CHEMISTRY

BOOKS - KUMAR PRAKASHAN KENDRA

CHEMISTRY (GUJRATI ENGLISH)

THE P-BLOCK ELEMENTS

Section A Questions

1. Give general information of elements of p-block.

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2. Give origin of group 13 elements

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3. Explain atomic radius of elements of boron family .

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4. Explain ionization enthalpy and electronegativity for elements of Boron family.

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5. How would you explain the lower atomic radius of Ga as compared to Al ?

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6. Explain physical characteristic of group 13 elements .

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7. Discuss the pattern of variation in the oxidation states of (i) B to Tl and (ii) C to Pb.

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8. How can you explain higher stability of BCl_3 as compared to $TlCl_3$?

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9. Give chemical properties of elements of group-13.

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

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11. Consider the compounds, BCl_3 and CCl_4. How will they behave with water ? Justify.

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12. Write reactions to justify amphoteric nature of aluminium.

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13. When metal X is treated with sodium hydroxide, a white precipitate (A) is obtained, which is soluble in excess of NaOH to give soluble complex (B). Compound (A) is soluble in dilute HCl to form compound (C). The

compound (A) when heated strongly gives (D), which is used to extract metal. Identify (X), (A), (B), (C) and (D). Write suitable equations to support their identities.

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14. Give important trends and anomalous properties of boron.

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15. In some of the reactions thallium resembles aluminium, whereas in others it resembles with group-I metals. Support this statement by giving some evidences.

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16. Explain physical and chemical properties of borax.

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17. Give physical and chemical properties of Orthoboric acid

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18. Is boric acid a protic acid ? Explain.

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19. Explain what happens when boric acid is heated.

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20. A certain salt X, gives the following results.

(i) Its aqueous solution is alkaline to litmus.

(ii) It swells up to a glassy material Y on strong heating

(iii) When conc. H_2SO_4 is added to a hot solution of X, white crystal of an acid Z separates out.

Write equations for all the above reactions and identify X, Y and Z.

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21. Write preparation of diborane and give physical and chemical properties of it.

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22. Describe the shapes of BF_3 and BH_4^- . Assign the hybridisation of boron in these species.

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23. What happens when Borax is heated strongly

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24. What happens when Boric acid is added to water

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25. What happens when Aluminium is treated with dilute NaOH

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26. What happens when BF_3 is reacted with ammonia ?

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27. Write balanced equations for :

$BF_3 + LiH \rightarrow$

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28. Write balanced equations for :

$B_2H_6 + H_2O \rightarrow$

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29. Write balanced equations for :

$NaH + B_2H_6 \rightarrow$

View Text Solution

30. Write balanced equations for :

$H_3BO_3 \xrightarrow{\Delta}$

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31. Write balanced equations for :

$Al + NaOH \rightarrow$

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32. Write balanced equations for :

$B_2H_6 + NH_3 \rightarrow$

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33. Give uses of boron and its compound.

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34. Give uses of Al and its compound.

View Text Solution

35. Give physical properties of B and Al.

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36. Suggest reasons why the B - F bond lengths in BF_3 (130 pm) and BF_4^- (143 pm) differ.

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37. If B-Cl bond has a dipole moment, explain why BCl_3 molecule has zero dipole moment.

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38. 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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39. Explain origin source of group 14 elements.

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40. Explain physical properties of group 14 elements.

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

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42. Explain oxidation states of group 14 elements.

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43. What are electron deficient compounds ? Are BCl_3 and $SiCl_4$ electron deficient species ? Explain.

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44. Explain reactivity of group 14 elements towards oxygen.

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45. Discuss reactivity of group 14 elements towards water and halogens.

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46. Rationalize the given statements and give chemical reactions :

Lead (II) chloride reacts with Cl_2 to give $PbCl_4$.

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47. Rationalize the given statements and give chemical reactions :

Lead (IV) chloride is highly unstable towards heat.

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48. Rationalize the given statements and give chemical reactions :

Lead is known not to form an iodide, Pbl_4 .

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49. Classify following oxides as neutral, acidic, basic or amphoteric :

$CO, B_2O_3, SiO_2, CO_2, Al_2O_3, PbO_2, Tl_2O_3$

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50. Write suitable chemical equations to show their nature.

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51. Why carbon differs from rest of the members of its group ? Explain.

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

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53. What do you understand by inert pair effect ?

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54. What do you understand by allotropy ?

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55. What do you understand by catenation ?

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56. Explain diamond.

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57. Explain graphite.

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58. Give reasons

Conc. HNO_3 can be transported in aluminium container.

