CHEMISTRY

BOOKS - MAXIMUM PUBLICATION

The p-block Elements

Exercise

1. The aqueous solution of borax is

A. Acidic

B. Alkaline

C. Neutral

D. Amphoteric

Answer: B

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2. Say TRUE or FALSE. Boron in aqueous solution forms B^{3+} ion.

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3. Which of the following halide of group 14 does not exist? a) CF_4 b) Cl_4 c) SiF_4 d) PbI_4

A. CF_4

B. Cl_4`

C. SiF_4

D. Pbl_4

Answer: D

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4. Orthoboric acid, H_3BO_3 is a

A. Protonic acid

B. Arrhenius acid

C. Lewis acid

D. Bronsted-Lowery acid

Answer:

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5. The zeolite used as a catalyst in petrochemical industries for cracking of hydrocarbons and isomerization is_____

6. Dry ice is_____

7. Thermodynamically most stable allotrope of carbon is_____

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8. The alkalimetal used in solar cells is_____

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9. $AlCl_3$ fumes in most air because

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10. Boron is an element with atomic number 5. Write down the electronic configuration of boron.

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11. Boron is an element with atomic number 5. Mention any two uses of boron.

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12. Boron is an element with atomic number 5. Write down some compounds of boron.

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13. Answer the question, with the help of the following: a) Hard solid b) Melting point above 450 K c) six allotropic forms are known d) Low electrical conductivity, e) Mass number12. Which is the element?

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

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15. $C + \frac{1}{2}O_2 \rightarrow \ldots\ldots\ldots\ldots$

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16. Write any two uses of carbon monoxide,

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17. How is carbon dioxide produced?

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18. What is the hardest element / form of an element in the world?

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19. Diborane has an unusual structure. Justify the statement with figure.

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20. Match the following :

A	B
CO	(i) A semi conductor in electronic devices
N_2	(ii) Reducing agent in metallurgy
O_3	(iii) Thermal decomposition of Ammonia
Boron	(iv) Used as a chemical reagent in organic chemistry

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21. PCl_3 fumes in moist air. Give reason.

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22. PCl_3 fumes in moist air. Write down a balanced equation that can reveal the answer

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23. Generally, non-metal oxides are basic. Do you agree?

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24. Generally, non-metal oxides are basic. What do you meant by oxides?

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25. Generally, non-metal oxides are basic. Which are the different types of oxides?

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26. Generally, non-metal oxides are basic. Give examples for each type of oxides.

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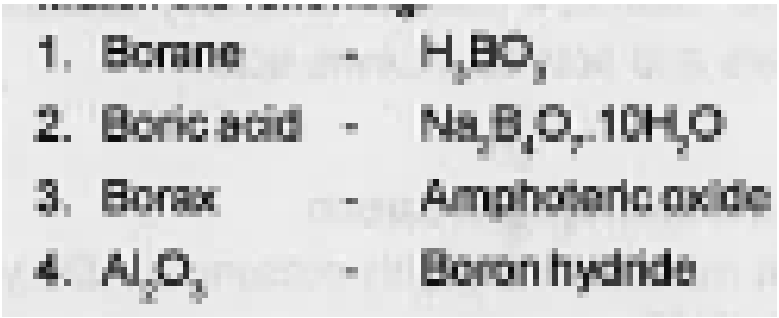
27. Match the following:



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28. How diborane reacts with oxygen?

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29. How diborane reacts with water?

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30. $\mathbb{C}l_2$ cannot be hydrolysed. Give reason

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31. Draw the structure of the dimer of $AlCl_3$

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32. Draw the structure of boric acid,

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33. Starting from borax how will you prepare boric acid? (Write the chemical equation).

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34. CO 2 is a gas but SiO_2 is a solid. Give reason.

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35. What are zeolites?

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36. What is ZSM-5?

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37. Explain the following: Allotropy

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38. Explain the following: Coke and Charcoal

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39. Give justification, The first lonisation enthalpy of carbon is greater than that of

boron, whereas the reverse is correct for the second ionisation enthalpy.

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40. Give justification, Graphite is a better lubricant on moon than that on earth.

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41. Match the following:

	I		II
A.	Mutualism	(i)	+ -
B.	Parasitism	(ii)	+ 0
C.	Amensalism	(iii)	+ +
D.	Commensalism	(iv)	- 0

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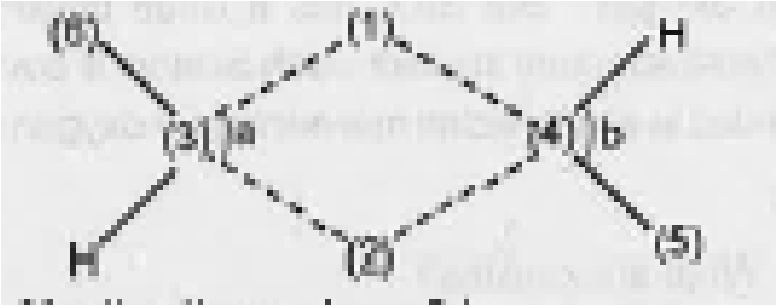
42. Wite down the corresponding elements in the figure : 1)..... br 2)..... br 3)..... Br 4)..... Br 5)..... Br 6).....



