



## CHEMISTRY

BOOKS - KUMAR PRAKASHAN KENDRA

CHEMISTRY (GUJRATI ENGLISH)

### THE P-BLOCK ELEMENTS

#### 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. How do you account for the reducing behaviour of  $H_3PO_2$  on the basis of its structure ?



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10. Elements of group-16 generally show lower value of first ionisation enthalpy compared to the corresponding periods of group-15. Why ?



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11.  $H_2S$  is less acidic than  $H_2Te$ . Why ?



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12. Which form of sulphur shows paramagnetic behaviour ?



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13. What happens when

(i) Concentrated  $H_2SO_4$  is added to calcium fluoride

(ii)  $SO_3$  is passed through water ?



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



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



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17. 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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18. When HCl reacts with finely powdered iron, it forms ferrous chloride and not ferric chloride. Why ?

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19. Discuss the molecular shape of  $BrF_3$  on the basis of VSEPR theory.



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

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



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



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## SECTION-A QUESTIONS

1. State the general electronic configuration of p-block elements. Which factors largely governs the properties of p-block elements ?





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2. Explain occurrence of elements of group-15.



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3. state the electronic configuration of group-15 elements.



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4. Discuss the variations in atomic and ionic radii of elements in group-15.



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5. Discuss the trends in ionisation enthalpies and electronegativity of group-15 elements.



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6. Discuss the physical properties of group-15 elements.



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7. Write a note on oxidation states of group-15 elements.



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8. Write a note on nature of bonding of group-15 elements.



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9. Discuss the anomalous behaviour of nitrogen.



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10. Explain the nature of hydride compounds of group-15 elements.



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11. Explain the nature of oxide compounds of group-15 elements.



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12. Write a note on halide compounds of group-15 elements.



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13. Discuss reactivity of group-15 elements with metals.



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14. Give preparation of dinitrogen ( $N_2$ ).



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15. Give physical and chemical properties of dinitrogen.



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16. Enlist the main uses of nitrogen.



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## SECTION-A QUESTIONS (AMMONIA)

1. Give preparation of ammonia.



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2. Discuss the physical and chemical properties of ammonia.



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3. Give uses of ammonia.



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4. Give the preparation and properties and structures of oxides of nitrogen.



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## SECTION-A QUESTIONS (NITRIC ACID)

1. Give preparation of Nitric acid.



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2. Discuss physical and chemical properties of nitric acid.



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3. Explain the brown ring test for nitrate ions.



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4. State the uses of nitric acid.



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## SECTION-A QUESTIONS (PHOSPHORUS - ALLOTROPIC FORMS)

1. Write a note on allotropes of phosphorus.



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## SECTION-A QUESTIONS (PHOSPHINE)

1. Give preparation of phosphine ( $PH_3$ ).



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2. State physical and chemical properties of phosphine ( $PH_3$ )



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3. State uses of phosphine.







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## SECTION-A QUESTIONS (PHOSPHORUS HALIDES)

1. Give the preparation of phosphorus trichloride and phosphorus pentachloride.



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2. Explain the molecular structures of phosphorus trichloride and phosphorus pentachloride.



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3. Discuss the properties of phosphorus trichloride and phosphorus pentachloride.

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4. State the oxoacids of phosphorus with their formula, methods of preparation and presence of characteristics bonds in their structure .

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## SECTION-A QUESTIONS (OXOACIDS OF PHOSPHORUS)

1. Draw the structures of following oxoacids of phosphorus :

(i) Orthophosphoric acid ( $H_3PO_4$ )

(ii) Pyrophosphoric acid ( $H_4P_2O_7$ )

(iii) Orthophosphorus acid ( $H_3PO_3$ )

(iv) Hypophosphorus acid ( $H_3PO_2$ )

(v) Cyclotrimetaphosphoric acid ( $HPO_3$ )<sub>3</sub>

(vi) Polymetaphosphoric acid ( $HPO_3$ )<sub>n</sub>



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2. Explain chemical behaviour of oxoacids of phosphorus.



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3. Explain occurrence of group-16 elements.



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4. State the electronic configurations of group-16 elements.



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5. Explain variations in atomic radii and ionisation enthalpies in group-16.



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6. Explain variations in electron gain enthalpy and electronegativity of group-16 elements.



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7. Discuss the physical properties of group-16 elements.



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**8.** Write a note on oxidation state of group-16 elements.



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**9.** Write a note on hydride compounds of Group-16 elements.



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**10.** Write a note on oxides of group-16 elements



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**11.** Write a note on oxides of group-16 elements



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**12.** Write a note on halide compounds of group-16 elements.



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**13.** Discuss the anomalous behaviour of oxygen.



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**14.** Write a preparation of dioxygen.



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15. Explain the physical and chemical properties of dioxygen.



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16. State uses of dioxygen.



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## SECTION-A QUESTIONS (SIMPLE OXIDES)

1. Write a detailed note on binary oxides.



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## SECTION-A QUESTIONS (OZONE $O_3$ )

1. Explain preparation of ozone.



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2. Explain properties of ozone and state its uses.



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## SECTION-A QUESTIONS (SULPHUR-ALLOTROPIC FORMS)

1. Write a note on allotropes of sulphur.



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## SECTION-A QUESTIONS (SULPHUR DIOXIDE $SO_2$ )

1. Write a note on preparation of sulphur dioxide.



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2. Explain properties of sulphur dioxide. State its uses.



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## SECTION-A QUESTIONS (OXOACIDS OF SULPHUR)

1. Write the names, molecular formula and structural formula of oxoacids of sulphur.



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## SECTION-A QUESTIONS (SULPHURIC ACID $H_2SO_4$ )

1. Explain contact process.



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2. Explain industrial manufacturing of sulphuric acid.



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3. Discuss physical and chemical properties of sulphuric acid.



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4. State the uses of sulphuric acid.



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## SECTION-A QUESTIONS (GROUP-17 ELEMENTS (HALOGENS))

1. State occurrence of group-17 elements.



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2. State the electronic configurations of Group-17 elements.



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3. Discuss variations in atomic radii and ionization enthalpies in Halogens.



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4. Write a note on :

(i)- Electron gain enthalpy of halogens

(ii) Electronegativity of halogens.



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5. Discuss physical properties of halogens.



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6. Write a note on oxidation states of group-17 elements.



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7. Explain chemical reactivity of halogens.



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8. Write a note on hydrogen halides.



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9. Explain reactivity of halogens with oxygen. OR Write a note on oxides of halogens.



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**10.** Write a note on metal halides.



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**11.** Explain reactivity of halogens with metals.



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**12.** Write a shortnote on interhalogen compounds.



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**13.** Discuss anomalous behaviour of fluorine.



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## SECTION-A QUESTIONS (CHLORINE)

1. Write preparation of dichlorine ( $Cl_2$ ).



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2. State properties and uses of dichlorine.



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## SECTION-A QUESTIONS (HYDROGEN CHLORIDE)

1. Write a note on preparation of hydrogen chloride and state its uses.



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2. Explain properties of hydrogen chloride.



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## SECTION-A QUESTIONS (OXOACIDS OF HALOGENS)

1. Write the names, molecular formula and structural formula of oxoacids of halogens.



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## SECTION-A QUESTIONS (INTERHALOGEN COMPOUNDS)

1. Write preparation of interhalogen compounds and state its uses.



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2. Discuss the properties of interhalogen compounds.



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## SECTION-A QUESTIONS (GROUP-18 ELEMENTS (NOBLE GASES))

1. State occurrence of group-18 elements.



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2. State the electronic configurations of group-18 elements.



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3. Explain the variations in the following properties of group-18 elements :

(i) Atomic radii

(ii) Ionisation enthalpy

(iii) Electron gain enthalpy



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4. Discuss physical properties and chemical properties of noble gases.



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5. Write preparation of :

(i) Xenon - Fluorine compounds

(ii) Xenon - Oxygen compounds



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6. Discuss properties of :

(i) Xenon-fluoride compounds

(ii) Xenon-oxygen compounds



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7. State the uses of noble gases.



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### SELF- PRACTICE QUESTIONS (GIVE REASON FOR THE FOLLOWING)

1.  $NCl_5$  is not known but  $N_2O_5$  is known.



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2. Bismuth shows metallic properties.



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3. The stability of elements of group-15 in (+5) oxidation state decreases down the group.



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4.  $NF_3$  cannot be hydrolysed.



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5.  $NF_3$  shows very less tendency to donate electrons.



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6.  $CN^-$  is known but  $CP^-$  is not known.



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## SELF- PRACTICE QUESTIONS (GIVE SUITABLE EXPLANATIONS FOR THE FOLLOWING)

1.  $Pl_5$  is not known.



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2. White phosphorus is highly reactive.



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3. In solid state,  $PCl_5$  is known to exists as  $[PCl_4]^+ [PCl_6]^-$



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4. Phosphine shows property of inflammability.



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5. Xenon does not form compounds such as  $XeF_3$  or  $XeF_5$



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6. Large amount of noble gases are harmful.



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7. Down the group, the liquefaction of noble gases becomes easier.



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8. Xenon forms compound directly with fluorine.



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9. Helium does not form clathrate compounds.



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SELF- PRACTICE QUESTIONS (GIVE REASONS FOR THE FOLLOWING):



1.  $SCl_6$  is not known to exist.



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2. Oxygen is not known to show (+4) or (+6) oxidation states.



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3. The boiling point of  $H_2Te$  is higher than  $H_2S$



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4. Sulphur and oxygen shows large difference in boiling points.





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5. High concentration of ozone is explosive.



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6. Mercury loses meniscus when comes in contact with ozone.



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7. Bleaching action of ozone is permanent.



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8. Fluorine is not known to form  $F_3^-$  ion.



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9.  $LiI$  is a covalent compound.



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10.  $NF_3$  is an exothermic compound while  $NCl_3$  is an endothermic compound.



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11. Among all the four halogens,  $F_2$  is most reactive



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**12.** Oxides of bromine are highly unstable.



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**13.** The colour of halogens darkens moving down the group.



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**14.** Fluorine does not show disproportionation reactions.



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1. Why are pentahalides of P, As, Sb and Bi more covalent than their 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. (a) Bond angle in  $PH_4$  is higher than that in  $PH_3$ . Why ?

(b) What is formed when  $PH_3$  reacts with an acid ?



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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 reaction of  $PCl_5$  with water.



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11. What is the basicity of  $H_3PO_3$  is heated?



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12. What happens when  $H_3PO_3$  is heated ?



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13. List the important sources of sulphur.



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14. Write the order of thermal stability of the hydrides of Group-16 elements.



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15. Why is  $H_2O$  a liquid and  $H_2S$  a gas ?



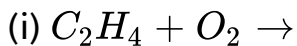
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16. Which of the following does not react with oxygen directly ? Zn, Ti, Pt, Fe



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17. Complete the following reactions :



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18. Why does  $O_3$  act as a powerful oxidising agent ?



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19. How is  $O_3$  estimated quantitatively ?



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



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**21.** 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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**22.** How is the presence of  $SO_2$  detected ?



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**23.** Mention three areas in which  $H_2SO_4$  plays an important role.



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**24.** Write the conditions to maximise the yield of  $H_2SO_4$  by Contact process.



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**25.** Why is  $Ka_2 < Ka_1$  for  $H_2SO_4$  in water ?



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



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**27.** Give two examples to show the anomalous behaviour of fluorine.



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**28.** Sea is the greatest source of some halogens. Comment.



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29. Give the reason for bleaching action of  $Cl_2$ .



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30. Name two poisonous gases which can be prepared from chlorine gas.



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31. Why is  $Icl$  more reactive than  $I_2$ ?



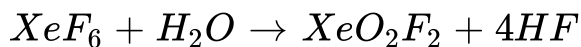
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32. Why is helium used in diving apparatus ?



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**33.** Balance the following equation :



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



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## SECTION-C TEXTUAL EXERCISE

**1.** Discuss the general characteristics of Group-15 elements with reference to their electronic configuration, oxidation

state, atomic size, ionisation enthalpy and electronegativity.



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



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3. Discuss the trends in chemical reactivity of group-15 elements.



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4. Why does  $NH_3$  form hydrogen bond but  $PH_3$  does not ?





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



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6. How is ammonia manufactured industrially ?



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



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8. Give the resonating structures of  $NO_2$  and  $N_2O_5$



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9. The H - N - H angle value is higher than H-P-H, H-As-H and H-Sb-H angles. Why ?



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



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11. Explain why  $NH_3$  is basic while  $BiH_3$  is only feebly basic.



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12. Nitrogen exists as diatomic molecule and phosphorus as  $P_4$ . Why ?



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13. Write main differences between the properties



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**14.** Why does nitrogen show catenation properties less than phosphorus ?



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**15.** Give the disproportionation reaction of  $H_3PO_3$ .



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**16.** Can  $PCl_5$  act as an oxidising as well as a reducing agent ?  
Justify.



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17. 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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18. Why is dioxygen a gas but sulphur a solid ?



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19. Knowing the electron gain enthalpy values for  $O \rightarrow O^-$  and  $O \rightarrow O^{2-}$  as  $-141$  and  $702 \text{ kJ mol}^{-1}$  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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20. Which aerosols deplete ozone ?



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21. Write the conditions to maximise the yield of  $H_2SO_4$  by Contact process.



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22. How is  $SO_2$  an air pollutant ?



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23. Why are halogens strong oxidising agents ?



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24. Explain why fluorine forms only one oxoacid, HOF.



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25. Explain why inspite of nearly the same electronegativity, nitrogen forms hydrogen bonding while chlorine does not.



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26. Write two uses of  $ClO_2$



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27. Why are halogens coloured ?



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28. Write the reactions of  $F_2$  and  $Cl_2$  with water.



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29. How can you prepare  $Cl_2$  from HCl and HCl from  $Cl_2$  ?

Write reactions only.



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



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31. What are the oxidation states of phosphorus in the following:

(i)  $H_3PO_3$ , (ii)  $PCl_3$ , (iii)  $Ca_3P_2$ , (iv)  $Na_3PO_4$ , (v)  $POF_3$  ?



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32. Write balanced 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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33. How are xenon fluorides  $XeF_2$ ,  $XeF_4$  and  $XeF_6$  obtained ?



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34. With what neutral molecule is  $ClO^-$  isoelectronic ? Is that molecule a Lewis base ?



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35. How are  $XeO_3$  and  $XeOF_4$  prepared ?



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**36.** Arrange the following in the order of property indicated for each set :

(i)  $F_2$ ,  $Cl_2$ ,  $Br_2I_2$  - increasing bond dissociation enthalpy.

(ii) HF, HCl, HBr, HI - increasing acid strength.

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



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**37.** Which one of the following does not exist ?

