How is chlorine prepared in the laboratory ?

How does it react with the following ?

Iodine



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6. How is chlorine prepared in the laboratory ?

How does it react with the following ?

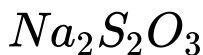
H_2S



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7. How is chlorine prepared in the laboratory ?

How does it react with the following ?



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8. Discuss the anomalous behaviour of fluorine.



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9. How is chlorine prepared by electrolytic method ? Explain its reaction with NaOH



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10. How is chlorine prepared by electrolytic method ? Explain its reaction with NH_3 under different conditions.



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11. Write the names and formulae of the oxoacids of chlorine. Explain their structures and relative acidic nature.



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Group 18 Elements Long Answer Questions

1. How are XeF_2 , XeF_4 , XeF_6 prepared ?

Explain their reaction with water. Discuss their structures.



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Intext Questions

1. Why are pentahalides more covalent than trihalides ?



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2. Why is BiH_3 the strongest reducing agent amongst all the hydrides of Group 15 elements ?



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3. Why is N_2 less reactive at room temperature ?



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4. Mention the conditions required to maximise the yield of ammonia.



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5. How does ammonia react with a solution of Cu^{2+} ?



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6. What is the covalence of nitrogen in N_2O_5 ?



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7. Bond angle in PH_4^+ is higher than that in PH_3 . Why ?





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8. What happens when white phosphorus is heated with concentrated NaOH solution in an inert atmosphere of CO_2 ?



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9. What happens when PCl_5 is heated ?



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10. Write a balanced equation for the hydrolytic reaction of PCl_5 in heavy water.



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11. List the important sources of sulphur.



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12. Write the order of thermal stability of the hydrides of group 16 elements.





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



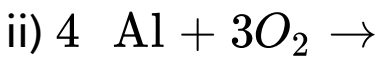
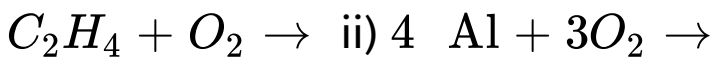
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14. Which of the following does not react with oxygen directly ? Zn, Ti, Pt, Fe.



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15. Complete the following reactions. i)



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16. Why does O_3 act as a powerful oxidising agent ?



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17. How is O_3 estimated quantitatively ?





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18. What happens when sulphur dioxide is passed through an aqueous solution of Fe (III) salt ?



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19. Comment on the nature of two S - O bonds formed in SO_2 molecule. Are the two S - O bonds in this molecule equal ?



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20. How is the presence of SO_2 detected ?



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21. Mention three areas in which H_2SO_4 plays an important role.



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22. Write the conditions to maximize the yield of H_2SO_4 by contact process.



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23. Considering the parameters such as bond dissociation enthalpy, electron gain enthalpy and hydration enthalpy, compare the oxidising power of F_2 and Cl_2 .

Oxidizing power is a combined effect of bond dissociation enthalpy, electron gain enthalpy and hydration enthalpy.



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24. Give two examples to show the anomalous behaviour of fluorine.



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25. Sea is the greatest source of some halogens.
Comment.



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26. Give the reason for bleaching action of Cl_2 ?



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27. Name some poisonous gases which can be prepared from chlorine gas.



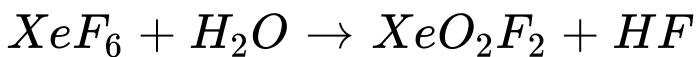
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28. Why is helium used in diving apparatus ?



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29. Balance the following equation :



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



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