PREVIOUS HSE QUESTIONS FROM THE CHAPTER "THE p-BLOCK ELEMENTS"

1. Write the formula of the basic structural unit of silicates. (1)
2. What are zeolites? Give any two uses of zeolites. (2)
3. Sketch the structures of graphite and diamond. What is the impact of structure on physical properties of these allotropes? (3) [August 2018]
4. The allotrope of carbon with the highest thermodynamic stability is…….. (1)
5. Draw the structure of orthoboric acid. Why it is not a protonic acid? (2)
6. Explain any one method of preparation and structure of diborane. (3) [March 2018]
7. a) Diborane is an electron deficient compound. Explain the structure of diborane. (2)
   b) What is water gas? (1)
   c) Inorganic benzene is …… (1) [July 2017]
8. Borax is an important compound of Boron.
   a) The solution of borax is alkaline. Give reason. (2)
   b) Give any two uses of borax. (1)
   c) Diamond has covalent bonding. Yet it has high melting point. Give a reason. (1) [March 2017]
9. a) CCl_4 does not undergo hydrolysis but $SiCl_4$ undergoes hydrolysis. Why? (2)
   b) Differentiate between silicates and silicones. (2) [September 2016]
10. Carbon has many allotropes.
    a) Write the name of any two allotropic forms of carbon. (1)
    b) Briefly explain the structure of any one of the above mentioned allotrope. (2)
    c) CCl_4 does not undergo hydrolysis. Give reason. (1)
11. When BF_3 is treated with LiH at 450K, a hydride of boron is formed.
    a) Identify the hydride of boron formed in the above reaction. (1)
    b) Briefly explain the structure of the above mentioned hydride. (2)
    c) Boron compounds behave as Lewis acids. Why? (1) [March 2016]
12. Orthoboric acid is an important compound of boron. Prepare a short note on orthoboric acid highlighting the following aspects.
    - Method of preparation * Acidic nature *Action of heat *structure (4) [October 2015]
13. a) Thermodynamically, the most stable allotrope of carbon is …….. (1)
    b) Carbon is the first member of group 14 in the periodic table.
    i) Why does carbon differ from the rest of the members of its group? (1)
    ii) Write any two anomalous properties of carbon. (2) [March 2015]
14. Give reason for the following:
    a) CO_2 is a gas while SiO_2 is a solid. (1)
    b) CCl_4 cannot be hydrolyzed but $SiCl_4$ can be hydrolyzed. (1)
    c) Borax bead test can be used to identify metaborates in the laboratory. (1)
    d) Graphite is used as a lubricant in machines. (1) [August 2014]
15. a) What is dry ice? (1)
    b) Why does BF_3 behave as a Lewis acid? (1)
    c) Carbon forms millions of compounds due to its self-linking property to form long chains and big rings.
    i) Name the above property of carbon. (1)
    ii) Give the reason for the above property of carbon. (1) [March 2014]

16. a) i) Boric acid (H_3BO_3) is considered as a weak acid. Why? (1)
    ii) Carbon monoxide is highly poisonous. Why? (1)
    b) What are zeolites? What is its use? (2) [September 2013]
17. The group 14 elements have four electrons in the outermost shell.
    a) $SiCl_4$ can be easily hydrolyzed by water while CCl_4 cannot be hydrolyzed. Why? (1)
    b) How are fullerenes prepared? (1)
    c) Distinguish between silicones and silicates? (2)` [March 2013]
18. a) Diborane is an electron deficient compound.
    i) Name the special bonds that present in Diborane. (1)
    ii) How will you convert Diborane into inorganic benzene? (1)
    iii) What are silicones? Write its general formula. (2) [September 2012]

19. Borax, orthoboric acid and diborane are some useful compounds of boron.
    a) Write the chemical formula of borax. (1)
    b) Boric acid is not a protonic acid but acts as a Lewis acid. Justify. (1)
    c) Explain the structure of diborane using a diagram. (2) [March 2012]
20. a) Some elements can exist in different crystalline forms and are called allotropes.
    i) What are the important allotropic forms of carbon? (1)
    ii) Which allotropic form of carbon is used as a dry lubricant in machines running at high temperature? (1)
    b) When sodium borohydride ($NaBH_4$) is treated with iodine (I_2), two gaseous products were obtained. One is hydrogen and the other is a highly toxic gas X, which catches fire upon exposure to air. When the gas X is heated with ammonia for a long time, a compound Y of ring structure is obtained. Identify X and Y. (Name and molecular formula are expected) (2) [October 2011]
21. Two important compounds of carbon are carbon monoxide and carbon dioxide.
    a) Why carbon monoxide is called a poisonous gas? (1)
    b) How is CO_2 responsible for global warming? (1½)
    c) What are producer gas and water gas? Mention their uses? (1½) [March 2011]
22. Match the following:

A	B	C
1. Inorganic benzene	a) Allotrope	i) Aluminium
2. Glass like beads	b) Borax	ii) Carbon
3. Fullerene	c) Borazine	iii) B_2H_6
4. Zeolites	d) Dry ice	iv) $B_3N_3H_6$
	e) Softening of hard water	v) $Na_2[B_4O_5(OH)_4].8H_2O$

(4) [September 2010]

23. Boron, Aluminium, Gallium, Indium and Thalium belong to group 13 of the periodic table of elements.
    a) How can you explain the higher stability of BCl_3 as compared to $TlCl_3$? (1)
    b) While Aluminium can be form the ion $[AlF_6]^{3-}$, Boron is unable to form $[BF_6]^{3-}$ ion. Explain. (1)
    c) State whether the compound BCl_3 is acidic or basic. (1)
    d) Write the hybridization state of B in BF_3 and BH_4^-. (1) [March 2010]
24. a) Briefly describe the structure of diborane. (2)
    b) What is inorganic benzene? Why is it so called? (2) [March 2009]
25. Some elements show allotropy.
    a) Define allotropy. (1)

b) Diamond is hard and non-conducting, while graphite is soft and conducting. Explain. (2) [June 2008]

26. Carbon and silicon belong to the same group and have many similarities. But …….

a) CO_2 is a gas while SiO_2 is a solid. Explain (2)

b) CCl_4 cannot be hydrolysed, but $SiCl_4$ can be. Why? (1) [February 2008]