



CHEMISTRY

BOOKS - MBD -HARYANA BOARD

P BLOCK ELEMENTS

Very Short Answer Type Questions

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



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2. What happens when sulphur dioxide is passed into aqueous solution of Fe (III) salt ?



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3. Why is H_2O a liquid and H_2S a gas at room temperature ?



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4. Write chemical reaction to show that chlorine gas can be obtained from bleaching powder.



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5. Why does NH_3 forms hydrogen bonds but PH_3 does not ?



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6. Why are halogens strong oxidising agents ?

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

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8. Explain why inspite of nearly the same electronegativity, oxygen forms hydrogen

bonding while chlorine does not.

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9. With what neutral molecule is ClO^- isoelectronic? Is the molecule a Lewis base?

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10. Why is ICl more reactive than I_2 ?

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11. Write the reaction of Cl_2 with water.

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12. Why is BiH_3 the strongest reducing agent amongst all the hydrides of group 15 ?

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



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14. Why does NH_3 forms hydrogen bonds but PH_3 does not ?



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15. Give the resonating structures of NO_2 and N_2O_5



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



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17. Give the disproportionation reaction of H_3PO_3



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Short Answer Type Questions

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

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2. Discuss the anomalous behaviour of oxygen.

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3. Discuss abnormal behaviour of nitrogen.

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4. What is the basicity of H_3PO_4 ?



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



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



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7. What happens when copper reacts with (i) conc. HNO_3 (ii) Dil. HNO_3 ?



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8. (i) HF is liquid while HCl is gas, why?

(ii) Give the increasing order of acidic strength and reducing character of HF, HCl, HBr, and HI.

Give reasons.





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9. Arrange HClO_4 , HClO_3 , HClO_2 and HClO in the increasing order of acidic strength and explain on the basis of the structure of their anions.



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10. Why is nitrogen inert while phosphorus is reactive ?



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11. Why is nitrogen a gas while phosphorus is solid ?



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12. (i) Explain O_2 is gas and sulphur is solid.

(ii) Give the reaction of O_3 with (a) PbS (b)

Acidified $FeSO_4$ and (c) Hg.



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



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14. How is nitrogen prepared in the laboratory? Write the chemical equation of the reactions involved.



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

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16. Write balanced equations for the following:

(a) NaCl is heated with sulphuric acid in the presence of MnO_2

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

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17. (a) Account for the following observations:

(i) Hydrogen fluoride has higher boiling point than hydrogen chloride. (ii) Nitrogen is fairly inert gas.

(b) Draw the molecular structure of peroxomonosulphuric acid.



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18. (a) SF_6 is not easily hydrolysed. Explain. (b)

Ozone is used for purifying air in crowded

places such as cinema halls, tunnels, etc.

Explain. (c) Why oxide ion is called hard ion ?

Explain.



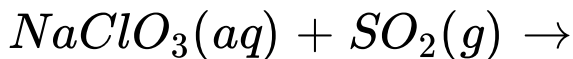
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19. (a) Write one chemical reaction to show that conc. H_2SO_4 can be an oxidising agent.

(b) Write the structural formula for XeO_3 and PF_5

(c) Complete the following chemical equations

:



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20. How is ozone estimated quantitatively?



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21. Explain :

(a) SF_6 is known but SH_6 is not known.

Explain.

(b) SO_3 has zero dipole moment. Why?

(c) Noble gases have low boiling points.

Explain.



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



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23. How is nitrogen prepared in the laboratory? Write the chemical equation of the reactions involved.



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



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



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



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27. Knowing the electron gain enthalpy values for $O \rightarrow O^-$ and $O \rightarrow O^{2-}$ as - 141 and 702

kJ mol^{-1} respectively, how can you account for the formation of a large number of oxides having O^{2-} species and not O^- ?

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28. Write two uses of ClO_2

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29. Why are halogens coloured ?

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30. Write balanced equations for the following:

(a) NaCl is heated with sulphuric acid in the presence of MnO_2

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



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31. What is the reaction of conc. H_2SO_4 with

(i) Sulphur (ii) Carbon ?



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32. What is the shape of XeF_4 molecule ?



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33. (a) $(CH_3)_3N$ is basic, but $(CF_3)_3N$ is not

basic. Explain.

(b) Electron affinity of Chlorine is more than fluorine. Explain.



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34. What are interhalogen compounds ? Give examples.



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35. Why are interhalogen compounds more reactive than halogens ?



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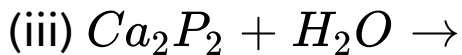
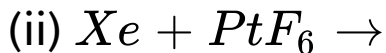
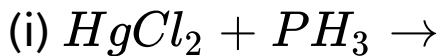
36. Why does nitrogen show catenation properties less than phosphorus ?



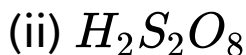
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Long Answer Type Question

1. (a) Complete the following chemical equation :



(b) Draw the structures of the following compounds :



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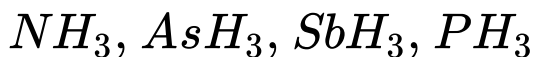
2. List the uses of Helium, Neon and Argon gases.



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3. (a) Among group 18 elements, only Xe can form compounds. Explain.