(i)  $XeOF_4$ , (ii)  $NeF_2$ , (iii)  $XeF_2$ , (iv)  $XeF_6$



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**38.** 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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**39.** Why do noble gases have comparatively large atomic sizes ?



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**40.** List the uses of neon and argon gases.



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## SECTION -D (NCERT EXEMPLAR SOLUTION) (MULTIPLE CHOICE QUESTIONS (MCQS))

1. On addition of cone.  $H_2SO_4$  to a chloride salt, colourless fumes are evolved but in case of iodide salt, violet fumes come out. This is because .....

A.  $H_2SO_4$  reduces HI to  $I_2$

B. HI is of violet colour

C. HI gets oxidised to  $I_2$

D. HI changes to  $HIO_3$

**Answer: C**



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2. In qualitative analysis when  $H_2S$  is passed through an aqueous solution of salt acidified with dil.  $HCl$ , a black precipitate is obtained. On boiling the precipitate with dil.  $HNO_3$ , it forms a solution of blue colour. Addition of excess of aqueous solution of ammonia to this solution gives .....

- A. Deep blue precipitate of  $Cu(OH)_2$
- B. Deep blue solution of  $[Cu(NH_3)_4]^{2+}$
- C. Deep blue solution of  $Cu(NO_3)_2$
- D. Deep blue solution of  $Cu(OH)_2 \cdot Cu(NO_3)_2$

**Answer: B**



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3. In a cyclotrimetaphosphoric acid molecule, how many single and double bonds are present ?

- A. 3 double bonds, 9 single bonds
- B. 6 double bonds, 6 single bonds
- C. 3 double bonds, 12 single bonds
- D. Zero double bonds, 12 single bonds

**Answer: C**



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4. Which of the following elements can be involved in pn-dn bonding ?

A. Carbon

B. Nitrogen

C. Phosphorus

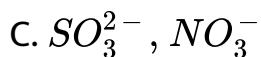
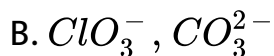
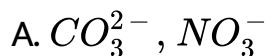
D. Boron

**Answer: C**

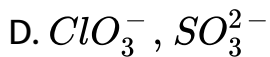


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5. Which of the following pairs of ions are isoelectronic and isostructural ?







**Answer: A**



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6. Affinity for hydrogen decreases in the group from fluorine to iodine. Which of the halogen acids should have highest bond dissociation enthalpy ?

A. HF

B. HCL

C. HBr

D. HI

**Answer: A**

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7. Bond dissociation enthalpy of E - H (E = element) bonds is given below. Which of the compounds will act as strongest reducing agent ?

Compound	$\text{NH}_3$	$\text{PH}_3$	$\text{AsH}_3$	$\text{SbH}_3$
$\Delta_{\text{diss}}(\text{E} - \text{H})/\text{kJ mol}^{-1}$	389	322	297	255

A.  $\text{NH}_3$

B.  $\text{PH}_3$

C.  $\text{AsH}_3$

D.  $\text{SbH}_3$

**Answer: D**

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8. On heating with concentrated NaOH solution in an inert atmosphere of  $CO_2$ , white phosphorus gives a gas. Which of the following statement is incorrect about the gas ?

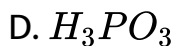
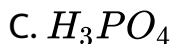
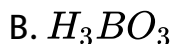
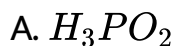
- A. It is highly poisonous and has smell like rotten fish.
- B. It's solution in water decomposes in the presence of light.
- C. It is more basic than  $NH_3$ .
- D. It is less basic than  $NH_3$ .

**Answer: C**



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9. Which of the following acids forms three series of salts ?



**Answer: C**



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10. Strong reducing behaviour of  $H_3PO_2$  is due to .....

A. low oxidation state of phosphorus.

B. presence of two -OH groups and one P-H bond.

C. presence of one -OH group and two P-H bonds.

D. high electron gain enthalpy of phosphorus.

**Answer: C**



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**11.** On heating lead nitrate forms oxides of nitrogen and lead.

The oxides formed are.....

A.  $N_2O$ ,  $PbO$

B.  $NO_2$ ,  $PbO$

C.  $NO$ ,  $PbO$

D.  $NO$ ,  $PbO_2$

**Answer: B**



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12. Which of the following elements does not show allotropy ?

A. Nitrogen

B. Bismuth

C. Antimony

D. Arsenic

**Answer: A**



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13. Maximum covalency of nitrogen is.....

A. 3

B. 5

C. 4

D. 6

**Answer: C**



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**14.** Which of the following statements is wrong ?

A. Single N-N bond is stronger than the single P-P bond.

B.  $PH_3$  can act as a ligand in the formation of coordination compound with transition elements.

C.  $NO_2$  is paramagnetic in nature.

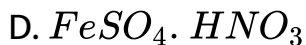
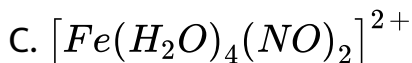
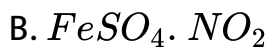
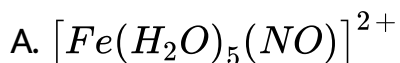
D. Covalency of nitrogen in  $N_2O_5$  is four.

**Answer: A**



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15. A brown ring is formed in the ring test for  $NO$  ion. It is due to the formation of



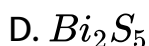
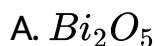
**Answer: A**



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16. Elements of group-15 form compounds in (+5) oxidation state. However, bismuth forms only one well characterised compound in (+5) oxidation state. The compound is.....



**Answer: B**



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17. On heating ammonium dichromate and barium azide separately we get

A.  $N_2$  in both cases

B.  $N_2$  with ammonium dichromate and NO with barium azide

C.  $N_2O$  with ammonium dichromate and  $N_2$  with barium azide

D.  $N_2O$  with ammonium dichromate and  $NO_2$  with barium azide

**Answer: A**



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18. In the preparation of  $HNO_3$ , we get NO gas by catalytic oxidation of ammonia. The moles of NO produced by the oxidation of two moles of  $NH_3$  will be.....

A. 2

B. 3

C. 4

D. 6

**Answer: B**



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19. The oxidation state of central atom in the anion of compound  $NaH_2PO_2$  will be .....

A. +3

B. +5

C. +1

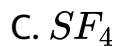
D. -3

**Answer: C**



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**20.** Which of the following is not tetrahedral in shape ?

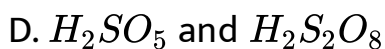
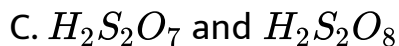
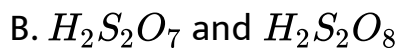
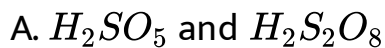


**Answer: C**



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**21. Which of the following are peroxoacids of sulphur ?**



**Answer: C**



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22. Hot cone.  $H_2SO_4$  acts as moderately strong oxidising agent. It oxidises both metals and non-metals. Which of the following element is oxidised by cone.  $H_2SO_4$  into two gaseous products ?

A. Cu

B. S

C. C

D. Zn

**Answer: C**



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23. A black compound of manganese reacts with a halogen acid to give greenish yellow gas. When excess of this gas reacts with  $NH_3$  an unstable trihalide is formed. In this process the oxidation state of nitrogen changes from.....

A. ( - 3) to ( + 3)

B. (-3) to 0

C. (-3) to (+5)

D. 0 to (-3)

**Answer: A**



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24. In the preparation of compounds of Xe, Bartlett had taken

$O_2^+ PtF_6^-$  is a base compound. This is because .....

- A. Both  $O_2$  and Xe have same size.
- B. Both  $O_2$  and Xe have same electron gain enthalpy.
- C. Both  $O_2$  and Xe have almost same ionisation enthalpy.
- D. Both Xe and  $O_2$  are gases.

**Answer: C**



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25. In solid state  $PCl_5$  is a.....

- A. Covalent solid



B. Octahedral structure

C. Ionic solid with  $[PCl_6]^+$  octahedral and  $[PCl_4]^-$  tetrahedral.

D. Ionic solid with  $[PCl_4]^+$  tetrahedral and  $[PCl_6]^-$  octahedral.

**Answer: D**



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**26.** Reduction potentials of some ions are given below.

Arrange them in decreasing order of oxidising power :

Ion	$ClO_4^-$	$IO_4^-$	$BrO_4^-$
Reduction potential ( $E^\circ/V$ )	1.19 V	1.65 V	1.74 V

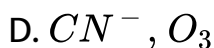
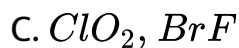
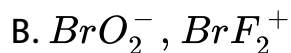
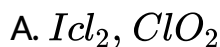


**Answer: C**



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**27. Which of the following is isoelectronic pair ?**



**Answer: B**



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## SECTION -D (NCERT EXEMPLAR SOLUTION) (MULTIPLE CHOICE QUESTIONS MCQS (MORE THAN ONE QUESTIONS))

1. If chlorine gas is passed through hot NaOH solution, two changes are observed in the oxidation number of chlorine during the reaction. These are ..... and .....

A. 0 to (+5)

B. 0 to (+3)

C. 0 to (-1)

D. 0 to (+1)

Answer: A::C::D



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2. Which of the following options are not in accordance with the property mentioned against them ?

A.  $F_2 > Cl_2 > Br_2 > I_2$  - Oxidising power.

B.  $MI > MBr > MCl > MF$  - Ionic character of metal halide.

C.  $F_2 > Cl_2 > Br_2 > I_2$  - Bond dissociation enthalpy.

D.  $HI > HBr > HCl > HF$  Hydrogen-halogen bond strength.

Answer: A::B::C::D



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3. Which of the following is correct for  $P_4$  molecule of white phosphorus ?

- A. It has 6 lone pairs of electrons.
- B. It has six P-P single bonds.
- C. It has three P-P single bonds.
- D. It has four lone pairs of electrons.

**Answer: A::B::D**



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4. Which of the following statements are correct ?

- A. Among halogens, radius ratio between iodine and fluorine is maximum.
- B. Leaving F-F bond, all halogens have weaker X-X bond than X-X' bond in interhalogens.
- C. Among interhalogen compounds maximum number of atoms are present in iodine fluoride.
- D. Interhalogen compounds are more reactive than halogen compounds

**Answer: A::C::D**



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5. Which of the following statements are correct for  $SO_2$  gas ?

- A. It acts as bleaching agent in moist conditions.
- B. It's molecule has linear geometry.
- C. It's dilute solution is used as disinfectant.
- D. It can be prepared by the reaction of dilute  $H_2SO_4$  with metal sulphide.

**Answer: A::C::D**



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6. Which of the following statements are correct ?

- A. All the three N - O bond lengths in  $HNO_3$  are equal.
- B. All P - Cl bond lengths in  $PCl_5$  molecule in gaseous state are equal.
- C.  $P_4$  molecule in white phosphorus have angular strain therefore white phosphorus is very reactive.
- D.  $PCl_5$  is ionic in solid state in which cation is tetrahedral and anion is octahedral.

**Answer: A::C::D**



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7. Which of the following orders are correct as per the properties mentioned against each ?



A.  $As_2O_3 < SiO_2 < P_2O_3 < SO_2$  - Acid strength

B.  $AsH_3 < PH_3 < NH_3$  - Enthalpy of vapourisation.

C.  $S < O < Cl < F$  - More negative electron gain enthalpy.

D.  $H_2O > H_2S > H_2Se > H_2Te$  - Thermal stability.

**Answer: A::D**



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**8. Which of the following statements are correct ?**

A. S - S bond is present in

B. In peroxosulphuric acid ( $H_2SO_5$ ) sulphur is in (+6) oxidation state.

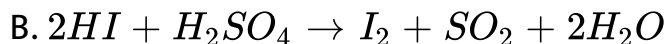
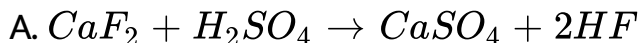
- C. Iron powder along with  $Al_2O_3$  and  $K_2O$  is used as a catalyst in the preparation of  $NH_3$  by Haber's process.
- D. Change in enthalpy is positive for the preparation of  $SO_3$  by catalytic oxidation of  $SO_2$

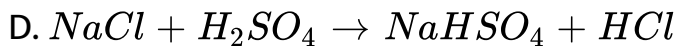
**Answer: A::B::D**



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**9.** In which of the following reactions conc.  $H_2SO_4$  is used as an oxidising reagent ?





Answer: A::B::C::D



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10. Which of the following statements are true ?

- A. Only type of interactions between particles of noble gases are due to weak dispersion forces.
- B. Ionisation enthalpy of molecular oxygen is very close to that of xenon.
- C. Hydrolysis of  $\text{XeF}_6$  is a redox reaction.
- D. Xenon fluorides are not reactive.

Answer: A::B::D



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## SECTION -D (NCERT EXEMPLAR SOLUTION) (SHORT ANSWER TYPE QUESTIONS)

1. 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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2. Write a balanced chemical equation for the reaction showing catalytic oxidation of  $NH_3$  by atmospheric oxygen.



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3. Write the structure of pyrophosphoric acid.



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4.  $PH_3$  forms bubbles when passed slowly in water but  $NH_3$  dissolves. Explain why ?



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5. In  $PCl_5$ , phosphorus is in  $sp^3d$  hybridised state but all its five bonds are not equivalent. Justify your answer with reason.



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6. Why is nitric oxide paramagnetic in gaseous state but the solid obtained on cooling it is diamagnetic ?



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7. Give reason to explain why  $ClF_3$  exists but  $FCl_3$  does not exist.



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8. Out of  $H_2O$  and  $H_2S$ , which one has higher bond angle and why ?



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



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10. On reaction with  $Cl_2$ , phosphorus forms two types of halides 'A' and 'B'. Halide A is yellowish-white powder but halide 'B' is colourless oily liquid. Identify A and B and write the formulas of their hydrolysis products.

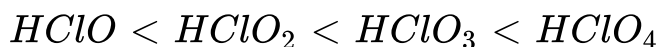


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11. In the ring test of  $NO_3^-$  ion,  $Fe^{2+}$  ion reduces nitrate ion to nitric oxide, which combines with  $Fe_{aq}^{2+}$  ion to form brown complex. Write the reactions involved in the formation of brown ring.

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12. Explain why the stability of oxoacids of chlorine increases in the order given below :

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13. Explain why ozone is thermodynamically less stable than oxygen ?

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14.  $P_4O_6$  reacts with water according to equation  $P_4O_6 + 6H_2O \rightarrow 4H_3PO_3$ . Calculate the volume of 0.1 M



NaOH solution required to neutralise the acid formed by dissolving 1.1 g of  $P_4O_6$  in  $H_2O$  .



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**15.** White phosphorus reacts with chlorine and the product hydrolyses in the presence of water. Calculate the mass of HCl obtained by the hydrolysis of the product formed by the reaction of 62 g of white phosphorus with chlorine in the presence of water.



