

INDIAN SCHOOL MUSCAT

CHEMISTRY DEPARTMENT

QUESTION BANK

The p-Block Elements

VSA QUESTIONS (1 - MARK QUESTIONS)

1. In which one of the two structures, NO_2^+ and NO_2^- , the bond angle has a higher value?
2. Which one of the following is not oxidized by O_3 . State the reason.

KI , FeSO_4 , K_2MnO_4 , KMnO_4

3. Account for the following (Each question carries one mark)
 - i. Iodine is more soluble in KI , than H_2O .
 - ii. $\text{R}_3\text{P} = \text{O}$ exist but $\text{R}_3\text{N} = \text{O}$ can not exist.
 - iii. N-N, bond is weaker than P-P, on the contrary N_2 is very inert.
 - iv. Both Cl and O have the same electronegativity but only O forms H-bonding
 - v. NO is paramagnetic in the gaseous state but dimagnetic in liquid and solid state
 - vi. Among Halogens F_2 is the strongest oxidising agent
 - vii. ICl bonds are weaker than Cl_2 .
 - viii. Hydrogen fluoride is much less volatile than hydrogen chloride
 - ix. Interhalogen compounds are strong oxidizing agents
 - x. PCl_5 is ionic in nature in the solid state.
 - xi. Sulphur has greater tendency for catenation than Oxygen
 - xii. Phosphorous is more reactive than nitrogen.
 - xiii. Of the noble gases only xenon forms known chemical compounds

- xiv. In solution of H_2SO_4 in water the second dissociation constant K_{a2} , is less than the first K_{a1} .
- xv. Pentahalides of a metal is more covalent than its trihalides.
- xvi. Fe dissolves in HCl to form FeCl_2 , not FeCl_3 .
- xvii. Helium is used in diving equipments

4. Give reason for the following. (Each question carries one mark)

- i. Nitrogen exhibits +5 oxidation state but does not form penta halides.
- ii. Phosphine (PH_3) is used in Holme's signals.
- iii. H_3PO_2 shows reducing behavior.

Group 16 elements show low rate of 1st Ionisation Energy than compared to corresponding periods of Group 15

5. Draw the structures of the following (Each question carries one mark)

- i. $\text{H}_4\text{P}_2\text{O}_5$
- ii. HClO_4
- iii. BrF_3
- iv. H_3PO_3
- v. $\text{H}_2\text{S}_2\text{O}_8$
- vi. HOCl_2

6. Complete the following chemical equations. (Each question carries one mark)

- i. $\text{XeF}_4 + \text{O}_2\text{F}_2 \rightarrow$
- ii. $\text{Cu} + \text{HNO}_3 \rightarrow$
- iii. $\text{HgCl}_2 + \text{PH}_3 \rightarrow$
- iv. $\text{I}_2 + \text{HNO}_3 \rightarrow$

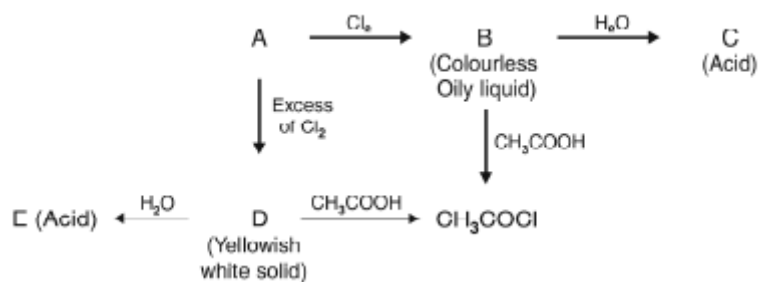
- v. $\text{P}_4 + \text{SO}_2\text{Cl}_2 \rightarrow$
- vi. $\text{Cl}_2 + \text{F}_2 \rightarrow$
- vii. $\text{C} + \text{H}_2\text{SO}_4 \rightarrow$
- viii. $\text{Na}_2\text{SO}_3 + \text{Cl}_2 + \text{H}_2\text{O} \rightarrow$
- ix. $\text{NO}_3^- + \text{Fe}^{2+} + \text{H}^+$

SA (I) QUESTIONS (2 - MARK QUESTIONS)

7. Compare the structures of SF_6 and SF_4
8. i. Write the composition of bleaching powder.
ii. What happens when NaCl is heated with conc. H_2SO_4 in the presence of MnO_2 . Write the chemical equation
9. i. Hydrolysis of XeF_6 is not regarded as a redox reaction. Why?
ii. Write a chemical equation to represent the oxidising nature of XeF_4 .
10. A colourless and a pungent smelling gas which easily liquifies to a colourless liquid and freezes to a white crystalline solid, gives dense white fumes with ammonia. Identify the gas and write the chemical equation for its laboratory preparation
11. Explain the structure of the following using VSEPR theory.
i. XeO_3
ii. XeF_2
12. Write the chemical equations of the following reactions
i. Glucose is heated with conc. H_2SO_4 .
ii. Sodium nitrate is heated with conc. H_2SO_4 .

SA (II) QUESTIONS (3 - MARK QUESTIONS)

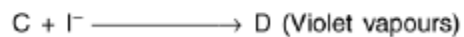
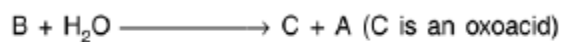
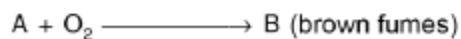
13. Arrange the following in the order of the property mentioned
- $\text{PH}_3, \text{NH}_3, \text{SbH}_3, \text{AsH}_3$ (increasing basic strength)
 - $\text{HCl}, \text{HBr}, \text{HF}, \text{HF}$ (increasing acid strength)
 - $\text{HClO}_4, \text{HClO}, \text{HClO}_2$ (increasing oxidizing power)
- 14.
- Name the process of manufacture of H_2SO_4
 - Outline the different steps involved
 - What will you observe when H_2SO_4 is added to hydrated CuSO_4
- 15.
- How does O_3 react with lead sulphide? Write chemical equation.
 - What happens when SO_2 is passed in acidified KMnO_4 solution?
 - SO_2 behaves with lime water similar to CO_2 .
16. An unknown salt X reacts with hot conc. H_2SO_4 to produce a brown coloured gas which intensifies on addition on copper turnings. On adding dilute ferrous sulphate solution to an aqueous solution of X and then carefully adding conc. H_2SO_4 along the sides of the test tube, a brown complex Y is formed at the interface between the solution and H_2SO_4 . Identify X and Y and write the chemical equation involved in the reaction.
17. A translucent white waxy solid (A) on heating in an inert atmosphere is converted to its allotropic form (B), Allotrope (A) on reaction with very dilute aqueous NaOH liberates a highly poisonous gas (C) having a rotten fish smell, with excess of chlorine forms D which hydrolyses to form compound (E). Identify the compounds (A) to (E).
18. Identify A, B, C, D and E in the following sequence of reactions.



Complete the reactions of the above mentioned sequence

19. Write the structure of A, B, C, D and E in the following sequence of reactions :

Complete reactions of the above mentioned sequence and name the process by which 'C' is obtained.



- 20.
- Name the compound of phosphorus similar to ammonia.
 - Suggest a method for preparing the above compound in the laboratory.
 - Write the balanced chemical equation.