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43. The simplest boron hydride is diborane. Wire down the molecular formula of diborane

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44. The simplest boron hydride is diborane. Distinguish between terminal hydrogen and bridging hydrogen atoms of diborane

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45. How is orthoboric acid prepared?

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46. Account for the acidic nature of orthoboric acid.

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47. How is diborane prepared in the laboratory?

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48. `BCl_3 is a good Lewis acid. Why?

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49. Name the allotropes of carbon

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50. Carbon monoxide is highly poisonous. Do you agree? Justify

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51. Diamond is hard and non conducting while graphite is soft and conducting. Why?

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52. Explain the action of heat on boric acid.

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53. What is inorganic benzene? How is it formed?

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54. Explain the difference in properties of diamond and graphite on the basis of their

structures

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55. How do you explain the lower atomic radius of gallium as compared to aluminium?

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56. Boron resembles silicon in many of its properties. What is this resemblance generally known as?

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57. What is dry ice? What is it used for?

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58. What are silicones?

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59. Elements of group 13 are.....

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60. Which of the following is not a mineral of boron? (borax, bauxite, colemanite, tincal)

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61. In the reaction between NH_3 and BF_3 ammonia acts as..... (Lewis base, Lewis acid, brownsted base)

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62. Diamond and Graphite are carbon's.....

(allotropic forms, isotopic forms)

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63. The hydrides of boron are called boranes.

How diborane reacts with ammonia?

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64. The hydrides of boron are called boranes. Account for the exceptional hardness of diamond.

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65. Why does boron trifluoride behave as a Lewis acid?

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

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

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68. Aluminium trifluoride is insoluble in anhydrous HF but dissolves on addition of NaF. Aluminium trifluoride precipitates out of the resulting solution when gaseous BF_3 is bubbled through. Give reasons.

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69. In some of the reactions, thallium resembles aluminium, whereas in others it

resembles with group 1 metals. Support this statement by giving some evidences

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70. A compound is formed between oxygen and fluorine. Do you know whether It is oxygen difluoride or flurine oxide? Explain

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71. NO and HNO_3 are two compounds of N. In which of them is N_2 more oxidized?

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72. Briefly describe the structure of diborane.

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73. What is inorganic benzene?

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74. 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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75. Boron, Aluminium, Gallium, Indium and Thallium belong to group 13 of the periodic

table of elements. While Aluminium can be form the ion $[AIF_6]^{3-}$, Boron is unable to form $[BF_6]^{3-}$ ion. Explain.

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76. Boron, Aluminium, Gallium, Indium and Thallium belong to group 13 of the periodic table of elements. State whether the compound BCI_3 is acidic or basic

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77. Boron, Aluminium, Gallium, Indium and Thallium belong to group 13 of the periodic table of elements. Write the hybridization state of B in BF_3

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78. Match the following :

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

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

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80. 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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81. 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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82. 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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83. 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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84. Borax, orthoboric acid and diborane are some useful compounds of boron Write the chemical formula of borax.

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

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

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

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89. What are silicones? .

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

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

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

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94. Carbon monoxide is highly poisonous. Why?

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95. What are zeolites?

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96. What is dry ice?

Watch Video Solution

97. Why does BF_3 behave as a Lewis acid?

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98. 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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99. 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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100. Give reasons for the following: CO_2 is a gas whereas SiO_2 is a solid.

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101. Give reasons for the following: CCl_4 cannot be hydrolyzed but $SiCl_4$ can hydrolysed.

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102. Give reasons for the following: Borax bead test can be used to identify metaborates in the laboratory.

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103. Give reasons for the following: Graphite is used as a lubricant in machines.

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

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

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107. 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

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

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

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

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111. 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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112. 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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113. 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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114. CCl_4 does not undergo hydrolysis but $SiCl_4$ undergoes hydrolysis. Why?

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115. Differentiate between silicates and silicons.

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116. Borax is an important compound of Boron. The solution of borax is alkaline. Give a reason.

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117. Borax is an important compound of Boron.Give any two uses of borax.

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118. Borax is an important compound of Boron. Diamond has co-valent bonding. Yet it has high melting point. Give a reason.

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