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**16.** Name three oxoacids of nitrogen. Write the disproportionation reaction of that oxoacid of nitrogen in which nitrogen is in (+3) oxidation state.



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**17.** Nitric acid forms an oxide of nitrogen on reaction with  $P_4O_{10}$ . Write the reaction involved. Also write the resonating structures of the oxide of nitrogen formed.



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**18.** Phosphorus has three allotropic forms :

(i) white phosphorus

(ii) red phosphorus and

(iii) black phosphorus. Write the difference between white and red phosphorus on the basis of structure.



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19. Give an example to show the effect of concentration of nitric acid on the formation of oxidation product.



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20.  $PCl_5$  reacts with finely divided silver on heating and a white silver salt is obtained, which dissolves on adding excess aqueous  $NH_3$  solution. Write the reactions involved to explain what happens.



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21. Phosphorus forms a number of oxoacids. Out of these oxoacids phosphinic acid has strong reducing property. Write

its structure and also write a reaction showing its reducing behaviour.



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## SECTION -D (NCERT EXEMPLAR SOLUTION)(MATCHING THE COLUMNS)

1. Match the compounds given in Column-I with the hybridisation and shape given in Column-II and mark the correct option.

Column-I	Column-II
(A) $\text{XeF}_6$	(1) $sp^3d^3$ distorted octahedral
(B) $\text{XeO}_3$	(2) $sp^3d^2$ square planar
(C) $\text{XeOF}_4$	(3) $sp^3$ pyramidal
(D) $\text{XeF}_4$	(4) $sp^3d^2$ square pyramidal

A. A-(1), B-(3), C-(4), D-(2)

B. A-(1), B-(2), C-(4), D-(3)

C. A-(4), B-(3), C-(1), D-(2)

D. A-(4), B-(1), C-(2), D-(3)

**Answer: a**



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**2.** Match the formulas of oxides given in Column-I with the type of oxide given in Column-II and mark the correct option.

Column-I	Column-II
(A) $\text{Pb}_3\text{O}_4$	(1) Neutral oxide
(B) $\text{N}_2\text{O}$	(2) Acidic oxide
(C) $\text{Mn}_2\text{O}_7$	(3) Basic oxide
(D) $\text{Bi}_2\text{O}_3$	(4) Mixed oxide

A. A-(1), B-(2), C-(3), D-(4)

B. A-(4), B-(1), C-(2), D-(3)

C. A-(4), B-(2), C-(4), D-(1)

D. A-(4), B-(3), C-(1), D-(2)

**Answer: b**



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**3. Match the items of Columns-I and II and mark the correct option.**

Column-I	Column-II
(A) $\text{H}_2\text{SO}_4$	(1) Highest electron gain enthalpy
(B) $\text{CCl}_3\text{NO}_2$	(2) Chalcogen
(C) $\text{Cl}_2$	(3) Tear gas
(D) Sulphur	(4) Storage batteries

A. A-(4), B-(3), C-(1), D-(2)

B. A-(3), B-(4), C-(1), D-(2)

C. A-(4), B-(1), C-(2), D-(3)

D. A-(2), B-(1), C-(1), D-(2)

**Answer: a**



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**4.** Match the species given in Column-I with the shape given in Column-II and mark the correct option.

Column-I	Column-II
(A) $\text{SF}_4$	(1) Tetrahedral
(B) $\text{BrF}_3$	(2) Pyramidal
(C) $\text{BrO}_3^-$	(3) Sea-saw shaped
(D) $\text{NH}_4^+$	(4) Bent T-shaped

A. A-(3), B-(2), C-(1), D-(4)

B. A-(3), B-(4), C-(2), D-(1)

C. A-(1), B-(2), C-(3), D-(4)

D. A-(1), B-(4), C-(3), D-(2)

**Answer: b**



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**5. Match the items of Columns-I and II and mark the correct option.**



Column-I	Column-II
(A) Its partial hydrolysis does not change oxidation state of central atom	(1) He
(B) It is used in modern diving apparatus	(2) $\text{XeF}_6$
(C) It is used to provide inert atmosphere for filling electrical bulbs	(3) $\text{XeF}_4$
(D) Its central atom is in $sp^3d^2$ hybridisation	(4) Ar

A. A-(1), B-(4), C-(2), D-(3)

B. A-(1), B-(2), C-(3), D-(4)

C. A-(2), B-(1), C-(4), D-(3)

D. A-(1), B-(3), C-(2), D-(4)

**Answer: c**



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## SECTION -D (NCERT EXEMPLAR SOLUTION)(ASSERTION AND REASON TYPE)

1. Assertion :  $N_2$  is less reactive than  $P_4$ .

Reason : Nitrogen has more electron gain enthalpy than phosphorus.

- A. Both assertion and reason are correct statements, and reason is the correct explanation of the assertion.
- B. Both assertion and reason are correct statements, but reason is not the correct explanation of the assertion.
- C. Assertion is correct, but reason is wrong statement.
- D. Assertion is wrong but reason is correct statement.

**Answer: c**



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2. Assertion :  $HNO_3$  makes iron passive.

Reason :  $HNO_3$  forms a protective layer of ferric nitrate on the surface of iron.

- A. Both assertion and reason are correct statements, and reason is the correct explanation of the assertion.
- B. Both assertion and reason are correct statements, but reason is not the correct explanation of the assertion.
- C. Assertion is correct, but reason is wrong statement.
- D. Assertion is wrong but reason is correct statement.

Answer: c



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3. Assertion : HI cannot be prepared by the reaction of KI with concentrated  $H_2SO_4$ .

Reason : HI has lowest H-X bond strength among halogen acids.

- A. Both assertion and reason are correct statements, and reason is the correct explanation of the assertion.
- B. Both assertion and reason are correct statements, but reason is not the correct explanation of the assertion.
- C. Assertion is correct, but reason is wrong statement.
- D. Assertion is wrong but reason is correct statement.

**Answer: b**



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4. Assertion : Both rhombic and monoclinic sulphur exist as  $S_8$  but oxygen exists as  $O_2$  .

Reason : Oxygen forms  $pn - pn$  multiple bond due to small size and small bond length but  $p\pi - p\pi$  bonding is not possible in sulphur.

- A. Both assertion and reason are correct statements, and reason is the correct explanation of the assertion.
- B. Both assertion and reason are correct statements, but reason is not the correct explanation of the assertion.
- C. Assertion is correct, but reason is wrong statement.
- D. Assertion is wrong but reason is correct statement.

**Answer: a**



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5. Assertion :  $\text{NaCl}$  reacts with concentrated  $\text{H}_2\text{SO}_4$  to give colourless fumes with pungent smell. But on adding  $\text{MnO}_2$  the fumes become greenish yellow.

Reason :  $\text{MnO}_2$  oxidises  $\text{HCl}$  to chlorine gas which is greenish yellow.

- A. Both assertion and reason are correct statements, and reason is the correct explanation of the assertion.
- B. Both assertion and reason are correct statements, but reason is not the correct explanation of the assertion.
- C. Assertion is correct, but reason is wrong statement.
- D. Assertion is wrong but reason is correct statement.

**Answer: a**



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**6.** Assertion :  $SF_6$  cannot be hydrolysed but  $SF_4$  can be.

Reason : Six F atoms in  $SF_6$  prevent the attack of  $H_2O$  on sulphur atom of  $SF_6$ .

- A. Both assertion and reason are correct statements, and reason is the correct explanation of the assertion.
- B. Both assertion and reason are correct statements, but reason is not the correct explanation of the assertion.
- C. Assertion is correct, but reason is wrong statement.
- D. Assertion is wrong but reason is correct statement.

Answer: a



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## SECTION -D (NCERT EXEMPLAR SOLUTION)(LONG ANSWER TYPE QUESTIONS)

1. An amorphous solid "A" burns in air to form a gas "B" which turns lime water milky. The gas is also produced as a by-product during roasting of sulphide ore. This gas decolourises acidified aqueous  $KMnO_4$  solution and reduces  $Fe^{3+}$  to  $Fe^{2+}$ . Identify the solid "A" and the gas "B" and write the reactions involved.



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2. On heating lead (II) nitrate gives a brown gas "A". The gas "A" on cooling changes to colourless solid "B". Solid "B" on heating with NO changes to a blue solid «C. Identify 'A', 'B' and 'C' and also write reactions involved and draw the structures of 'B' and 'C\



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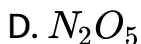
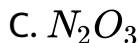
3. On heating compound (A) gives a gas (B) which is a constituent of air. This gas when treated with 3 moles of hydrogen ( $H_2$ ) in the presence of a catalyst gives another gas (C) which is basic in nature. Gas C on further oxidation in moist condition gives a compound (D) which is a part of acid rain. Identify compounds (A) to (D) and also give necessary equations of all the steps involved.



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## SECTION-E (MULTIPLE CHOICE QUESTIONS (MCQS)) (DARPAN.S EXAM ORIENTED MCQS)

1. Which of the following oxide is known as mixed anhydride ?

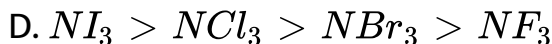
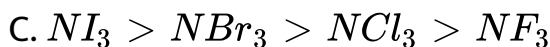
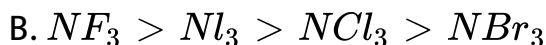
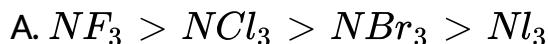


**Answer: B**



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2. Which of the following is the correct order of Lewis basic strength ?

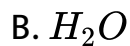


**Answer: C**



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3. Which of the following cannot act as an electron pair donor ?



**Answer: A**



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4. In phosphorus acid, the number of OH group present is/are .....

A. One

B. Two

C. Three

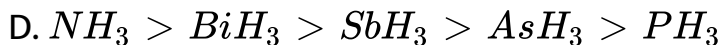
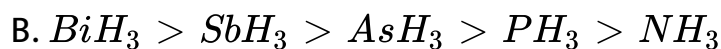
D. Four

Answer: B



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5. The correct order of basic strength of hydrides of group-15 is .....



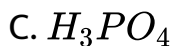
Answer: A



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6. The product of the reaction of  $P_4O_{10}(s)$  with water is

.....



**Answer: C**



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7. In determination of boiling points, the Van- der-Waal's force is likely to be dominant in.....

A.  $Br_2$

B.  $HCl$

C.  $H_2S$

D.  $NH_3$

**Answer: A**



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**8. Which of the following compounds is most stable ?**

A.  $LiI_3$

B.  $CsI_3$

C.  $NaI_3$

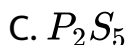
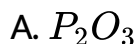
D.  $KI_3$

**Answer: B**



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9. A colourless gas with rotten fish smell, burns spontaneously with a bright flash, giving beautiful vortex rings of white smoke is.....



**Answer: B**

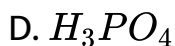
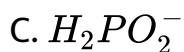
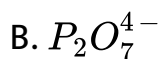
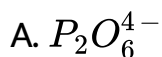


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10. Amongst the following, the strongest reducing agent is

.....



**Answer: C**



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11. In the reaction :  $H_2O + Br_2 \rightarrow HOBr + HBr$ ,  $Br_2$  gets

.....

- A. Only reduced
- B. Only oxidized
- C. Disproportionates
- D. Neither oxidised nor reduced

**Answer: C**



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**12.** In presence of Lewis acid, which Xenon compound is an excellent fluorinating agent ?

- A.  $\text{XeOF}_2$
- B.  $\text{XeF}_2$
- C.  $\text{XeF}_6$

D.  $XeF_4$

**Answer: B**



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**13.** The true statement for the acids of phosphorus  $H_3PO_2$ ,  $H_3PO_3$  and  $H_3PO_4$  is .....

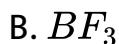
- A. The order of acidity is  $H_3PO_4 > H_3PO_3 > H_3PO_2$
- B. All acids are reducing agents.
- C. All of them are tribasic acids.
- D. In all three acids, the geometry of phosphorus is tetrahedral.

**Answer: D**



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14. In which of the following compounds, all bond lengths are not equal ?



**Answer: A**



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15. Ozone ( $O_3$ ) will not oxidise .....

A.  $KMnO_4$

B.  $KI$

C.  $PbS$

D.  $FeSO_4$

**Answer: A**



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**16.** Which of the following is the correct order of the boiling points of hydrides of group-16 ?

A.  $H_2Te > H_2O > H_2Se > H_2S$

B.  $H_2O > H_2Te > H_2Se > H_2S$

C.  $H_2O > H_2S > H_2Se > H_2Te$



**Answer: B**



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17. The halogen with highest polarisability is.....

A. Fluorine

B. Chlorine

C. Bromine

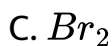
D. Iodine

**Answer: D**



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18. The halogen that absorbs a light of maximum wavelength is .....



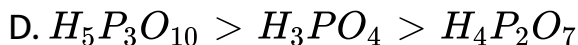
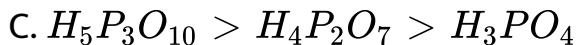
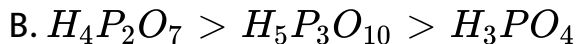
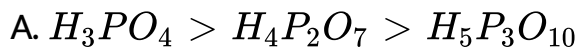
**Answer: D**



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19. The correct order of acidic strength of acids :

$H_3PO_4$ ,  $H_4P_2O_7$  and  $H_5P_3O_{10}$  is .....



**Answer: C**



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**20.** Identify the correct order of acidic strength.





**Answer: B**



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**21.** The correct order of oxidizing nature of  $Ocl^-$ ,  $Obr^-$  and  $Ol^-$  ions are.....

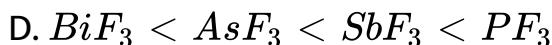
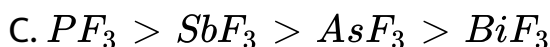
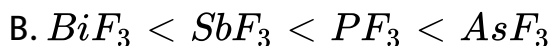
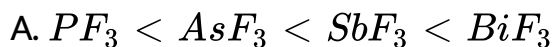


**Answer: A**



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22. The correct order of melting points of group-15 trifluorides is .....



**Answer: A**



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23. Brown colour of  $HNO_3$  can be removed by....

A. adding Mg powder.

B. passing air through warm acid.

C. passing  $NH_3$  through acid.

D. boiling the acid

**Answer: B**



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**24.** When a zinc reacts with very dilute nitric acid it produces

.....

A. NO

B.  $NO_2$

C.  $NH_4NO_3$

D.  $H_2$

**Answer: C**



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**25.** Which reagent can be used to distinguish  $O_3$  and  $H_2O_2$  ?

