CHEMISTRY

BOOKS - A N EXCEL PUBLICATION

THE P-BLOCK ELEMENTS

Question Bank

1. Discuss the pattern of variation of oxidation states of B to Tl

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2. Discuss the pattern of variation of oxidation states of (ii) C to Pb

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3. Boron, Aluminium, Gallium, Indium and Thallium belong to group 13 of the periodic table of elements. How can you explain a higher stability of BCI_3 as compared to $TiCI_3$?

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4. Consider the compounds, BCI_3 and CCl_4. How will they behave with water?

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5. Explain the shapes of BF_3 and BH_4^-. Assign hybridisation of Boron in these species.

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6. Write reactions to justify the amphoteric nature of Al.

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7. What are electron deficient compounds? Are BCl_3 and $SiCl_4$ electron deficient?

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8. Write down the resonance structures of CO_3^{2-} and HCO_3^-

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9. Rationalise the statements and give chemical reactions. (i) Lead (II) Chloride reacts with Cl_2 to give $PbCl_4$

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10. Rationalise the statements and give chemical reactions. (ii) Lead (IV) chloride is unstable towards heat

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11. Rationalise the statements and give chemical reactions. (iii) Lead is known not to form an iodide Pbl_4

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12. Suggest a reason why B-F bond length in BF_3 (130 pm) and BF_4^- (143 pm) differ?

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13. Define dipole moment. The dipole moment of BF_3 is zero. Why?

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14. What happens when Borax is heated

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15. What happens when Boric acid is added to water

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16. What happens when Al treated with dilute NaOH

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17. What happens when BF_3 reacted with NH_3

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18. Explain the reaction Si is heated with methyl chloride at high temperature in prsence of copper

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19. Explain the reaction SiO_2 is treated with HF

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20. Explain the reaction CO is heated with ZnO

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21. Explain the reaction Hydrated alumina is mixed with aqueous NaOH

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22. Give reasons (i) Con.HNO_3 can be transported in Al containers

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23. Give reasons (ii) A mixture of Al pieces and dilute NaOH is used to open drains

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24. Give reasons (iii) Graphite is used as a lubricant

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25. Give reasons (iv) Diamond is used as an abrasive

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26. Give reasons (v) Al alloys are used to make aircraft body

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27. Give reasons (vi) Aluminium utensils cannot be kept in water overnight

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28. Give reasons (vii) Aluminium wire is used to make transmission cables.

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29. Explain why is there a phenomenal decrease in ionisation enthalpy from carbon to silicon?

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30. Classify the oxides as neutral, acidic amphoteric and basic

$CO, B_2O_3, SiO_2, Al_2O_3, PbO_2, Tl_2O_3$

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31. A certain salt X gives the following reactions (i) Its aqueous solution is alkaline to litmus

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32. A certain salt X gives the following reactions (ii) It swells up to a glassy matter Y on heating

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33. A certain salt X gives the reaction,When Con.H_2SO_4 is added to a hot solution of X, white crystals of an acid Z separates out. Identify X, and Z.

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34. Write balanced equation for $BF_3 + LiH \rightarrow$

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35. Write balanced equation for

$B_2H_6 + H_2O \rightarrow$

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36. Write balanced equation for

$NaH + B_2H_6 \rightarrow$

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37. Write balanced equation for $H_3BO_3 \rightarrow$

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38. Write balanced equation for $Al + NaOH \rightarrow$

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39. Write balanced equation for $B_2H_6 + NH_3$ gives

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40. The aqueous solution of borax is

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41. Boric acid is polymeric due to -----

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42. Hybridisation of boron in B_2H_6 is -----

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43. Thermodynamically, the most stable allotrope of carbon is.....

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44. The Elements of group 14 show ----- oxidation states

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45. Boron, Aluminium, Gallium, Indium and Thallium belong to group 13 of the periodic table of elements. How can you explain a higher stability of BCI_3 as compared to $TiCI_3$?

