

Guess Paper – 2014
Class – XII
Subject – Chemistry
p-block Reasoning questions:-

- Why does NO_2 dimerise?
[Hint: Contains odd no. of valence e^- & behaves as typical odd molecule. On dimerisation it is converted to typical N_2O_4 molecule with even no. of valence e^- .]
- How HNO_3 prepared through Ostwald's process can be concentrated?
[Hint: By dehydrating with conc. H_2SO_4 it can be concentrated to 98%]
- Describe the reactions of Cu with dil. HNO_3 & conc. HNO_3 .
[Hint: $3\text{Cu} + 8\text{HNO}_3(\text{dil.}) \rightarrow 3\text{Cu}(\text{NO}_3)_2 + 2\text{NO} + 4\text{H}_2\text{O}$; $\text{Cu} + 3\text{HNO}_3(\text{conc.}) \rightarrow \text{Cu}(\text{NO}_3)_2 + 2\text{NO}_2 + \text{H}_2\text{O}$]
- Describe Brown ring test. Also state the reason for the occurrence of brown colour at the interface of H_2SO_4 and solution.
[Hint: Formation of $[\text{Fe}(\text{H}_2\text{O})_5(\text{NO})]^{2+}$ complex]
- State the oxidising nature of nitric acid through appropriate reactions.
[Hint: a) $\text{I}_2 + 10\text{HNO}_3 \rightarrow 2\text{IO}_3 + 10\text{NO}_2 + 4\text{H}_2\text{O}$
b) $\text{C} + 4\text{HNO}_3 \rightarrow \text{CO}_2 + 4\text{NO}_2 + 2\text{H}_2\text{O}$
c) $\text{S}_8 + 48\text{HNO}_3 \rightarrow 8\text{H}_2\text{SO}_4 + 48\text{HNO}_3 + 16\text{H}_2\text{O}$
d) $\text{P}_4 + 20\text{HNO}_3 \rightarrow 4\text{H}_3\text{PO}_4 + 20\text{NO}_2 + 4\text{H}_2\text{O}$]
- What happens to white phosphorus when exposed to air? Give suitable reaction.
[Hint: $\text{P}_4 + 5\text{O}_2 \rightarrow \text{P}_4\text{O}_{10}$]
- Describe the properties of white phosphorus. How can you obtain phosphine (PH_3) from white phosphorus?
- How is red phosphorus prepared from white phosphorus? Describe its properties. Also state the formation of black phosphorus through red phosphorus.
- Write the preparation of phosphine. Also describe the way to purify phosphine.
[Hint: $\text{Ca}_3\text{P}_2 + 6\text{HCl} \rightarrow 2\text{PH}_3 + 3\text{CaCl}_2$
 $\text{PH}_3 + \text{HI} \rightarrow \text{PH}_4\text{I}$; $\text{PH}_4\text{I} + \text{KOH} \rightarrow \text{KI} + \text{H}_2\text{O} + \text{PH}_3$]
- Which gas is used in Holmes's signal? Show that it is basic in nature but it is weakly basic by giving two suitable reactions.
[Hint: $\text{PH}_3 + \text{HI} \rightarrow \text{PH}_4\text{I}$
 $\text{PH}_3 + \text{HBr} \rightarrow \text{PH}_4\text{Br}$]
- How phosphorus pentachloride reacts towards moist air?
[Hint: $\text{PCl}_5 + \text{H}_2\text{O} \rightarrow \text{POCl}_3 + 2\text{HCl}$
 $\text{POCl}_3 + 3\text{H}_2\text{O} \rightarrow \text{H}_3\text{PO}_4 + 3\text{HCl}$]
- Why does PCl_3 give fumes in moisture?
- Give an account for the reducing nature of H_3PO_2 .

[Hint: $4\text{AgNO}_3 + 2\text{H}_2\text{O} + \text{H}_3\text{PO}_2 \rightarrow 4\text{Ag} + 4\text{HNO}_3 + \text{H}_3\text{PO}_4$]

14. Why P- H bonds do not play any role in basicity of oxoacids of phosphorus?
[Hint: P-H bonds are not ionisable to give H^+]
15. Discuss the basicity of H_3PO_2 , H_3PO_3 , H_3PO_4 and $(\text{H}_3\text{PO}_3)_3$.
[Hint: mono, di, tri and tri basic.]
16. Why group 16 have lower ionisation enthalpy than that of group 15?
17. Why electron gain enthalpy of oxygen is less negative as compared to sulphur?
18. Describe the trends of 16 group elements. Which is more metallic in comparison of oxygen and polonium and why?
19. Oxygen and sulphur have large difference in their melting point and boiling point. Comment.
20. Why oxygen shows only -2 oxidation state? Do polonium exhibit the same oxidation state?
21. Oxygen shows anomalous behaviour. Discuss. Also state an example of its anomalous behaviour.
22. Arrange hydrides of group 16 in :-
 - a. Increasing order of thermal stability.
 - b. Increasing order of acidic character.
 - c. Decreasing melting and boiling point.
23. Why external heating is required to initiate the reactions of oxygen?
24. Write the reaction of di-oxygen with Ca, P_4 , Al, C, ZnO_2 , SO_2 and HCl.
25. Giving suitable reactions show that SO_2 is acidic whereas CaO is basic in nature.
26. What are amphoteric oxides? Show the amphoteric nature of Al_2O_3 .
27. Why electric charge necessary in the preparation of Ozone?
28. On what basis you can say that O_3 is a powerful oxidizing agent.
29. By giving any two appropriate reactions describe its oxidating power.
30. Jet aeroplanes deplete the ozone layer. Comment on this statement by giving required chemical reaction.
31. Describe quantitative estimation of ozone.
32. What are the favourable conditions for the maximum yield of sulphuric acid. Give reason for these favourable conditions.
33. Why k_{a1} is much larger than k_{a2} for H_2SO_4 in water?
34. What are the characteristics of sulphuric acid?
35. Why electron gain enthalpy of F_2 is less than that of Cl_2 ?
36. State the reason for strong oxidising nature of halogens.
37. Why most of the reactions of fluorine are exothermic?
38. Give two examples of anomalous behaviour of fluorine.
39. Why charcoal is used in preparation of HCl from H_2 and Cl_2 ?
40. Write the balanced chemical equation for the reaction of chlorine with hot and conc. NaOH.
Is this reaction a disproportionation reaction? Justify
41. HCl reacts with finely powdered Fe and it forms ferrous chloride not ferric chloride. Why?

42. Why ionisation enthalpy of group 18 so high?
43. Why group 18 have large positive values of electron gain enthalpy?
44. State the reason for the inertness of noble gases.

Paper Submitted by:

Name Anuraj Shrivastava

Email anuraj12@rocketmail.com

Phone No. 8719960016