A.  $H_2S$

B.  $KMnO_4$

C. PbS

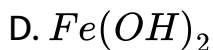
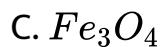
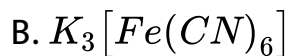
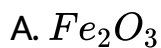
D. NaI

**Answer: B**



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26. Ozone reacts with  $K_4[Fe(CN)_6]$  to form .....



**Answer: B**



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27. The number of S - O bonds in  $H_2S_2O_8$ .....

A. 10

B. 12

C. 9

D. 8

**Answer: B**



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**28.** Which of the following statements about oxide of phosphorus is not correct ?

A.  $P_4O_{10}$  is anhydride of  $H_3PO_4$

B.  $P_4O_6$  is anhydride of  $H_3PO_3$

C.  $P_4O_6$  act as a ligand for transition element

D. P - P bonds are present in  $P_4O_6$

**Answer: D**



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29. Which of the following reacts with  $AsF_3$  in liquid  $BrF_3$ ?

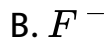
- A.  $XeF_6$  only
- B.  $XeF_6$  and  $XeF_4$
- C.  $XeF_2$  and  $XeF_6$
- D.  $XeF_6$  and  $XeF_2$

Answer: C



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30. For a reaction:  $HX(aq) + H_2O$

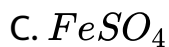
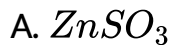


**Answer: C**



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**31.** Which of the following on heating gives mixture of  $\text{SO}_2$  and  $\text{SO}_3$  ?





D.  $Na_2SO_4$

**Answer: C**



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**32.** When an alkali metal fluoride are dissolved in  $XeF_4$ , the anion X is formed. The shape of anion X is .....

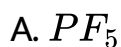
- A. Octahedral
- B. Square antiprismatic
- C. Pentagonal monopiramidal
- D. Distorted octahedral

**Answer: C**



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33. Which of the following is least stable ?

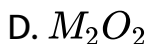
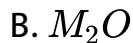


**Answer: B**



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34. When an alkali metal hydroxide is reacted with ozone, a dark red coloured compound formed is .....

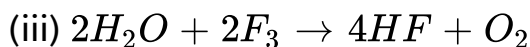
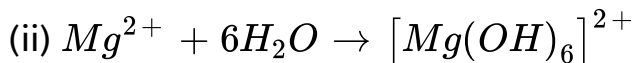


**Answer: C**



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**35.** Consider the following reactions of water :



The role of a water in a reaction (i), (ii) and (iii) are.....

A. oxidant, base and reductant

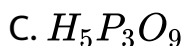
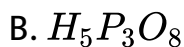
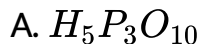
- B. acid, base and oxidant.
- C. base, reductant and oxidant
- D. reductant, acid and base.

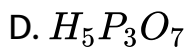
**Answer: A**



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**36.** Amongst the following oxoacids of phosphorus, which oxoacids has phosphorus in (+4), (+3) and (+4) oxidation states ?



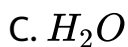
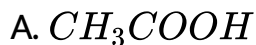


**Answer: B**



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**37.** Which of the following compounds with  $H_2SO_4$  will act as an acid ?



**Answer: B**



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38. Which of the following compounds will not undergo hydrolysis ?

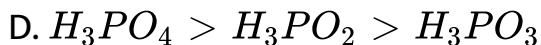
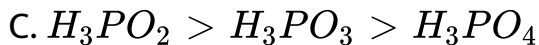
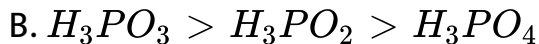
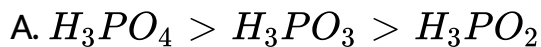


**Answer: A**



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39. The correct order of acidic strength of oxo acids of phosphorus is .....

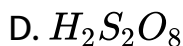
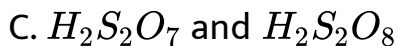
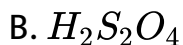
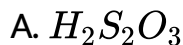


**Answer: C**



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**40.** The compound having S - S single bond is .....



**Answer: B**



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**41.** The number P = O bonds present in tetrabasic  $H_4P_2O_7$  is.....

A. Three

B. two

C. one

D. four

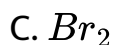
**Answer: B**



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42. Which of the following does not form halite when treated with concentrated alkali ?



**Answer: B**

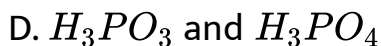
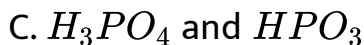
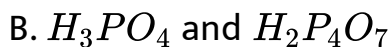
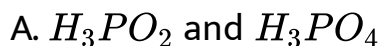


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43. Consider the following sequence of reactions :



In the above sequence of reactions Y and A are respectively.....



**Answer: A**



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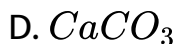
**44.** A certain compound (X) shows the following reactions :

(i) When  $K_3$  is added to an aqueous suspension of (X) containing acetic acid, iodine is liberated.

(ii) When  $CO_2$  is passed through an aqueous suspension of

(X), the turbidity transforms to a precipitate.

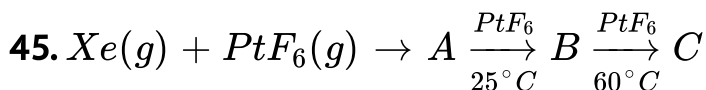
(iii) When (X) is heated with ethyl alcohol, a product of anesthetic use is obtained. The (X) is .....



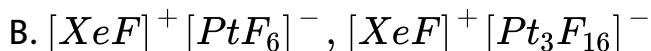
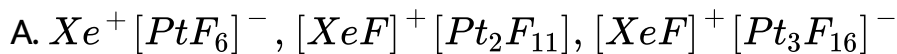
**Answer: B**



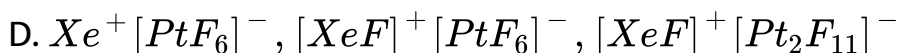
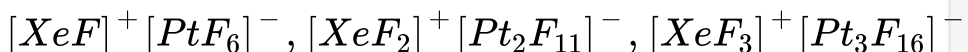
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The products A, B and C are respectively.



C.



**Answer: D**



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**46.** Which of the following element never shows disproportionation reaction ?

A. Nitrogen

B. Phosphorus

C. Fluorine

D. Bromine

**Answer: C**



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**47. Which of the following is not an oxidizing agent ?**

A.  $SO_2$

B.  $H_2SO_4$

C.  $HNO_3$

D.  $H_3PO_4$

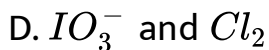
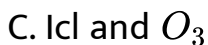
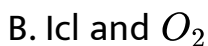
**Answer: D**



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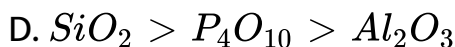
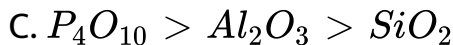
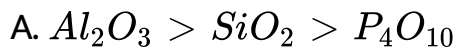
48.  $\text{ClO}_3^-$  reacts with  $\text{I}_2$  to form.....



**Answer: D**

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49. Which of the following is the correct order of acidic nature of oxide ?



**Answer: B**

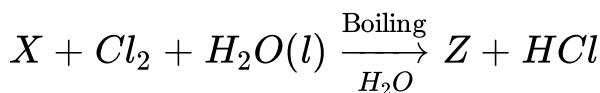


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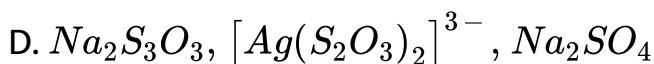
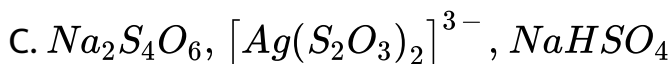
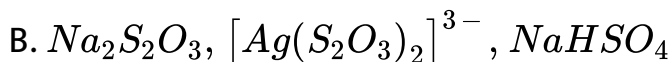
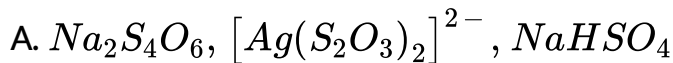
**50.** Consider the following reaction :



(Soluble complex)



The (X), (Y) and (Z) are respectively

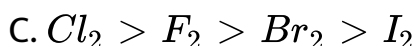
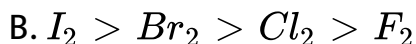
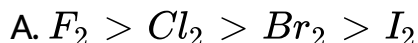


**Answer: B**

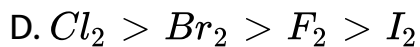


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**51.** The correct order of bond dissociation enthalpy of halogens is.....





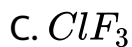


**Answer: D**



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**52.** Which of the following compound does not exist ?



**Answer: B**



**Watch Video Solution**

53.  $XeF_2$  on hydrolysis yeild.....



**Answer: D**



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54. Which of the following does not form cage compounds ?



C. Xe

D. Kr

**Answer: B**



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**55. Which of the following is known as "Stranger" gas ?**

A. Xe

B.  $Cl_2$

C.  $O_3$

D.  $SO_2$

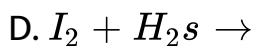
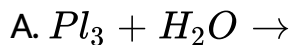
**Answer: A**



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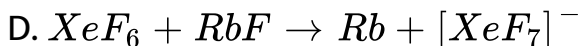
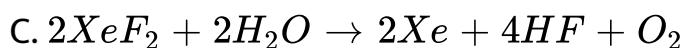
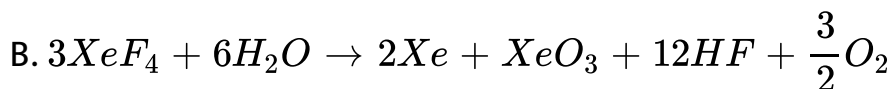
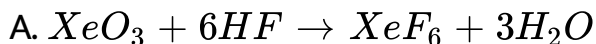
56. HI can not be prepared by which of the following methods ?



**Answer: B**

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57. Which one of the following reactions of xenon compound is not feasible ?



**Answer: A**



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58. Identify the incorrect statement :



B.  $Cl_2$  reacts with excess  $NH_3$  to give  $NH_4Cl$  and  $HCl$ .

C.  $Br_2$  reacts with hot and concentrated alkali to give  $BrO_3$  and  $Br$ .

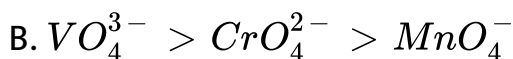
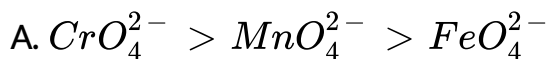
D. Rhombic sulphur dissolves in boiling concentrated solution of sodium sulphite to form sodium thiosulphate.

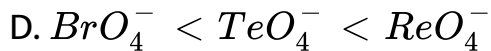
**Answer: B**



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**59.** The correct order of oxidizing power is .....



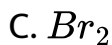


**Answer: C**



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**60.** Phosphine explodes in presence of.....



D. All of these

**Answer: D**



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**61.** Which of the following element possess highest metallic properties ?

A. P

B. As

C. Sb

D. Bi

**Answer: D**



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**62.** .....elements does not possess allotropes.



A. N

B. Bi

C. P

D. As

**Answer: A**



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**63.** Nitrogen can form.....type of oxides.

A. 4

B. 5

C. 6

D. 7

**Answer: C**



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**64.** Choose correct option by using T (true) or F (false) :

(i) In group-15, stability of +3 oxidation state increases down the group.

(ii) In group-15, stability of -3 and +5 oxidation state decreases down the group.

(iii) Nitrogen element possess +1 to +7 oxidation state when it react with oxygen elements.

(iv) Elements of group-15 possess general oxidation state of -3, +3 and +5.

A. FTTF

B. TTTT

C. TTFT

D. FFFF

**Answer: C**



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**65. Which element does not form stable diatomic molecule ?**

A. Oxygen

B. Phosphorous

C. Chlorine

D. Nitrogen

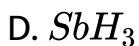
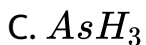
**Answer: B**



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66. ....hydrides are non inflammable.



**Answer: A**

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67. Which of the following trihalide is least basic ?



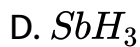
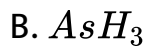
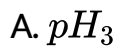


**Answer: C**



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**68.** .....is highest soluble in water.



**Answer: C**



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**69.** Which factor is suitable for inertness of  $N_2$  ?

- A. d-orbital is not vacant
- B. high electronegativity
- C. high dissociation enthalpy
- D. none of the above

**Answer: C**



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70. .... gas is obtained on reaction of ammonium sulphate with caustic soda ?

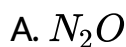


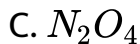
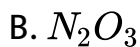
**Answer: D**



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71. ....oxide is linear.





**Answer: A**



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**72.** In blast furnace, which mixture on heating gives phosphorous ?

A. Ash of bone and coke.

B. Ash of bone, silica and coke.

C. Ash of bone and silica.

D. None of the above



**Answer: B**



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**73.** Phosphine gas gives explosion on contact with .....

- A. Hydrolytic agent
- B. Reducing agent
- C. Oxidizing agent
- D. None of the above

**Answer: C**



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74. What is possessed by pyrophosphoric acid ?

- A. Four hydroxylic group
- B. + 3 oxidation of P
- C. Five oxygen molecule
- D. P - P bond

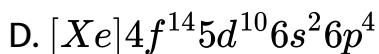
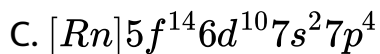
**Answer: A**



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75. Electronic arrangement of pollonium is.....

- A.  $[Kr]4f^{14}5d^{10}6s^26p^3$
- B.  $[Xe]4f^{14}5d^{10}6s^16p^3$



**Answer: D**



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**76.** Which of the following has highest electronegativity ?

A. Oxygen

B. Sulphur

C. Tellurium

D. Sellenium

**Answer: A**



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77. Liquid oxygen possess.....color.

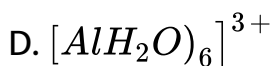
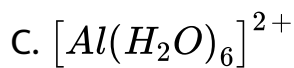
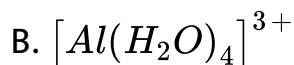
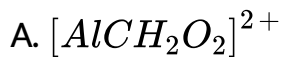
- A. Red
- B. Dark blue
- C. Faint blue
- D. Black

**Answer: C**



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78. When  $Al_2O_3$  is reacted with aqueous solution of HCl gives.....complex.



**Answer: D**



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**79.** What is industrial name of  $H_2S_2O_7$  ?

A. Pyrosulphuric acid

B. Marshall's acid

C. Olum

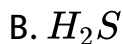
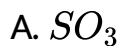
D. (A), (B) and (C) all three

**Answer: D**



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**80.** When Cu metal is heated with concentrated sulphuric acid, then.....is obtained.

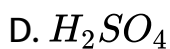
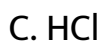
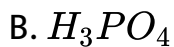


**Answer: C**



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81. ....acid is useful in lead storage cell.