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59. Give reasons

A mixture of dilute NaOH and aluminium pieces is used to open blocked drain.

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60. Give reasons

Graphite is used as lubricant.

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61. Give reasons

Diamond is used as an abrasive.

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62. Give reasons

Aluminium alloys are used to make aircraft body.

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63. Give reasons

Aluminium utensils should not be kept in water overnight.

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64. Give reasons

Aluminium wire is used to make transmission cables.

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65. What is the state of hybridisation of carbon in CO_3^{2-}

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66. What is the state of hybridisation of carbon in diamond.

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67. What is the state of hybridisation of carbon in graphite ?

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

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69. Explain fullerenes.

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70. Give uses of Carbon.

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71. Give preparation of carbon monoxide.

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72. Explain properties of carbon monoxide and give its uses

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73. Suggest a reason as to why CO is poisonous.

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74. Give preparation and properties of carbon dioxide.

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75. Explain the following reactions :

Silicon is heated with methyl chloride at high temperature in the presence of copper.

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76. Explain the following reactions :

Silicon dioxide is treated with hydrogen fluoride.

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77. Explain the following reactions :

CO is heated with ZnO.

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78. Explain the following reactions :

Hydrated alumina is treated with aqueous NaOH solution.

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79. Give uses of carbon dioxide.

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80. How is excessive content of CO_2 responsible for global warming ?

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81. Give one method for industrial preparation and one for laboratory preparation of CO and CO_2 each.

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82. Explain silicon dioxide.

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83. Discuss preparation and properties of silicones.

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84. If the starting material for the manufacture of silicones is $RSiCl_3$, write the structure of the product formed.

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85. Give uses of silicon.

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86. Give information of silicon compound.

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87. Explain zeolites compounds.

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88. Standard electrode potential values, $(E^{\ominus})$ for Al^{3+}/Al is -1.66 V and that of Tl^{3+}/Tl is +1.26 V. Predict

about the formation of M^{3+} ion in solution and compare the electropositive character of the two metals.

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89. White fumes appear around the bottle of anhydrous aluminium chloride. Give reason.

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90. Boron is unable to form BF_6^{3-} ion. Explain.

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91. Why is boric acid considered as a weak acid ?

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92. Select the member(s) of group 14 that used as semiconductor.

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93. $[SiF_6]^{2-}$ is known whereas $[SiCl_6]^{2-}$ not. Give possible reasons.

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94. Diamond is covalent, yet it has high melting point. Why ?

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95. What are silicones ?

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96. Explain borax bead test.

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Section B Objective Questions Short Questions

1. Which group is known as p-block elements ?

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2. Give name of group 13 elements.

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3. Give increasing order of group 13 elements for atomic radius.

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4. Give oxidation state of gallium.

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5. Which hydrated elements of group 13 are found as polymer in nature ?

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6. Which hydroxides of group 13 are amphoteric in nature ?

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7. Draw structure of diboren.

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8. Give chemical reaction of aluminum with dilute HCl ?

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9. What is catenation ?

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10. Give chemical reaction for preparing pure CO.

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11. Give uses of silica gel.

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12. Which ions are present in aluminosilicates ?

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13. Write down use of ZSM-5.

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14. Write general and empirical forumula of silicon.

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15. Give chemical reaction for the preparation of water gas and producer gas.

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16. Give chemical reaction for the preparation of borax bead.

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17. Draw structure of Al_2Cl_6 and give uses of $AlCl_3$.

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18. Give structure of gaseous $AlCl_3$.

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19. Mention isotops of boron.

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20. Which elements of group 13 possess both +1 and +3 oxidation state ?

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21. Write chemical reaction of Al with aqueous alkali.

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22. Which elements of group 13, except B, can form tetrahedral and octahedral complex in aqueous medium ?

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23. Give suitable laboratory preparation for diborane.

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24. Give industrial preparation for diborane.

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25. Write chemical reaction to prepare inorganic benzene $(B_3N_3H_6)$.

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26. Give uses of $LiBH_4$ and $BaBH_4$.

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27. Give uses of Borax.

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28. Al having double conductivity as compared to which metal ?

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29. Dilute aqueous solution of ..... acid is used as antibiotic.

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30. Name the metals with which Al can form alloy ?

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31. Half-life of $.^{14}C$ is .....

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32. Tin and lead are mainly occur as which ore ?

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33. Mention uses of pure forms of germanium and silicon.

View Text Solution

34. Hybridization of central atom in SiF_6^{-2}, $\left[Sn(OH)_6\right]^{-2}$

View Text Solution

35. Draw the resonance structure of CO_2

View Text Solution

36. ..... acid is produce at the end of hydrolysis of $SiCl_4$.