(b) Arrange the followings in order of increasing their basicity:



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4. (a) The basic character among the hydrides of group-15 elements decreases with

increasing atomic numbers. Explain.

(b) Draw the structure of SF_4 and XeF_4 molecules.

(c) What is the oxidation number of P in H_2PO_4 acid ?



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5. Arrange the following in the order or property indicated for each set

(a) F_2, Cl_2, Br_2, I_2 Increasing bond dissociation enthalpy.

(b) HF, HCl, HBr, HI Increasing acid strength.

(c) $NH_3, PH_3, AsH_3, SbH_3, BiH_3$

Increasing base strength.



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6. (a) Give names of some oxoacids of halogens.

(b) Arrange the following in the decreasing order of acidic strength :

(i) $HClO, HClO_2, HClO_3, HClO_4$

(ii) $HClO, HBrO, HIO.$



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7. Name oxoacids of chlorine and their formulae.



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8. Explain the following:

(a) How is XeF_4 prepared ? Give its molecular shape.

(b) Why ammonia has higher boiling point than phosphene?



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9. Explain the following:

(a) Arrange HCl, HI, HBr, HF in increasing order of acidic strength.

(b) Draw structure of IF_4^-

(c) Why are interhalogen compounds more reactive than related elemental halogens ?

(d) Write chemical formula of Laughing gas.

(e) Why molecular nitrogen is not so reactive ?



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10. List the important oxoacids of phosphorus and their formulae .



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11. Name five oxoacids of phosphorus and their formulae



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12. Give two important use of NH_3 and chemical reaction of NH_3 with

(i) H_2O (ii) HCl and (iii) $FeCl_3(aq)$.



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13. (a) How will you prepare nitric acid

(b) Discuss the structure of nitric acid and give its important uses .



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14. Explain the following :

(a) PH_3 has lower boiling point than NH_3 ,

why

(b) Noble gases are mostly inert why ?

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15. Describe Ostwald process for the manufacture of Nitric acid. Give uses.

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16. (i) Ammonia is good complexing agent.

Explain.

(ii) PCl_5 exists as $[\text{PCl}_6]^- [\text{PCl}_4]^+$ but PBr_5

exists as $[\text{PBr}_4]^+ [\text{Br}]^-$. Explain.

(iii) Cl_5 is known but I_5 is not known. Why?

(iv) Suggest a method for the laboratory preparation of DCl . Write a balanced equation for the reaction.

(v) H_3PO_3 is diprotic acid. Explain.



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17. Name the various hydrides of group 16 elements. Arrange these hydrides in their decreasing order of

(i) Volatility (ii) Bond angle (iii) Acidic character

H_2S is less acidic than H_2Te , why (iv)

Thermal stability and (v) Reducing character.



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18. Write the names and formulae of any five oxyacids of sulphur.





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19. (a) What are interhalogen compounds ?

Give examples.

(b) Why are interhalogen compounds more reactive than halogens ?



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20. Which of the two H_2O or H_2S has higher boiling point ? Explain.



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21. (a) Why does PCl_3 fumes in moisture ?

(b) NO_2 dimerises to N_2O_4 ?



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22. Draw the structure of XeF_2 and XeO_3 .

Write their shapes and hybridisation.

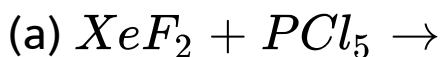


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23. How are XeO_3 and $XeOF_4$ prepared ?

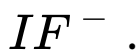
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24. Complete the following reaction



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25. Explain the following: (b) Draw structure of



(c) Why are interhalogen compounds more reactive than related elemental halogens ?

(d) Write chemical formula of laughing gas.

(e) Why molecular nitrogen is not so reactive ?



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26. Account for the following:

(a) Molecular nitrogen N_2 is not particularly

reactive.

(b) H_3PO_3 is diprotic.

(c) Nitrogen forms no pentahalides like phosphorus.

(d) Water has higher boiling point than H_2S .



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27. Explain the following:

(a) H_2S is a gas while H_2O is liquid at room temperature.

(b) Ionization energies of noble gases are very

high.

(c) Why is ammonia a good complexing agent

?

(d) Name a compound in which iodine shows positive oxidation state.



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28. List the important oxoacids of phosphorus and give their structures.



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29. Name five oxoacids of phosphorus and their formulae.



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30. (a) Arrange the following in the order of property indicated for each set :

(i) F_2, Cl_2, Br_2, I_2 - Increasing bond dissociation enthalpy .

(ii) HF, HCl ,HBr, HI - Decreasing acid strength

(iii) $NH_3, PH_3, AsH_3, SbH_3, BiH_3$ -
Decreasing base strength .

(b) Write the conditions to maximize the yield to H_2SO_4 by contact process .



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31. (a) Draw the structure of following

(i) XeF_6 (i) $XeOF_4$

Describe the harber process for manufacture of ammonia



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32. Define allotropy. Name the important allotropic forms of sulphur.



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33. (a) The basic character among the hydrides of group-15 elements decreases with increasing atomic numbers. Explain. (b) Draw the structure of SF_4 and XeF_4 molecules. (c) What is the oxidation number of P in H_3PO_4 acid ?





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- 34.** (a) Draw the structure of XeF_2 and BrF_3
- (b) Give the structures of white phosphorus and red phosphorus



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