**Answer: D**



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82. Number of  $S = O$  bond present in  $H_2S_2O_8$  is .....

A. 2

B. 3

C. 4

D. 6

**Answer: C**



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**83.** In.....oxidation number of sulphur is +7.

A.  $H_2SO_4$

B.  $SO_2$

C.  $H_2S$

D. none of above

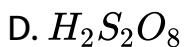
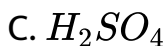
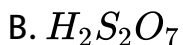
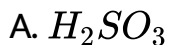
**Answer: D**



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84. In.....oxoacid of sulphur has lone pair of electron on sulphur atom.



**Answer: A**



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85. Atomic number of At is .....

A. 117

B. 85

C. 53

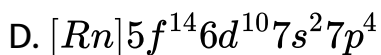
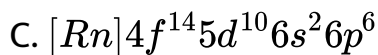
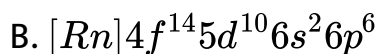
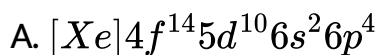
D. 167

**Answer: B**



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**86.** Electronic arrangement of Lv is.....



**Answer: D**



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**87.** Chlorination of ethane is carried out in presence of .....

A. Anhydrous  $AlBr_3$

B.  $HgCl_2$

C.  $ZnCl_2$

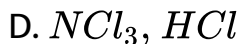
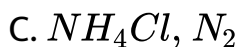
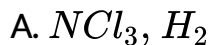
D. Ultra violet light

**Answer: D**



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**88.** Reaction of ammonia gas with excess of dichlorine gas produces ..... and ..... products.



**Answer: D**



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**89.** To solublize nobel metals like gold, platinum .....mixture is used.

- A. 1:3 concentrated HCl and concentrated  $HNO_3$
- B. 1:3 concentrated  $HNO_3$  and concentrated HCl
- C. 1:3 concentrated  $HNO_3$  and concentrated  $H_2SO_4$
- D. 1: 3 concentrated  $H_2SO_4$  and concentrated HCl

**Answer: B**



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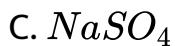
**90.** What is the molecular formula of bromic acid ?

- A. HOBrO
- B.  $HOBrO_3$
- C.  $HOBrO_2$
- D.  $HOBrO_4$

**Answer: C**



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**Answer: A**



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92. What is the atomic arrangement of P atom in orthophosphorous acid ?

- A. Tetrahedral
- B. Octahedral
- C. Square planar
- D. None of the above

**Answer: D**



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93. What is the shape of  $PCl_5$  ?

- A. Pyramidal

B. Trigonal bipyramidal

C. Tetrahedral

D. Angular

**Answer: B**



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**94.** Basicity of phosphorous acid is .....

A. 1

B. 2

C. 3

D. 4



**Answer: B**



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**95.** Which of the following inert gas is highly reactive ?

A. He

B. Ne

C. Ar

D. Xe

**Answer: D**



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96. Which of the following molecule has planar shape ?



**Answer: B**



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97. Which of the following gas has least solubility in water ?



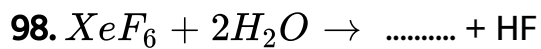
C. Ar

D. Xe

**Answer: D**



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**Answer: A**



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99. What is the role of  $Fe(OH)_3$  in the contact process ?

- A. To remove colloidal impurities
- B. To remove moisture
- C. To remove dust particles
- D. To remove impurities of Arsenic

**Answer: D**



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100. A : Al forms  $[AlF_6]^{3-}$  but B does not form  $[BF_6]^{3-}$  R : B does not react with fluorine.

A. a

B. b

C. c

D. d

**Answer: C**



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**101.** Which of the following is a strongest oxidising agent ?

A.  $Br_2$

B.  $I_2$

C.  $Cl_2$

D.  $F_2$

**Answer: D**



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**102.** Tincture of iodine is -

- A. aqueous solution of  $I_2$
- B. solution of  $I_2$  in aqueous KI
- C. alcoholic solution of  $I_2$
- D. aqueous solution of KI

**Answer: B**



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**103.** A : The S-S-S bond angle in  $S_8$  molecule is  $105^\circ$  R :  $S_8$  has a V-shape.

A. a

B. b

C. c

D. d

**Answer: C**



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**104.** Phosphine is prepared by the reaction of water with which reagent ?

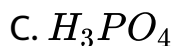
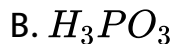
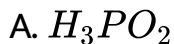
- A. Calcium phosphide
- B. Calcium hydride
- C. Calcium dihydorgen phosphate
- D. Calcium phosphate

**Answer: A**

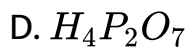


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**105.** Which of the following have maximum number of P - H bond ?







**Answer: A**



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**106.** Which colourless gas turns brown in air ?

A. NO

B.  $NO_2$

C.  $N_2O_4$

D.  $N_2O_5$

**Answer: A**



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107. What is not correct for  $SO_2(g)$  ?

- A. It is angular in shape
- B. both S - O bonds are same
- C. It decolourise the  $KMnO_4$  solution
- D. It is dehydrating agent

**Answer: D**



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108. Bromine is added to cold dilute aqueous solution of NaOH. The mixture is boiled. Which of the following statements is not true ?

- A. During the reaction bromine is present in four different oxidation states.
- B. The greatest difference between the various oxidation states of bromine is 5.
- C. On acidification of the final mixture bromine is formed.
- D. Disproportionation of bromine occurs during the reaction.

**Answer: C**



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**109.** The shape and hybridisation of some xenon oxyfluorides are given. Choose the wrong set.

A.  $XeOF_2 \rightarrow$  T-Shape- $sp_3d$

B.  $XeOF_4 \rightarrow$  Square pyramidal- $sp_3d_2$

C.  $XeO_2F_2 \rightarrow$  Distorted trigonal bipyramidal- $sp^3d$

D.  $XeO_3F_2 \rightarrow$  Octahedral- $sp_3d$

**Answer: D**



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**110. A :**  $PCl_5$  is covalent in gaseous and liquid states but ionic in solid state.

**R:**  $PCl_5$  in solid state consists of tetrahedral  $PCl_4^+$  cation and octahedral  $PCl_6^-$  anion.

**A. a**

B. b

C. c

D. d

**Answer: A**



**View Text Solution**

**111.** What is the product when  $P_4O_{10}$  is dissolves in water ?

A. Phosphorous acid

B. Orthophosphoric acid

C. Phosphoric acid

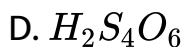
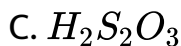
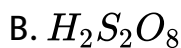
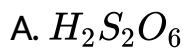
D. None of these

**Answer: B**



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**112.** Which of the following compound have O - O bonding?



**Answer: B**



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**113.** Sulphur atom of which oxoacid have non bonding electron pair ?

- A. Sulphurous acid
- B. Sulphuric acid
- C. Disulphuric acid
- D. Pyrosulphuric acid

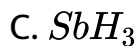
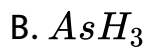
**Answer: A**



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**114.** Which hydride of group 15 is unstable ?

- A.  $PH_3$



**Answer: D**



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**115.** What is the basicity of pyrophosphorous acid ?

A. 2

B. 4

C. 1

D. 5

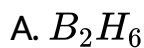


**Answer: A**



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**116.** Iodine oxidises sodium borohydride to give



B. Sodium hydride

C. HI



**Answer: A**



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**117.** What is the oxidation state of phosphorous element in cyclometa phosphoric acid ?

A. + 3

B. + 5

C. - 3

D. + 2

**Answer: B**



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**118.** The wrong statement about fullerene is.

A. it has 5-membered carbon ring.

B. it has 6-membered carbon ring.

C. it has  $sp_2$  hybridization.

D. it has 5-membered rings more than 6-membered rings.

**Answer: D**



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**119.** Best reagent for the conversion of  $AgNO_3$  to Ag is .....

A.  $HClO_4$

B.  $H_3PO_2$

C.  $HIO_4$

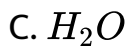
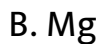
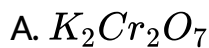
D.  $I_2$

**Answer: B**



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**120.** Which of the following can be oxidised by  $SO_2$  ?



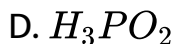
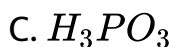
D. All of these

**Answer: B**



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121. Which of the following oxoacids of phosphorus is a reducing agent and a monobasic acid as well ?



**Answer: D**



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122. Which of the following is true for  $N_2O_5$  ?

A. It exists in solid state in the form of  $[NO_2][NO_3]$

- B. It is a brown gas
- C. It is an anhydride of  $HNO_2$
- D. It is paramagnetic

**Answer: A**



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**123.** Which of the following contains atleast one lone pair in all of its halides ?

- A. Cl
- B. N
- C. Se
- D. Xe

**Answer: D**



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## **SECTION-E (MULTIPLE CHOICE QUESTIONS (MCQS)) (MCQS ASKED IN COMPETITIVE EXAM)**

**1. Which is the possible oxidation states of phosphorus in its compounds ?**

A.  $-3$  to  $+5$

B.  $-3$ ,  $+3$  to  $+5$

C.  $-3$ ,  $0$ ,  $+5$

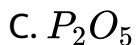
D.  $0$  to  $+5$

**Answer: A**



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2. Which of the following is an amphoteric ?



**Answer: A**



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3. Which inert element is the most reactive ?



A. He

B. Xe

C. Ar

D. Ne

**Answer: B**



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**4. What is the formula of cryolite ?**

A.  $Na_3 \cdot AlF_6$

B.  $Al_2O_3 \cdot 2H_2O$

C.  $K \cdot AlSi_2O_3$

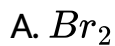
D.  $Al_2O_3$

**Answer: A**



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5. Which halogen element is obtained from sea weeds ?

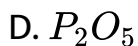
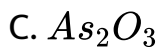
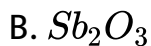
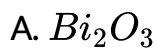


**Answer: B**



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6. Which of the following oxides of group 15 is most acidic ?



**Answer: D**



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7. Which compound have maximum value of bond energy ?



C. HI

D. HCl

**Answer: B**



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**8. What is the formula of sodium pyro phosphate?**

A.  $Na_4P_2O_7$

B.  $Na_2P_2O_7$

C.  $Na_3P_4O_7$

D.  $Na_3PO_4$

**Answer: A**



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9. Which statement is correct for  $H_3PO_3$  and  $H_3PO_4$  ?

A.  $H_3PO_3$  is a monobasic and reducing agent.

B.  $H_3PO_3$  is a dibasic & reducing agent.

C.  $H_3PO_4$  is a tribasic and reducing agent.

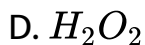
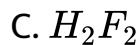
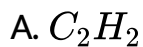
D.  $H_3PO_4$  is a tribasic and oxidising agent.

**Answer: B**



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10. The shape of  $O_2F_2$  resemble with shape of which of the following molecule ?

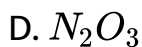
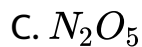


**Answer: D**



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**11. Which oxide of Nitrogen is in solid form ?**



**Answer: C**



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**12. Which allotropes of phosphorous is most stable ?**

A. Black P

B. Red P

C. Yellow P

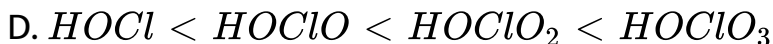
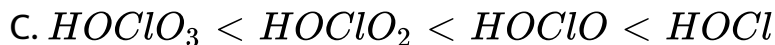
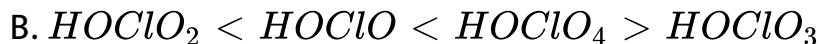
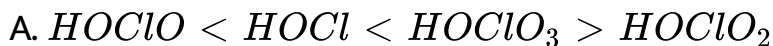
D. White P

**Answer: A**



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13. Which is the correct increasing acidity order of oxo acids ?



**Answer: D**

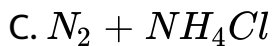
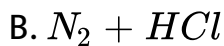


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14. Which product is obtained by the reaction of chlorine with excess amount of ammonia ?







**Answer: C**



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**15.** Helium is used in ballons because -

A. it is radioactive.

B. it more reactive than  $H_2$ .

C. it is lighter then  $H_2$ .

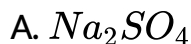
D. it is lighter then  $H_2$ .

**Answer: C**



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**16.** Which product is obtained by the reaction between  $Na_2S_2O_3$  and  $Cl_2$  gas ?



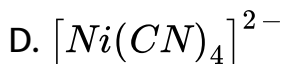
**Answer: B**



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**SECTION-E (MULTIPLE CHOICE QUESTIONS (MCQS)) (MCQS ASKED IN JEE/NEET/AIEEE EXAM)**

1. Which of the following is a square planar ?



**Answer: C**



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2. How many ( $\sigma$ ) bonds are present in  $P_4O_{10}$  ?

A. 6

B. 8

C. 18

D. 16

**Answer: D**



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**3.** The number of single electron pairs on Xe atom in  $XeF_2$ ,  $XeF_4$  and  $XeF_6$  are respectively...

A. 2, 3, 1

B. 1, 2, 3

C. 4, 1, 2

D. 3, 2, 1

**Answer: D**



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4.  $NCl_3$  is possible for nitrogen while  $NCl_5$  is not possible.

For phosphorus atom  $PCl_3$  and  $PCl_5$  both are possible. The reason for this is.....

- A. P-atom possesses vacant d-orbitals, while N-atom does not possess.
- B. The electronegativity of P is less than that of N.
- C. The tendency to form hydrogen bond for phosphorus is less than that of nitrogen

D. At normal temperature phosphorus is solid, while nitrogen possesses gaseous state.

**Answer: A**



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5. Which of the following statements is not true ?

A. HF is a stronger acid than HCl

B. Among halide ions, iodide is the most powerful reducing agent

C. Fluorine is the only halogen that does not show a variable oxidation state

D. HOCl is a stronger acid than HOBr

**Answer: A**



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6. Which of the following factors is responsible for the property of fluorine as strong oxidising agent ?

- A. Electron affinity
- B. Ionisation enthalpy
- C. Hydration enthalpy
- D. Bond dissociation energy

**Answer: C**



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7. How many H atoms are directly attached with P atom in hypophosphorus acid ?

A. 0

B. 3

C. 2

D. 1

**Answer: C**



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8. Select correct order

A.  $\text{HI} > \text{HBr} > \text{HF} > \text{HCl}$



B.  $\text{HI} > \text{HBr} > \text{HCl} > \text{HF}$

C.  $\text{HF} > \text{HCl} > \text{HBr} > \text{HI}$

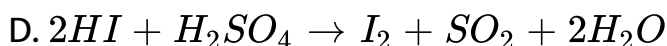
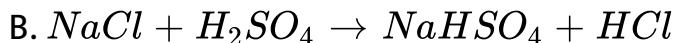
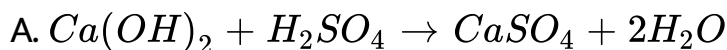
D.  $\text{HI} > \text{HF} > \text{HBr} > \text{HCl}$

**Answer: B**



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**9.** Which of the following reaction shows the oxidising nature of  $\text{H}_2\text{SO}_4$  ?