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37. Mention catenation order for group 14 elements.

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38. Carbon can form $p\pi - p\pi$ bond with which kind of elements ?

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39. Give the name of scientist who discover fullerene.

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40. Give the use of dimond.

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41. Give C-C single bond length and double bond in fullerene.

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42. Give uses of CO_2.

View Text Solution

43. Give chemical reaction for the preparation of producer gas.

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44. Give chemical reaction for the preparation of water gas (Synthetic gas).

View Text Solution

45. Buffer system helps to maintain blood pH between .....

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46. How dry ice is produce ? Mention its uses.

View Text Solution

47. Which are various forms of silica ?

View Text Solution

48. Give main use of Quartz.

View Text Solution

49. Mention the starting material to produce silicons.

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50. Give the name of basic structural unit and its examples

.

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51. Manmade sillicate is .....

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52. .....is used to convert alcohols directly into gasoline.

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53. Give the use of hydrated zeolites.

View Text Solution

54. What is alumino silicate ? Which ions are used to balance its electric charge ?

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55. When silicate units are linked together , they form which type of structures ?

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56. ..... an amorphous form of silica is used in filtration plants.

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Section B Objective Questions True False

1. Fullerene has 12 rings of 6 memberes and 20 rings of 5 memberes

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2. CO in monoxide is neutral while in dioxide CO_2 is acidic .

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3. Boron fibres are used in making light composite material for aircraft.

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4. When borax is heated in a Bunsen burner flame with CaO on a loop of platinum wire , a yellow coloured $Co(BO_2)_2$ bead is formed.

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5. Oxides of indium and thallium are basic in their properties .

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6. C, Si non metals , germanium , tin and lead are high melting metals.

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Section B Objective Questions Assertion Reason

1. Assertion : CO_2 is gas at room temperature but SiO_2 is solid at room temperature.

Reason : CO_2 possess C=O bond but SiO_2 does not possess Si=O bond.

A. Statement Assertion and Reason both are right. Statement Reason is correct explanation of statement Assertion.

B. Statement Assertion and Reason both are right , but Assertion is not correct explanation of statement Assertion.

C. Statement Assertion is right but statement Reason is wrong

D. Both statement Assertion and Reason are wrong .

Answer: B

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2. Assertion : Diamond is hard solid substance with network like arrangement.

Reason : In diamond each carbon atom undergoes sp^3 hybridisation.

A. Statement Assertion and Reason both are right. Statement Reason is correct explanation of

statement Assertion.

B. Statement Assertion and Reason both are right , but Assertion is not correct explanation of statement Assertion.

C. Statement Assertion is right but statement Reason is wrong

D. Both statement Assertion and Reason are wrong .

Answer: A

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3. Assertion: Borax bead test is not suitable for Al(III) .

Reason: Al_2O_3 is water insoluble.

A. Statement Assertion and Reason both are right. Statement Reason is correct explanation of statement Assertion.

B. Statement Assertion and Reason both are right , but Assertion is not correct explanation of statement Assertion.

C. Statement Assertion is right but statement Reason is wrong

D. Both statement Assertion and Reason are wrong .

Answer: B

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4. Assertion : $B(OH)_3$ is acidic in nature while $In(OH)_3$ is basic in nature.

Reason: $B(OH)_3$ form network like structure by strong H-bond.

A. Statement Assertion and Reason both are right. Statement Reason is correct explanation of statement Assertion.

B. Statement Assertion and Reason both are right , but Assertion is not correct explanation of statement Assertion.

C. Statement Assertion is right but statement Reason is wrong

D. Both statement Assertion and Reason are wrong .

Answer: C

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5. Assertion : CO is highly poisonous substance.

Reason : CO can form stable complex with hemoglobin in blood

A. Statement Assertion and Reason both are right. Statement Reason is correct explanation of statement Assertion.

B. Statement Assertion and Reason both are right , but Assertion is not correct explanation of statement Assertion.

C. Statement Assertion is right but statement Reason is wrong

D. Both statement Assertion and Reason are wrong .

Answer: A

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6. Assertion : Graphite is good conductor of heat and electricity .

Reason : All the electrons of graphite are arranged in C-C type and form σ -bond.

A. Statement Assertion and Reason both are right. Statement Reason is correct explanation of

statement Assertion.

B. Statement Assertion and Reason both are right , but Assertion is not correct explanation of statement Assertion.

C. Statement Assertion is right but statement Reason is wrong

D. Both statement Assertion and Reason are wrong .

Answer: C

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7. Assertion : C_{60} fullerene is an allotropes of carbon.