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46. Boron, Aluminium, Gallium, Indium and Thallium belong to group 13 of the periodic table of elements. While Aluminium can be

form the ion $[AlF_6]^{3-}$, Boron is unable to form $[BF_6]^{3-}$ ion. Explain.

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47. Boron, Aluminium, Gallium, Indium and Thallium belong to group 13 of the periodic table of elements. State whether the compound BCl_3 is acidic or basic

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48. Explain the shapes of BF_3 and BH_4^-. Assign hybridisation of Boron in these species.

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49. Two Important oxides of carbon are carbon monox ide and carbon dioxide. Why is CO called a poisonous gas?

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50. Two important oxides of carbon are carbon monoxide and carbon dioxide.

a) How is CO_2 responsible for global warming?

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51. Two Important oxides of carbon are carbon monox ide and carbon dioxide. What are producer gas and water gas? Mention their uses.

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52. Some elements can exit in different Crystaline forms and are called allotropes, What are the three important allotropic forms of carbon?

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53. Some elements can exit in different Crystaline forms and are called allotropes, Which allotropic form of carbon is used as a

dry lubricant in machines running at high temperature

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54. When sodium borohydride $(NaBH_4)$ is treated with iodine (l_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 ob tained. Identify X and Y. (Name and molecular formula are expected)

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55. Borax, orthoboric acid and diborane are some useful compounds of boron Write the chemical formula of borax.

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56. Borax, orthoboric acid and diborane are some useful compounds of boron Boric acid Is not a protonic acid but acts as a Lewis acid. Justify.

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57. Borax, orthoboric acid and diborane are some useful compounds of boron. Explain the structure of diborane using a diagram.

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58. Diborane is an electron deficient compound. Name the special bonds that present in diboron.

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59. Diborane is an electron deficient compound. How will you convert Diborane into inorganic benzene?

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60. What are silicones? Write its General formula.

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61. The group 14 elements have four electronsin the outermost shell. $SiCl_4$, can be easily hydrolyzed by water while $\mathbb{C}l_4$ cannot be hydrolyzed.

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62. The group 14 elements have four electronsin the outermost shell. How are fullerenes prepared?

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63. The group 14 elements have four electronsin the outermost shell. Distinguish between silicones and Silicates.

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64. Boric acid (H_3BO_3) is considered as a weak acid Why?

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65. Carbon monoxide is highly poisonous. Why?

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66. What is dry ice?

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67. Why does BF_3 behave as a Lewis acid?

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68. Carbon forms millions of compounds due to its self-linking property to form long chains and big rings. Give the reason for the above property of carbon.

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69. Carbon forms millions of compounds due to its self-linking property to form long chains and big rings. Name the above property of carbon.

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70. Carbon forms millions of compounds due to its self-linking property to form long chains and big rings. Give the reason for the above property of carbon.

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71. Thermodynamically, the most stable allotrope of carbon is.....

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72. Carbon is the first member of group 14 in the periodic table, Write any two anomalous properties of carbon

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73. Carbon is the first member of group 14 in the periodic table, Why does carbon differ from the rest of the members of bts group?

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74. Carbon is the first member of group 14 in the periodic table, Write any two anomalous properties of carbon

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75. Carbon has many allotropes. Write the name of any two allotropic forms of carbon.

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76. Carbon has many allotropes. Briefly explain the structure of any one of the allotrope.

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77. Carbon has many allotropes. CCl_4 does not undergo hydrolysis. Glve a reason.

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78. When BF_3 is treated with LiH at 450 K, a hydride of borbon is formed. Identify the hydride of boron formed in the above reaction.

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80. When BF_3 is treated with LiH at 450 K, a hydride of borbon is formed. Briefly explain the structure of the above mentioned hydride.

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81. When BF_3 is treated with LiH at 450 K, a hydride of borbon is formed. Boron compounds behave as Lewis acids. Why?

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