**Answer: D**



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**10.** Which of the following is a correct statement ?

A. HF is a strong acid than HCl in aqueous medium.

B.  $HClO_4$  is a weak acid than  $HClO_3$ .

C.  $HNO_3$  is a strong acid than  $HNO_2$

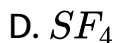
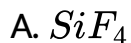
D.  $H_3PO_5$  is a strong acid then  $H_2SO_3$ .

**Answer: C**



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11. Which of the following molecule/ion do not have all the identical bond ?



**Answer: D**



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12. Which one of the following orders is not in accordance with the property stated against is ?

- A.  $HI > HBr > HCl > HF$ : Acidic property in water
- B.  $F_2 > Cl_2 > Br_2 > I_2$ : Electronegativity
- C.  $F_2 > Cl_2 > Br_2 > I_2$ : Bond dissociation energy
- D.  $F_2 > Cl_2 > Br_2 > I_2$ : Oxidising power

**Answer: C**



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**13. Which of the following statements is correct ?**

- A.  $H_3PO_3$  is strong acid than  $H_2SO_3$ .
- B. HF is stronger acid than HCl in aqueous medium.
- C.  $HClO_4$  is weaker acid than  $HClO_3$ .
- D.  $HNO_3$  is stronger acid than  $HNO_2$ .

**Answer: D**



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**14.** Continuous use of which fertilizer increase the acidity of soil ?

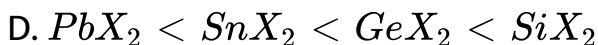
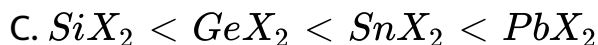
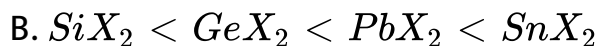
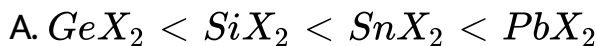
- A. Urea
- B. Super phosphate of lime
- C. Ammonium sulphate
- D. None of these

**Answer: C**



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15. Mention the correct order of stability of dihalides of Si, Ge, Sn and Pb.



**Answer: C**



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16. Ozone have a angular shape and it has -



B.  $1\sigma$  and  $1\pi$  bond

C.  $2\sigma$  and  $1\pi$  bond

D.  $1\sigma$  and  $2\pi$  bond

**Answer: C**



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**17.** The titration of oxalic acid in solution is possible with  $KMnO_4$  in presence of  $H_2SO_4$  but the titration in presence of HCl does not give satisfactory result because.

A. Chlorine of HCl is oxidised by oxalic acid.

B.  $H^+$  of HCl is reduced to  $H^2$  by  $MnO_4^-$ .

C.  $MnO_4^-$  is reduced to  $Mn^{2+}$  by HCl.

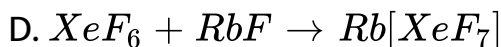
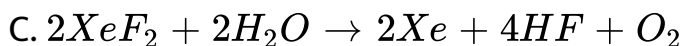
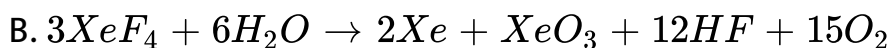
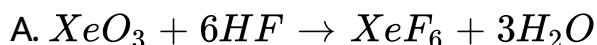
D. Oxalic acid is oxidised to  $CO_2$  and  $H_2O$  by HCl.

**Answer: C**



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**18.** Which xenon compound is not possible in following chemical reaction ?



**Answer: A**



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19. Which of the following options are not in accordance with the property mentioned against them ?

A. B It C It O It N The first ionisation enthalpy increases.

B.  $CO_2 < SiO_2 < SnO_2 < PbO_2$  The strength as oxidising agent increases.

C.  $NH_3 < PH_3 < AsH_3 < SbH_3$  Basic strength increases.

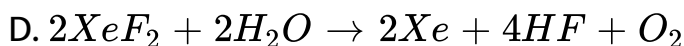
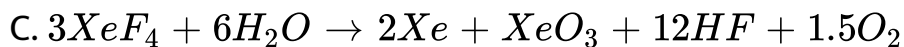
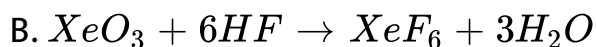
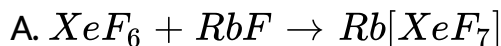
D.  $NH_3 < PH_3 < AsH_3 < SbH_3$  Basic strength increases.

Answer: D



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20. Which of the following reactions of xenon compounds is not possible ?

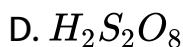
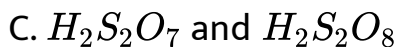
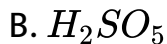
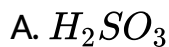


**Answer: B**



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21. Which product is given by sulphur trioxide on dissolution in to a sulphuric acid ?



**Answer: C**



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**22. Which of the following have P - O - P bond ?**

A. Hypophosphorous acid

B. Phosphorous acid

C. Pyrophosphoric acid

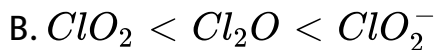
D. Orthophosphoric acid

Answer: C



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23. The correct order of increasing bond angles in the following species are :

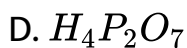
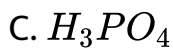
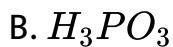
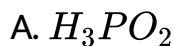


Answer: C



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24.  $P_4O_{10}$  is an anhydride of which compound ?



**Answer: C**



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25. Which of the following is a paramagnetic molecule ?



C. CO

D.  $O_3$

**Answer: B**



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**26.** With which of the following compound conc. HCl will give  $Cl_2$  gas at room temperature ?

A.  $MnO_2$

B.  $H_2S$

C.  $KMnO_4$

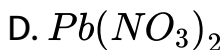
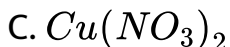
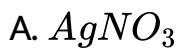
D.  $Cr_2O_3$

**Answer: C**



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27.  $NO_2$  gas is not obtained by heating which compound ?



**Answer: B**



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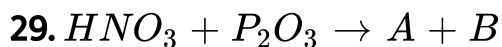
28. What is not correct at normal temperature and pressure ?

- A.  $P_4O_{10}$  is a white solid
- B.  $SO_2$  is a colourless gas
- C.  $SO_3$  is a colourless gas
- D.  $NO_2$  is a brown coloured gas

**Answer: C**

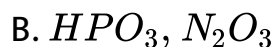
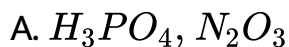


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A is an oxiacid of phosphorous and B is a oxide of Nitrogen.

What will be A & B ?





C.  $HPO_3$ ,  $N_2O_5$

D.  $H_3PO_3$ ,  $N_2O_5$

**Answer: C**



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**30. Which statement is wrong ?**

A. The stability of hydride of group 15 increases as moving from top to bottom

B. Nitrogen cannot form  $d\pi - p\pi$  bond

C. N - N bond is weaker than P - P bond

D.  $N_2O_4$  having two resonance structure

**Answer: A**



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**31. Which statement is wrong for sulphur ?**

- A.  $S_2$  is a paramagnetic.
- B. At  $200^\circ\text{C}$  temp.  $S_8$  is in cyclic form.
- C. At  $600^\circ\text{C}$  temp.  $S_2$  gas is in vapour state.
- D. Oxidation state of sulphur in sulphur compounds is not less than +4.

**Answer: D**



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32. By heating which of the following the pure  $N_2$  gas is obtained ?

A.  $NH_3$  with CuO

B.  $NH_4NO_3$

C.  $(NH_4)_2Cr_2O_7$

D.  $Ba(N_3)_2$

**Answer: D**



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33. Which of the following statement is wrong ?

- A. The stability of hydrides increases from  $NH_3$  to  $BiH_3$  in group 15 of the periodic table.
- B. Nitrogen cannot form dn - pn bond.
- C. Single N - N bond is weaker than the single P-P bond.
- D.  $N_2O_4$  has two resonance structure.

**Answer: A**



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**34.** Which of the following statements regarding sulphur is incorrect ?

- A.  $S_2$  molecule is paramagnetic
- B. The vapour at  $200^\circ\text{C}$  consists mostly of  $S_8$  rings.

C. At  $600^{\circ}\text{C}$  the gas mainly consists of  $\text{S}_2$  molecules.

D. The oxidation state of sulphur is never less than +4 in its compounds.

**Answer: D**



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**35.** The structure of  $\text{IF}_7$  is -

A. square pyramid

B. trigonal bipyramid

C. octahedral

D. pentagonal bipyramid

**Answer: D**



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**36.** Which of the following exists as covalent crystals in the solid state ?

A. Iodine

B. Silicon

C. Sulphur

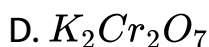
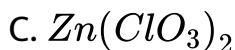
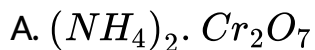
D. Phosphorus

**Answer: B**



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37. Which of the following does not give oxygen on heating ?



**Answer: A**



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38. Which one of the following properties is not shown by NO ?

A. It combines with oxygen to form nitrogen dioxide.

B. It's bond order is 2.5.

C. It is diamagnetic in gaseous state.

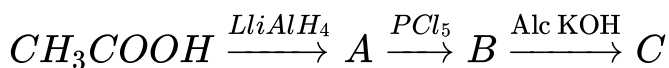
D. It is a neutral oxide.

**Answer: C**



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**39.** In the reaction,



The product C is:

A. Ethylene

B. Acetyl chloride

C. Acetaldehyde



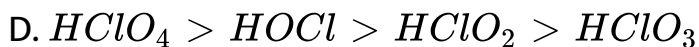
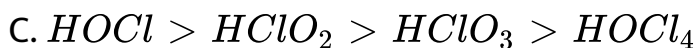
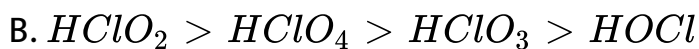
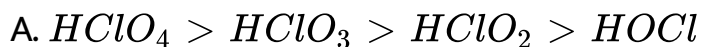
D. Acetylene

Answer: A



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40. Among the following oxoacids, the correct decreasing order of acid strength is :

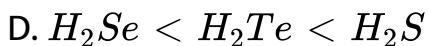
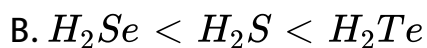
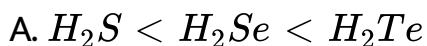


Answer: A



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41. Acidity of diprotic acids in aqueous solutions increases in the order :



**Answer: A**



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42. Which among the following is the most reactive ?

A.  $Cl_2$

B.  $Br_2$

C.  $I_2$

D.  $Icl$

**Answer: D**



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**43.** Which one has the highest boiling point ?

A. He

B. Ne

C. Kr

D. Xe

**Answer: D**



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**44.** Nitrogen dioxide and sulphur dioxide have some properties in common. Which property is shown by one of these compounds, but not by the other ?

- A. Forms 'acid-rain'
- B. Is a reducing agent.
- C. Is soluble in water.
- D. Is used as a food-preservative.

**Answer: D**



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45. Maximum bond angle at nitrogen is present in which of the following ?



**Answer: C**



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46. Strong reducing behaviour of  $\text{H}_3\text{PO}_2$  is due to :

A. High oxidation state of phosphorus.

- B. Presence of two -OH groups and one P - H bond.
- C. Presence of one -OH group and two P - H bonds.
- D. High electron gain enthalpy of phosphorus.

**Answer: C**



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**47.** The stability of +1 oxidation state among Al, Ga, In and Tl increases in the sequence :

A.  $Tl < In < Ga < Al$

B.  $In < Tl < Ga < Al$

C.  $Ga < In < Al < Tl$

D.  $Al < Ga < In < Tl$

**Answer: D**



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**48.** Which of the statements given below is incorrect ?

- A. ONF is isoelectronic with  $O_2N^-$
- B.  $OF_2$  is an oxide of fluorine
- C.  $Cl_2O_7$  is an anhydride of perchloric acid
- D.  $O_3$  molecule is bent

**Answer: B**



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49. Chlorine water on standing loses its colour and forms .....

- A. HCl only
- B. HOCl and  $HOCl_2$
- C. HCl and HOCl
- D. HCl and  $HClO_2$

**Answer: C**

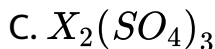
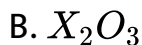


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50. Choose the incorrect formula out of the four compounds for an element X given below :

- A.  $X_2Cl_3$





**Answer: A**



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**51.** The pair in which phosphorous atoms have a formal oxidation state of +3 is :

A. Pyrophosphorous and pyrophosphoric acids.

B. Orthophosphorous and pyrophosphorous acids.

C. Pyrophosphorous and hypophosphoric acids.

D. Orthophosphorous and hypophosphoric acids.

**Answer: B**



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**52.** The species in which the N atom is in a state of sp hybridization is :



**Answer: B**



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53. The reaction of zinc with dilute and concentrated nitric acid respectively produces :

A.  $NO_2$  and  $N_2O$

B.  $N_2O$  and  $NO_2$

C.  $NO_2$  and NO

D. NO and  $N_2O$

**Answer: A**



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54. When copper is heated with cone.  $HNO_3$  it produces :

A.  $Cu(NO_3)_2$  and NO

B.  $Cu(NO_3)_2$ , NO and  $NO_2$

C.  $Cu(NO_3)_2$  and  $N_2O$

D.  $Cu(NO_3)_2$  and  $NO_2$

**Answer: D**



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**55.** Which is the correct statement for the given acids ?

A. Phosphinic acid is a monoprotic acid while phosphonic acid is a diprotic acid

B. Phosphinic acid is a diprotic acid while phosphonic acid is a monoprotic acid.

C. Both are triprotic acids.

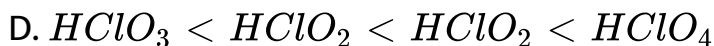
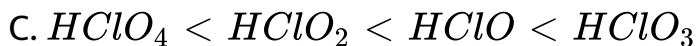
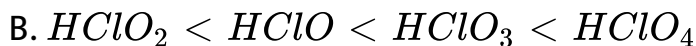
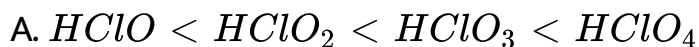
D. Both are diprotic acids.