Reason : In fullerene, five carbon membered ring arrange

on every side of ring.

A. Statement Assertion and Reason both are right. Statement Reason is correct explanation of statement Assertion.

B. Statement Assertion and Reason both are right , but Assertion is not correct explanation of statement Assertion.

C. Statement Assertion is right but statement Reason is wrong

D. Both statement Assertion and Reason are wrong .

Answer: B

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Section B Objective Questions Match The Following

1. Match Column-I with Column-II :

Column-I	Column-II
(A) $Bi^{+3} \rightarrow (BiO)^+$	(P) Heat
(B) $[AlO_2]^- \rightarrow Al(OH)_3$	(Q) Hydrolysis
(C) $SiO_4^{-4} \rightarrow Si_2O_7^{-6}$	(R) Acidification
(D) $(B_4O_7)^{-2} \rightarrow [B(OH)_3]$	(S) Dilution with water

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2. Match the following :

Compound	Nature
(i) PbO_2	(a) Acidic
(ii) SPO_2	(b) Basic
(iii) GeO_2	(c) Amphoteric

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3. Match the following :

	Allotrop	$\Delta_f H^{\ominus}$
(i)	Graphite	(a) 38.1 KJ/mol
(ii)	Diamond	(b) Zero
(iii)	Fullerene	(c) 1.90 KJ/mol

View Text Solution

Section C Mcqs Textual Exercise

1. An aqueous solution of borax is .....

A. neutral

B. amphoteric

C. basic

D. acidic

Answer: C

View Text Solution

2. Boric acid is polymeric due to .....

A. its acidic nature

B. the presence of hydrogen bonds.

C. its monobasic nature

D. its geometry

Answer: B

View Text Solution

3. The type of hybridisation of boron in dibrorane is .....

A. sp

B. sp^2

C. sp^3

D. dsp^2

Answer: C

View Text Solution

4. Thermodynamically the most stable form of carbon is .....

A. diamond

B. graphite

C. fullerenes

D. coal

Answer: B

View Text Solution

5. Elements of group 14 .....

A. exhibit oxidation state of +4 only

B. exhibit oxidation state of +2 and +4 only

C. form M^{2-} and M^{4+} ions

D. form M^{2+} and M^{4+} ions

Answer: B

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Section C Mcqs Darpan S Examination Oriented Mcqs

1. The general electronic configuration of all the elements of p-block .

A. ns^2np^1

B. ns^2np^6

C. ns^2np^{1-6}

D. ns^2np^{1-5}

Answer: C

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2. Which of the following is correct order for ionization enthalpy of group 13 ?

A. $B > Al > Ga > In > Tl$

B. $B < Al < Ga < In < Tl$

C. $B > Al < Ga > In < Tl$

D. $B > Al > Ga < In < Tl$

Answer: C

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3. Which of the following compound is known as inorganic benzene ?

A. Boron

B. Diboren

C. Hexaboren

D. Borazene

Answer: D

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4. Which of the following element has second highest order in terms of its abundance in earth crust ?

A. Carbon

B. Germenium

C. Silicon

D. Aluminium

Answer: C

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5. Which of the following mixture is known as producer gas ?

A. $CO + N_2$

B. $CO + H_2$

C. $CO + H_2O$

D. $O_2 + N_2$

Answer: A

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6. What is the use of ZSM-5 ?

A. Isomerism in petroleum

B. Decomposition of hydrocarbon

C. Gasoline directly from alcohol

D. All

Answer: C

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7. Which is the number of Calcium in terms of elements are obtained from earth crust ?

A. 4

B. 6

C. 3

D. 5

Answer: D

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8. Al is inert in nature , because .....

A. It has high electropositivity .

B. It forms hard layer of Al_2O_3 on the surface.

C. Strong reducing agent

D. It forms alloy with Cu.

Answer: B

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9. What is the molecular formula of borax ?

A. $Na_2B_4O_7.4H_2O$

B. $Na_2B_4O_{10}.10H_2O$

C. $NaB_4O_7.10H_2O$

D. $Na_2B_4O_7.10H_2O$

Answer: D

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10. .....is main ore of lead.

A. Zinc blend

B. Anglesite

C. Galena

D. Cerusite

Answer: C

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11. Give correct ionization enthalpy order for group 14.

A. $C < Si < Ge < Sn$

B. $C > Si < Ge < Sn$

C. $C > Si > Ge > Sn$

D. $C < Si > Ge > Sn$

Answer: C

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12. Which of the following element does not form compound with coordination number 5.

A. Si

B. Pb

C. C

D. All

Answer: C

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13. Which of the following elements shows same catenation property ?