**Answer: A**



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**56.** Among the following, the correct order of acidity is :

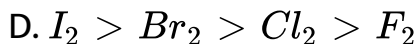
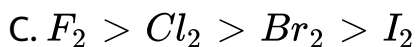
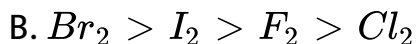
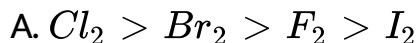


**Answer: A**



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57. Which one of the following orders is correct for the bond dissociation enthalpy of halogen molecules ?

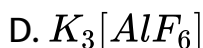
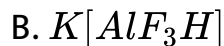
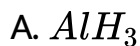


**Answer: A**



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58.  $AlF_3$  is soluble in HF only in presence of KF. It is due to the formation of



**Answer: D**



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**59.** Identify the incorrect statement :

A. The S - S - S bond angles in  $S_8$  and  $S_6$  rings are same.

B.  $S_8$  ring has crown shape.

C. Rhombic and monoclinic sulphur have  $S_8$  molecule.

D.  $S_2$  is paramagnetic like oxygen.

**Answer: A**



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**60.** The number of  $S = O$  and  $S - OH$  bonds present in peroxodisulphuric acid and pyrosulphuric acid respectively are.....

A. (4 and 2) and (4 and 2)

B. (2 and 2) and (2 and 2)

C. (4 and 2) and (2 and 4)

D. (2 and 4) and (2 and 4)

**Answer: A**



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61. A metal "M" reacts with nitrogen gas to afford " $M_3N$ ". " $M_3N$ " on heating at high temperature gives back "M" and on reaction with water produces gas "B". Gas "B" reacts with aqueous  $CuSO_4$  to form deep blue compound. "M" and "B" are respectively.....

A. Na and  $NH_3$

B. Li and  $NH_3$

C. Ba and  $N_2$

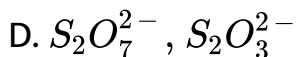
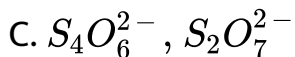
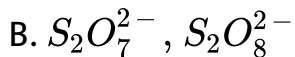
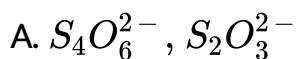
D. Al and  $N_2$

**Answer: B**



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62. In which pair of ions both the species contain S-S bond ?



**Answer: A**



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63. Which of the following absorbs carbon dioxide and releases oxygen ?



C. KOH

D.  $K_2O$

**Answer: B**



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**64.** The products obtained when chlorine gas reacts with cold and dilute aqueous NaOH are .....

A.  $ClO^-$  and  $ClO_3^-$

B.  $ClO_2^-$  and  $ClO_3^-$

C.  $Cl^-$  and  $ClO^-$

D.  $Cl^-$  and  $ClO_2^-$

**Answer: C**



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65. Strong reducing behaviour of  $H_3PO_4$  is due to..

- A. low oxidation state of E
- B. presence of one -OH group and two P - H bond.
- C. presence of two -OH group and one P - H bond.
- D. low coordination number of P.

**Answer: B**



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66. The tendency to form monovalent compounds among the group 13 elements is correctly exhibited in.....

A.  $B < Al < Ga < In < Tl$

B.  $Tl < In < Ga < Al < B$

C.  $Tl = In < Ga < Al < B$

D.  $B = Al = Ga = In = Tl$

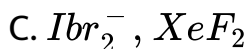
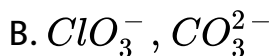
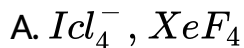
**Answer: A**

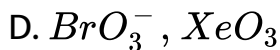


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**67.** Which of the following pair of species is not iso-structural

?



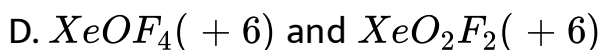
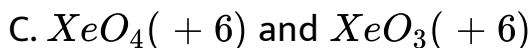
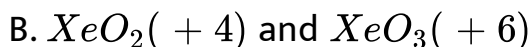
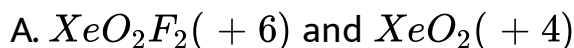


**Answer: B**



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**68.** Xenon hexafluoride on partial hydrolysis produces compounds "X and Y" compounds "X" and "Y" and the oxidation state of xenon are respectively.....



**Answer: D**



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69. Among the oxides of nitrogen :  $N_2O$ ,  $N_2O_4$  and  $N_2O_5$ , the molecules having nitrogen-nitrogen bonds are .....

A.  $N_2O_4$  and  $N_2O_5$

B.  $N_2O_4$  and  $N_2O_5$

C.  $N_2O_3$  and  $N_2O_4$

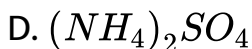
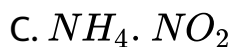
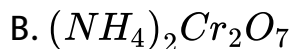
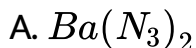
D. Only  $N_2O_5$

**Answer: B**



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70. The compounds that doesnot produce nitrogen gas by thermal decomposition is .....



**Answer: D**



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71. Which of the following statements is not true for halogens ?



- A. All form monobasic oxyacids
- B. Chlorine has the highest electron gain enthalpy
- C. All are oxidizing agents
- D. All but fluorine show positive oxidation states

**Answer: D**



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72. Iodine reacts with concentrated  $HNO_3$  to yield Y along with other products. The oxidation state of Y is .....

- A. 5
- B. 1
- C. 7

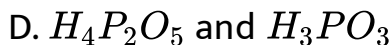
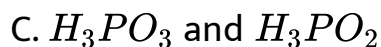
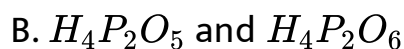
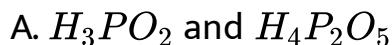
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**Answer: A**



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**73.** The pair that contains two P-H bonds in each of the oxoacids is .....



**Answer: A**



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74. Match the Xenon compounds in Column-I with its structure in Column-II and assign the correct code:



A. a-iii, b-iv, c-I, d-ii

B. a-I, b-ii, c-iii, d-iv

C. a-ii, b-iii, c-iv, d-i

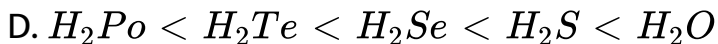
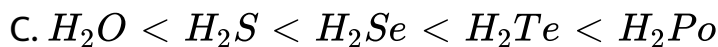
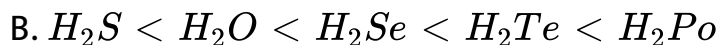
D. a-ii, b-iii, c-I, d-iv

**Answer: C**



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75. Which is the correct thermal stability order for  $H_2E$  (E = O, S, Se, Te, and Po) ?



**Answer: D**



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76. The number of moles of hydrogen molecules required to produce 20 moles of ammonia through Haber's process is :

A. 40

B. 10

C. 20

D. 30

**Answer: D**



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**77. Match the following:**



Which of the following is the correct option ?

A. a-iv, b-iii, c-ii, d-i

B. a-I, b-ii, c-iii, d-iv

C. a-ii, b-iv, c-I,d-iii

D. a-iii, b-iv,c-ii,d-i

**Answer: A**



**View Text Solution**

**78.** The electron gain enthalpy in kJ/mol of F, Cl, Br, and I respectively are :

A.  $-295$ ,  $-324$ ,  $-348$ ,  $-333$

B.  $-348$ ,  $-324$ ,  $-333$ ,  $-295$

C.  $-333$ ,  $-348$ ,  $-324$ ,  $-295$

D.  $-348$ ,  $-333$ ,  $-295$ ,  $-324$

**Answer: C**



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**79.** The number of bonds between sulphur and oxygen atoms in  $S_2O_8^{-2}$  and number of bonds between sulphur and sulphur atoms in rhombic sulphur, respectively, are :

A. 8 and 6

B. 4 and 6

C. 8 and 8

D. 4 and 8

**Answer: C**



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**80.** Chlorine reacts with hot and cone. NaOH and produces compounds X and Y. Compound X gives a white precipitate with  $AgNO_3$  soln. The average bond order between Cl and O atoms in Y is?



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### SECTION-E (MULTIPLE CHOICE QUESTIONS (MCQS)) (MCQS ASKED IN BOARD EXAM)

**1.** What is the product of reaction between excess xenon and fluorine at 673 K temperature ?





C.  $\text{XeF}_6$

D. Not given

**Answer: A**



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2. Which type of hybridisation is present in iodine pentachloride ?

A.  $sp^3d^2$

B.  $sp^3d$

C.  $dsp^3$

D.  $d^2sp^3$

**Answer: A**



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3. Which acid can be separated (isolated) in a pure form ?

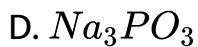
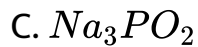
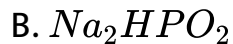
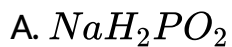


**Answer: C**



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4. What is the formula of salt prepared by the reaction between  $\text{NaOH}$  and hypophosphorous acid ?



**Answer: A**



**Watch Video Solution**

**5. Which one is not a p-block element ?**

A. Sr

B. Po

C. As

D. Ga

**Answer: A**



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6. How many 'S' atoms are arranged in a cyclic form in the monoclinic sulphur ?

A. 2

B. 10

C. 8

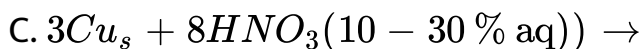
D. 6

**Answer: C**



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7. Which of the following reaction gives nitrogen monoxide gas ?



**Answer: C**



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8. Which of the following pair of substances are used as promoter in Haber process for production of  $NH_3$  ?

A. FeO and Fe

B.  $\text{KCl}$  and  $\text{AlCl}_3$

C.  $\text{K}_2\text{O}$  and  $\text{Al}_2\text{O}_3$

D.  $\text{KCl}$  and  $\text{FeCl}_3$

**Answer: C**



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**9. Which of the following oxo-acid is not possible ?**

A.  $\text{HOClO}_2$

B.  $\text{HlOFO}_2$

C.  $\text{HOBrO}_2$

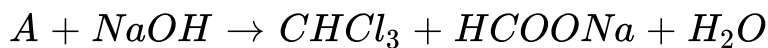
D.  $\text{HOIO}_2$

**Answer: B**



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**10.** What is A in the reaction given below ?



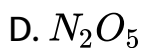
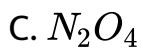
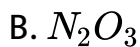
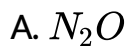
- A. Chloroform
- B. Chloral hydrate
- C. Chloral
- D. Carbon tetrachloride

**Answer: B**



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11. Which oxide is colourless and neutral ?



**Answer: A**



**Watch Video Solution**

12. What is the geometrical shape of  $XeO_3$  ?

A. Planar triangular

B. Trigonal pyramidal



C. Square planar

D. Tetrahedral

**Answer: B**



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**13.** Aqueous solution of which of the following acid can not be kept in glass bottle ?

A. HF

B. HI

C. HCl

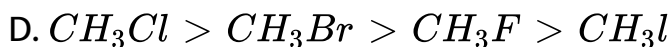
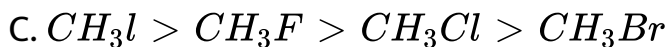
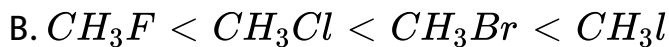
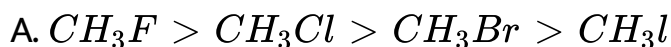
D. HBr

**Answer: A**



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14. Which of the following is the correct order for strength of C - X bond.



Answer: A



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15. The molecular formulae for phosgene and tear gas are.....and.....respectively.

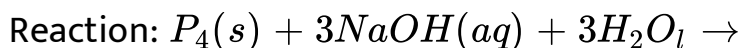


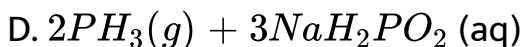
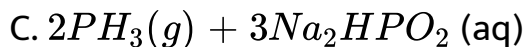
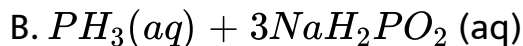
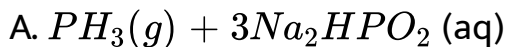
**Answer: D**



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16. Which product will be obtained in the following reaction?





**Answer: B**



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**17.** Which of the following mixture is called Aquaregia?

A. Two parts of cone. HCl and two parts of cone.  $HNO_3$

B. Three parts of dil.HCl and 1 part of cone.  $HNO_3$ .

C. Three parts of cone. HCl and 1 part of dil.  $HNO_3$ .

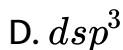
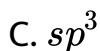
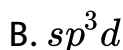
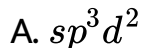
D. Three parts of cone. HCl and 1 part of cone.  $HNO_3$

**Answer: D**



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**18.** What is the hybridisation of central atom in the product obtained along with hydrofluoric acid when complete hydrolysis of Xenon Hexa Fluoride takes place ?



**Answer: C**



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19. How many gm of the oxidising agent gets reduced in the reaction of 65.4 gm of Zn with concentrated nitric acid ?

- A. 126
- B. 252
- C. 130.8
- D. 65.4

**Answer: A**



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20. In which of the following acid, the maximum number of hydrogen atoms are joined directly with phosphorous?

- A. Phosphorous acid
- B. Phosphonic acid
- C. Pyro phosphoric acid
- D. Phosphoric acid

**Answer: B**



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**21.** For an element X if  $XCl_3$ ,  $X_2O_5$  and  $Ca_3X_2$  is possible but  $XCl_5$  is not possible, then what is X ?

- A. B
- B. Al
- C. N

D. P

Answer: C



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22. By which of the following reactions, chlorine gas will not be obtained as the product ?

A. Oxidation of HCl by  $MnO_2$

B. Oxidation of HCl by  $KMnO_4$

C. Oxidation of  $KClO_3$  by  $KMnO_4$

D. By electrolysis of concentrated aqueous solution of NaCl.

Answer: C

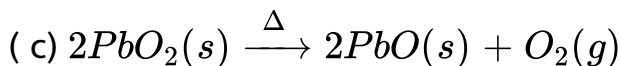
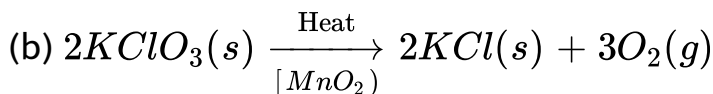




**23.** Read the following details and decide the correct answer(s) given with each question and then select correct option given below the questions.

(i) What is the method to obtain gas in laboratory ?

(a)



(ii) Which of the following does not have allotropes ?

(a) Oxygen

(b) Phosphorous

(c) Nitrogen

(d) Bismuth

(iii)  $XeF_6$  reacts with water to produce.....

(a)  $XeO_3$

(b)  $XeO_2F_2$

(c)  $XeOF_4$

(d)  $XeO$

(iv) Required concentration of  $O_2$  to sustain of marine and aquatic living beings is.....

(a) 3.08 ppm

(b) 3.80% w/w

(c) 3.80% v/v

(d) 3.08% v/v

A. (i) a, b (ii) rarr d, a (iii) rarr b, d, c, a (iv) rarr d

B. (i) rarr a, b (ii) rarr c, a (iii) rarr b, a, c (iv) rarr a

C. (i) rarr a, b (ii) rarr d, c (iii) rarr b, a, c (iv) rarr d

D. (i) rarr a, c (ii) rarr c (iii) rarr a, c (iv) -> c

**Answer: C**



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**24. Which of the following is aluminium's alloy ?**

A. Steel

B. German Silver

C. Alnico

D. Delta metal

**Answer: C**



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25. What is the aquaregia ?

- A. 3 parts of cone. HCl + 1 part of cone.  $HNO_3$
- B. 2 parts of cone. HCl + 2 parts of cone.  $HNO_3$
- C. 1 part of cone. HCl + 3 parts of cone.  $HNO_3$
- D. None of these

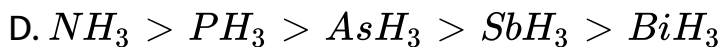
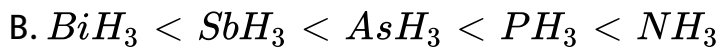
**Answer: A**



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26. The correct order of basic strength of hydrides of group-15 is .....

- A.  $NH_3 < PH_3 < AsH_3 < BiH_3 < Sb, H_3$

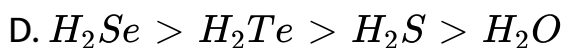
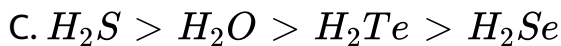
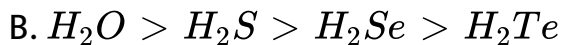
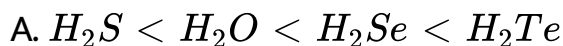


**Answer: B::D**



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**27.** Which of the following is the correct order of the boiling points of hydrides of group-16 ?



**Answer: B**



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**28.** What is not correct for white phosphorous ?

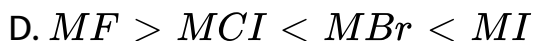
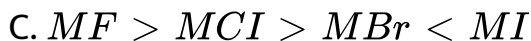
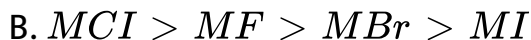
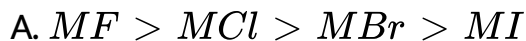
- A. It is heated at 803K to obtain a - black phosphorous.
- B. It is heated under pressure at 473K to obtain p - black phosphorous.
- C. It is insoluble in water.
- D. It glows in dark.

**Answer: A**



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29. The order of ionic character in metal halides is....

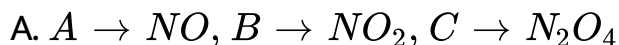


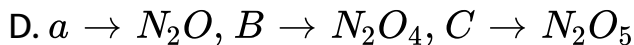
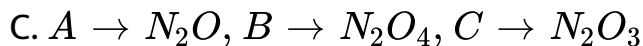
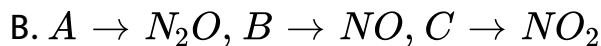
Answer: A



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30. A + Oxygen gives B("Brown paramagnetic") and B gives C("Colourless diamagnetic")  
C` What are A, B and C?





**Answer: A**



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**31.** What are the physical state, colour and shape of  $BrF_5$  ?

A. Liquid, colourless, square pyramidal

B. Liquid, yellow green, bent T- shaped

C. Gas, colourless, square pyramidal

D. Gas, colourless, bent T - shaped

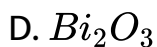
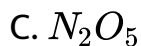
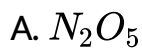


**Answer: A**



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**32. Which of the following oxides is basic ?**

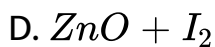


**Answer: D**



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33. Iodoform is formed by the reaction of alcohol with :



**Answer: B**



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34. Which of the following compound has a square pyramidal structure ?



B.  $\text{XeF}_6$  and  $\text{XeF}_4$

C.  $\text{XeOF}_4$

D.  $\text{XeF}_4$

**Answer: C**



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**35.** How many -OH groups are present in a trimetaphosphoric acid ?

A. 4

B. 5

C. 6

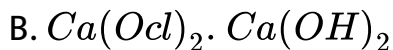
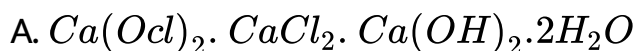
D. 10

**Answer: B**



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**36.** Which of the following is a composition of bleaching powder ?



**Answer: A**



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37. Which of the following is not a use of dioxygen gas ?

- A. Useful in preparation of steel
- B. Useful in respiration and combustion reaction
- C. Useful as bleaching agent for bleaching of different oils
- D. Useful in welding work of metals

**Answer: C**



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38. Which of the following is the strongest reducing agent ?

- A.  $PH_3$
- B.  $SbH_3$

C.  $AsH_3$

D.  $BiH_3$

**Answer: D**



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**39.** At which temperature both rhombic and monoclinic sulphur are stable ?

A. 369 K

B. 396 K

C.  $396^{\circ} \text{C}$

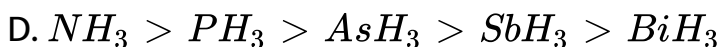
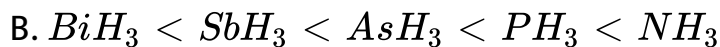
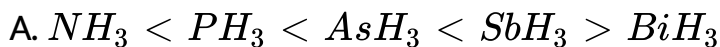
D.  $369^{\circ} \text{C}$

**Answer: A**



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40. Which is the real order of basicity of hydrides of elements of Group-15 ?



Answer: D



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41. Which is the suitable condition for "Industrially ammonia gas is manufactured by Haber's process"?

- A. 210 bar pressure, 773 K,  $[\text{FeO}]$
- B. 230 bar pressure, 770 K,  $[\text{Fe}_3\text{O}_4]$
- C. 200 bar pressure, 773 K,  $[\text{FeO}]$
- D. 220 bar pressure, 770 K,  $[\text{Fe}_2\text{O}_3]$

**Answer: C**



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42. Give shape, bond length and bond angle in Ammonia molecule respectively.



- A. Linear, 101.5 Pm, 104.5°
- B. Planar, 101.1 Pm, 105.8°
- C. Trigonal, 102.7 Pm, 103.8°
- D. Trigonal pyramidal, 101.7 Pm, 107.8°

**Answer: D**



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**43. Which catalyst is used in Ostwald's method ?**

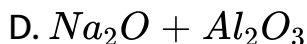
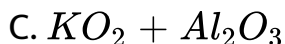
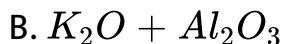
- A. Pt (20 %) + Rh (80 %)
- B. Pt (80 %) + Rh (20 %)
- C. Pt (10 %) + Rh (90 %)
- D. Pt (90 %) + Rh (10 %)

**Answer: D**



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**44.** Which of the following mixture is used as promoters in production of ammonia gas by Haber's process ?



**Answer: B**



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45. Which gas is obtained by reacting Calcium Phosphide with water ?

- A. Arshine
- B. Nitric oxide
- C. Phosphine
- D. Ammonia

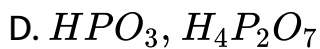
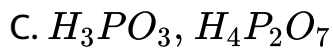
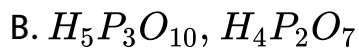
**Answer: C**



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46. Molecular formula of trimetaphosphoric acid and diphosphoric acid respectively is.....and .....

- A.  $H_5P_3O_{10}$ ,  $H_3PO_2$

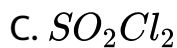
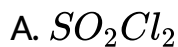


**Answer: B**



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**47.** Which of the following is the formula of Thionyl chloride ?

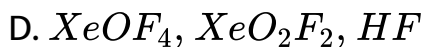
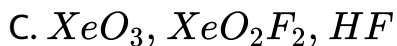
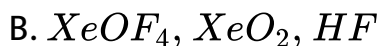


**Answer: D**



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**48.** Which product is obtained by partial hydrolysis of  $XeF_6$ ?



**Answer: D**



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**49.** How very pure dinitrogen gas can be obtained ?

- A. By liquidification of air and fractional distillation.
- B. By thermal decomposition of sodium or barium azide.
- C. By the reaction of aqueous ammonium chloride with aqueous sodium nitrite.
- D. By thermal decomposition of ammonium dichromate.

**Answer: B**



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**50.** Mention the proper choice for the True and False statement. For True statement T and for False statement F are mentioned.

- (a) Oxygen element possesses -2, -1, +1, +2, oxidation state.
- (b) The value of electron gain enthalpy of Cl element is more negative than that of F element.
- (c) Ozone is colourless in solid form.
- (d) Chlorine water when kept for longer times loses yellow colour.

A. TTF

B. TTFT

C. TFFT

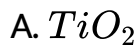
D. FTFT

**Answer: B**



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51. Which of the oxide shows appearance like metallic copper ?

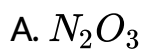


**Answer: C**

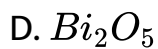
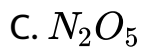
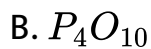


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52. Which of following oxide is not acidic ?







**Answer: D**



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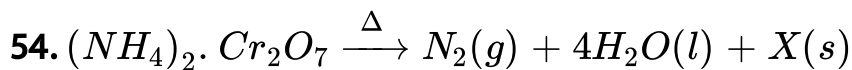
**53.** Which of the following elements is not included in Group-15 ?



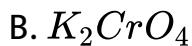
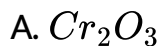
**Answer: C**



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Mention the substances 'X' in this reason.



**Answer: A**



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55. Which of the following statements is not applicable to white phosphorus ?

- A. It is highly reactive
- B. It is soluble in non-polar solvent.
- C. It is non-poisonous
- D. It is stored in water.

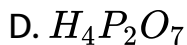
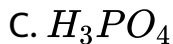
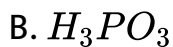
**Answer: C**



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56. Which acid is obtained by dissolving  $P_4O_6$  in water ?

- A.  $H_3PO_2$



**Answer: B**



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**57. What is the aquaregia ?**

A. Mixture of 50 % con. HCl + 50 % con.  $HNO_3$

B. One part con. HCl are three part con.  $HNO_3$

C. Three parts con. HCl and one part  $HNO_3$

D. Three part con. HCl and one part con.  $HNO_3$

**Answer: D**



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**58.** Which interhalogen compound is identified by spectroscopic method ?

A. ICl

B. IF

C. ClF

D. BrCl

**Answer: B**



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59. What is the colour of  $ICl_3$  ?

- A. Colourless
- B. Shining red
- C. Yellowish green liquid
- D. Orange

**Answer: D**



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60. Which is the molecule that possesses pentagonal pyramid structure?

- A.  $ClF_5$



**Answer: D**



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**61.** Select the proper choice by true statement by symbol "T" and false statement by symbol "F".

(i) Perchloric acid is weaker than chloric acid.

(ii) HF is stronger acid than HCl.

(iii)  $NH_3$  is weaker base than  $PH_3$ .

(iv) All noble gases exist as monoatomic.

**A. FTFT**

B. TFFT

C. FFFT

D. FTFF

**Answer: C**



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**62.** Oxidation number of sulphur in sulphuryl chloride is

A. +4

B. +6

C. +2

D. +3



**Answer: B**



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**63.** Geometrical shape of  $XeF_6$  is

- A. Hexagonal
- B. Distorted octahedral
- C. Octahedral
- D. Square pyramidal

**Answer: C**



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64. The oxidation state of phosphorus in phosphonic acid is

A. +5

B. +1

C. +3

D. +4

**Answer: B**



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65. Which element comes in 5th period of chalcogen group ?

A. Se

B. Te

C. Sb

D. Ar

**Answer: B**



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**66.**  $4Cu + 10HNO_3 \rightarrow Cu(NO_3)_2 + X + H_2O$  Mention the substance 'X'

A.  $NO_2$

B.  $N_2O$

C. NO

D.  $N_2O_3$

**Answer: B**



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**67.** Which one is common chief minerals for phosphorous and fluorine elements.

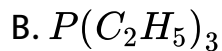
- A. Fluorspar
- B. Fluorapatite
- C. Chlorapatite
- D. Cryolite

**Answer: B**



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**68.** Which compound of phosphorus act as a ligands ?

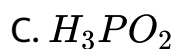
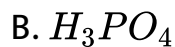
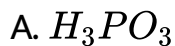


**Answer: B**



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**69.** On Hydrolysis of phosphorus oxychloride which acid is formed ?



D.  $HPO_3$

**Answer: B**



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**70.** Select the correct order of electron gain enthalpy for F, Cl, Br, I.

A.  $I > Br > Cl > F$

B.  $F > Cl > Br > I$

C.  $F > Cl < Br > I$

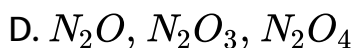
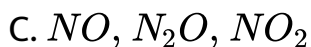
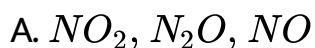
D.  $F < Cl > Br > I$

**Answer: D**



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71. When 4 mole, 3 mole and 1 mole of copper reacts with nitric acid, which types of oxide of nitrogen is formed respectively.

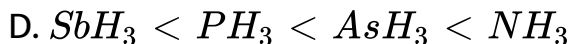
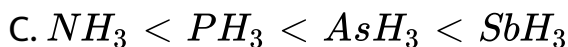
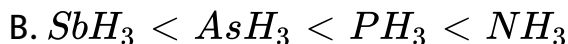
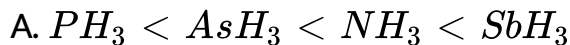


**Answer: B**



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72. Which of the following is the correct order of basicity of hydride compounds ?



**Answer: B**



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73. Which of the following halic(ii) acid can be formed ?





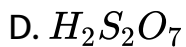
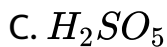
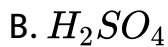
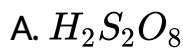


**Answer: C**



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**74.** What is the molecular formula of Marshall's acid ?

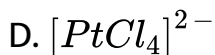
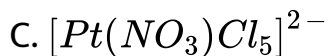
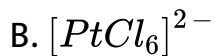


**Answer: A**



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**75.** In which form of complex, the platinum is dissolved in aqua regia ?



**Answer: B**



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76. Which explosive substance is obtained when proportion of dichlorine gas is more in the reaction with ammonia gas ?

- A. Nitrogen(II) oxide
- B. Ammonium chloride
- C. Nitrogen trichloride
- D. Ammonium chloride and dinitrogen gas

**Answer: C**



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77. Which of the following compound of xenon possess square pyramidal structure ?

- A.  $\text{XeO}_2\text{F}_2$

B.  $\text{XeOF}_4$

C.  $\text{XeO}_3$

D.  $\text{XeF}_6$

**Answer: B**



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