A. C,Si

B. Si,Sn

C. Sn Pb

D. Ge,Sn

Answer: D

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14. State allotropes of SiO_2.

A. Quartz

B. Cristobalite

C. Tridymite

D. All

Answer: D

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15. Identify acidic oxide

A. SiO_2

B. GeO_2

C. SnO_2

D. PbO_2

Answer: A

View Text Solution

16. Identify basic oxide.

A. SiO_2

B. GeO_2

C. SnO_2

D. PbO_2

Answer: D

View Text Solution

17. Which of the following oxides can act as amphoteric ?

A. SiO_2

B. GeO_2

C. SnO_2

D. PbO_2

Answer: B::C

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18. Which of the following property does not possess of Carbon atom.

A. It can form 4 covalent bond.

B. Can form cyclic compound.

C. Can form $p\pi - p\pi$ bond.

D. Can form $d\pi - p\pi$ bond

Answer: D

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19. Due to high bond energy of carbon , which of the following character does not possess by carbon.

A. C can form normal chain.

B. C can form cyclic chains.

C. Can carry more than 4 coordination number.

D. Can possess catenation properties .

Answer: C

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20. C_{70} fullerene , form which colour in toluene solvent ?

A. Violet

B. Orange Red

C. Red

D. Yellow

Answer: B

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21. What is the formula of boric acid ?

A. $B(OH)_3$

B. HBO_3

C. B_2O_3

D. H_2BO_3

Answer: A

View Text Solution

22. Which boron compound possess HBO_2 formula ?

A. Boric acid

B. Diboric acid

C. Metaboric acid

D. Hydrogen borate

Answer: C

View Text Solution

23. Which of the following is 'borane compound' ?

A. Boron halide

B. Boron hydride

C. Boron oxide

D. Boron hydroxide

Answer: B

View Text Solution

24. In preparation of borazene, diborane is heated with which compound ?

A. NH_3

B. H_2

C. O_2

D. H_2O

Answer: A

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25. Which substance possess $B_3N_3H_6$ molecular formula ?

A. Boric acid

B. Boron nitrogen hydride

C. Borazine

D. Boron nitride

Answer: C

View Text Solution

26. Which one of the following is crystalline form of carbon ?

A. Coal

B. Charcoal

C. Coke

D. Fullerene

Answer: D

View Text Solution

27. Carbon atoms of graphite possess which type of arrangement ?

A. Tetrahedral

B. Square planar

C. Hexagonal

D. Octahedral

Answer: C

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28. Carbon atoms of diamond possess which type of hybridization ?

A. sp

B. sp^2

C. sp^3

D. dsp^2

Answer: C

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29. Type of hybridization in graphite

A. sp

B. sp^2

C. sp^3

D. dsp^2

Answer: B

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30. What is the distance between two layers of carbon atom in graphite ?

A. $1.42A^{\circ}$

B. $1.35A^{\circ}$

C. $3.4A^{\circ}$

D. $3.42A^{\circ}$

Answer: C

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31. Shape of C_{60} fullerene is .....

A. Tennisball

B. Bukyball

C. Football

D. Wallyball

Answer: B

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32. Which is the amorphous form of carbon ?

A. Coke

B. Diamond

C. Graphite

D. Fullerene

Answer: A

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33. Which of the following is water gas ?

A. $CO + N_2$

B. $CO_2 + H_2$

C. $CO + H_2$

D. $CO + O_2$

Answer: C

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34. Which negative ion is present in ortho-silicate ?

A. SiO_4^{-4}

B. SiO_7^{-6}

C. $Si_3O_7^{-6}$

D. $(SiO_3)_n^{-3}$

Answer: A

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35. Exceptional elements of group 13 in terms of atomic radius is .....

A. Gallium

B. Indium

C. Boron

D. Thallium

Answer: A

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36. Which of the following 14 group elements have highest catenation property ?

A. C

B. Si

C. Ge

D. Pb

Answer: A

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37. B_2O_3 have which property ?

A. Acidic

B. Basic

C. Amphoteric

D. None

Answer: A

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38. Which of the following has highest stable oxidation state ?

A. Al

B. Ga

C. Tl

D. In

Answer: C

View Text Solution

39. $AlCl_3$ molecule is exist in which form ?

A. Dimer

B. Polymer

C. Monomer

D. None of the above

Answer: A

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40. Which of the following oxidation state do possess by group 14 elements ?

A. $+4$

B. $+4$ and +2

C. M^{-2} and M^{+2} ion

D. M^{-4} and M^{+4} ion

Answer: B

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41. Give the properties of H_3BO_3

A. Monobasic and strong lewis acid.

B. Monobasic and weak lowry bronsted base.

C. Monobasic and weak lewis acid.

D. Tribasic and weak lewis acid.

Answer: C

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42. ..... statement is true for Al_2O_3 and $Al(OH)_3$

A. Both are acidic.

B. Both are basic.

C. Both are amphoteric.

D. Al_2O_3 is acidic while $Al(OH)_3$ is basic.

Answer: C

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43. Moving from C to Pb, capacity to form $p\pi - p\pi$ bond with own atoms .....

A. decreases

B. increases

C. increases or decreases

D. remain constant

Answer: A

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44. Tetra halide of group 14 elements possess ..... shape.

A. square planar

B. octahedral

C. tiagonal bipyramid

D. tetrahedral

Answer: D

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45. Silicon is use as .....

A. seal

B. electrical resistant

C. grease

D. all of above

Answer: D

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Section C Mcqs Competitive Exams

1. Which is the possible oxidation states of phosphorous in its compounds ?

A. -3 to +5

B. -3, +3 to +5

C. $-3, 0, +5$

D. 0 to +5

Answer: A

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2. Which of the following is an amphoteric ?

A. SnO_2

B. CO_2

C. P_2O_5

D. MgO

Answer: A

View Text Solution

3. Which inert element is the most reactive ?

A. He

B. Xe

C. Ar

D. Ne

Answer: B

View Text Solution

4. Which type of hybridisation is observed for 'P' in PCl_5 ?

A. sp^3d

B. dsp^2

C. sp^3

D. sp^3d^2

Answer: A

View Text Solution

5. Which halogen element is obtained from sea weeds ?

A. Br_2

B. I_2

C. F_2

D. Cl_2

Answer: B

View Text Solution

6. What is the formula of cryolite ?

A. Na_3AlF_6

B. $Al_2O_3.2H_2O$

C. $K.AlSi_2O_3$

D. Al_2O_3

Answer: A

View Text Solution

7. Which one is known as oleum ?

A. H_2SO_5

B. $H_2S_2O_8$

C. H_2SO_3

D. $H_2S_2O_7$

Answer: D

View Text Solution

8. Which of the following oxides of group 15 is most acidic ?

A. Bi_2O_3

B. Sb_2O_3

C. As_2O_3

D. P_2O_5

Answer: D

View Text Solution

9. Which compound have maximum value of bond energy ?

A. HBr

B. HF

C. HI

D. HCl

Answer: B

View Text Solution

10. What is the formula of sodium pyro phosphate ?

A. $Na_4P_2O_7$

B. $Na_2P_2O_7$

C. $Na_3P_4O_7$

D. Na_3PO_4

Answer: A

View Text Solution

11. Which statement is correct for H_3PO_3 & H_3PO_4 ?

A. H_3PO_3 is a mono basic and reducing agent.

B. H_3PO_3 is a dibasic & reducing agent.

C. H_3PO_4 is a tribasic and reducing agent.

D. H_3PO_4 is a tribasic and oxidising agent.

Answer: B

View Text Solution

12. The shape of O_2F_2 resemble with shape of which of the following molecule ?

A. C_2H_2

B. C_2F_2

C. H_2F_2

D. H_2O_2

Answer: D

View Text Solution

13. Which oxide of Nitrogen is in solid form ?

A. NO

B. NO_2

C. N_2O_5

D. N_2O_3

Answer: C

View Text Solution

14. Which allotropes of phosphorous is most stable ?

A. Black P

B. Red P

C. Yellow P

D. White P

Answer: A

View Text Solution

15. Which is the possible oxidation state in the different compounds of Nitrogen ?

A. -3 to +5

B. -3 to +3

C. -3 to +4

D. -3 to +6

Answer: A

View Text Solution

16. Which is the correct increasing acidity order of oxo acids ?

A. $HOClO < HOCl < HOClO_3 > HOClO_2$

B. $HOClO_2 < HOClO < HOClO_4 > HOClO_3$

C. $HOClO_3 < HOClO_2 < HOClO < HOCl$

D. $HOCl < HOClO < HOClO_2 < HOClO_3$

Answer: D

View Text Solution

17. Which product is obtained by the reaction of chlorine with excess amount of ammonia ?

A. NH_4Cl

B. $N_2 + HCl$

C. $N_2 + NH_4Cl$

D. $N_2 + NCl_3$

Answer: C

View Text Solution

18. Helium is used in balloons because-

A. It is radioactive

B. It is more reactive than H_2

C. It is Incombustible

D. It is Lighter then H_2

Answer: C

View Text Solution

19. Which product is obtained by the reaction between $Na_2S_2O_3$ and Cl_2 gas ?

A. $Na_2S_4O_6$

B. $NaHSO_4$

C. NaCl

D. NaOH

Answer: B

View Text Solution

20. What is the role of $Fe(OH)_3$ in the contact process ?

A. To remove colloidal impurities

B. To remove moisture

C. To remove dust particles

D. To remove impurities of Arsenic

Answer: D

View Text Solution

21. Which of the following is a strongest oxidising agent ?

A. Br_2

B. I_2

C. Cl_2

D. F_2

Answer: D

View Text Solution

22. Tincture of iodine is

A. aqueous solution of I_2

B. solution of I_2 in aqueous Kl.

C. alcoholic solution of I_2

D. aqueous solution of Kl.

Answer: B

View Text Solution

23. Assertion : The S-S-S bond angle in S_8 molecule is 105°

Reason: S_8 has a V-shape.

A. If both assertion and reason are true and reason is the correct explanation of assertion.

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. If assertion is true but reason is false.

D. If both assertion and reason are false.

Answer: C

View Text Solution

24. Assertion: Al forms $[AlF_6]^{3-}$ but B does not form $[BF_6]^{3-}$

Reason: B does not react with fluorine.

A. If both assertion and reason are true and reason is the correct explanation of assertion.

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. If assertion is true but reason is false.

D. If both assertion and reason are false.

Answer: C

View Text Solution

25. Phosphine is prepared by the reaction of water with which reagent ?

A. Calcium phosphide

B. Calcium hydride

C. Calcium dihydorgen phosphate

D. Calcium phosphate

Answer: A

View Text Solution

26. Which of the following have maximum number of P -H bond ?

A. H_3PO_2

B. H_3PO_3

C. H_3PO_4

D. $H_4P_2O_7$

Answer: A

View Text Solution

27. Which colorless gas turns brown in air?

A. NO

B. NO_2

C. N_2O_4

D. N_2O_5

Answer: A

View Text Solution

28. What is not correct for $SO_{2(g)}$?

A. It is angular in shape

B. Both S - O bonds are same

C. It decolorise the $KMnO_4$ solution

D. It is dehydrating agent

Answer: D

View Text Solution

29. Bromine is added to cold dilute aqueous solution of NaOH. The mixture is boiled. Which of the following statements is not true ?

A. During the reaction bromine is present in four different oxidation states.

B. The greatest difference between the various oxidation states of bromine is 5.

C. On acidification of the final mixture bromine is formed.

D. Disproportionation of bromine occurs during the reaction.

Answer: C

View Text Solution

30. The shape and hybridisation of some xenon oxyfluorides are given. Choose the wrong set.

A. $XeOF_2 \rightarrow$ T-Shape sp^3d

B. $XeOF_4 \rightarrow$ Square pyramidal sp^3d^2

C. $XeO_2F_2 \rightarrow$ Distorted trigonal bipyramidal - sp^3d

D. $XeO_3F_2 \rightarrow$ Octahedral- sp^3d

Answer: D

View Text Solution

31. Assertion: PCl_5 is covalent in gaseous and liquid states but ionic in solid state.

Reason: PCl_5 in solid state consists of tetrahedral PCl_4^+ cation and octahedral PCl_6^- anion.

A. If both assertion and reason are true and reason is the correct explanation of assertion.

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. If assertion is true but reason is false.

D. If both assertion and reason are false.

Answer: A

View Text Solution

32. What is the product when P_4O_{10} is dissolves in water ?

A. Phosphorous acid

B. Ortho phosphoric acid

C. Phosphoric acid

D. None of these

Answer: B

View Text Solution

33. Which of the following compound have O-O bonding ?

A. $H_2S_2O_6$

B. $H_2S_2O_8$

C. $H_2S_2O_3$

D. $H_2S_4O_6$

Answer: B

View Text Solution

34. Sulphur atom of which oxo acid have non bonding electron pair ?

A. Sulphurous acid

B. Sulphuric acid

C. Disulphuric acid

D. Pyro sulphuric acid

Answer: A

View Text Solution

35. Which hydride of group 15 is unstable ?

A. PH_3

B. AsH_3

C. SbH_3

D. BiH_3

Answer: D

View Text Solution

36. What is the basicity of pyrophosphorous acid ?

A. 2

B. 4

C. 1

D. 5

Answer: A

View Text Solution

37. What is the oxidation state of phosphorous element in cyclo meta phosphoric acid ?

A. $+3$

B. $+5$

C. -3

D. $+2$

Answer: B

View Text Solution

38. Iodine oxidises sodium borohydride to give

A. B_2H_6

B. Sodium hydride

C. HI

D. I_3^-

Answer: A

View Text Solution

39. The wrong statement about fullerene is

A. it has 5 membered carbon ring.

B. it has 6-membered carbon ring.

C. it has sp^2 hybridization.

D. it has 5-membered rings more than 6 membered rings.

Answer: D

View Text Solution

Section C Mcqs Mcqs Asked In Board Exam

1. Which mixture is known as producer gas ?

A. $O_2 + N_2$

B. $CO + H_2$

C. $CO + H_2O$

D. $CO + N_2$

Answer: D

View Text Solution

2. For sharpening and grinding metals and other substances which substance is used ?

A. Beryllium carbide

B. Tungsten carbide

C. Calcium carbide

D. Carborendum

Answer: D

View Text Solution

3. Which metal is purified by Mond's carbonyl process ?

A. Ni

B. Ge

C. Sn

D. Cu

Answer: A

View Text Solution

4. Which substance is known as Inorganic benzene ?

A. Borazine

B. Diborane

C. Hexaborane

D. Boron

Answer: A

View Text Solution

5. Which type of silicate is Beryl (Panna Ratna) ?

A. Linear Silicate

B. Chain Silicate

C. Cyclic Silicate

D. Ring Silicate

Answer: C::D

View Text Solution

6. Which mixture of gases is produced on heating Tin oxalate (SnC_2O_4) ?

A. $CO + CO_2$

B. $CO_2 + O_2$

C. $CO_2 + O_3$

D. $CO + O_2$

Answer: A

View Text Solution

7. Which substance is used to stop radioactive rays ?

A. SiC

B. WC

C. CaC_2

D. Be_4C

Answer: D

View Text Solution

8. Which of the following substance is used in the making of tools ?

A. Be_4C

B. WC

C. SiC

D. CaC_2

Answer: B

View Text Solution

9. Which anion unit is observed in Muscovite ?

A. $\left(Si_2O_5^{2-}\right)_n$

B. $\left(Si_4O_{11}^{6-}\right)_n$

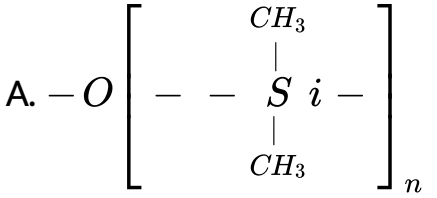
C. $(SiO_3)_n^{2n-}$

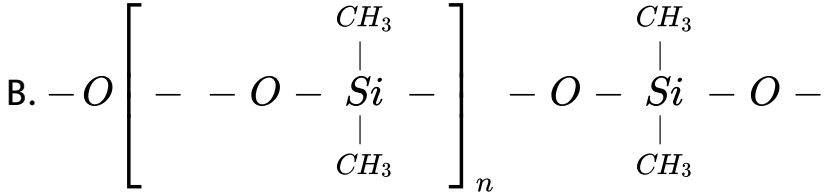
D. $Si_3O_9^{6-}$

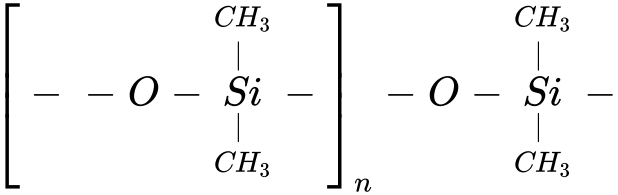
Answer: A

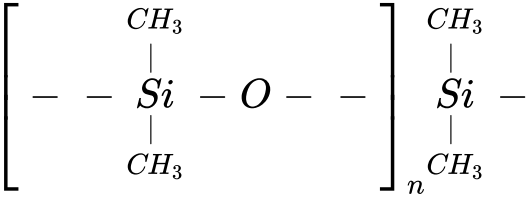
View Text Solution

10. Which of the following given structure of Silicones is correct ?

A. 

B. 

C. 

D. 

Answer: D

View Text Solution

11. Which gas is useful in buffer system to control the pH of blood ?

A. CO_2

B. O_2

C. N_2

D. SO_2

Answer: A

View Text Solution

12. Which ion gives green coloured bead during qualitative analysis by Borax bead test ?

A. Co^{2+}

B. Cu^{2+}

C. Mn^{2+}

D. Cr^{3+}

Answer: D

View Text Solution

13. Which compound is obtained on reaction of Diborane with Ammonia at 450 K temperature ?

A. $B_3N_2H_6$

B. $B_3N_3H_6$

C. $BN + H_2$

D. $B_2N_3H_6$

Answer: B

View Text Solution

14. What will be the stability order of Group-14 ?

A. $CX_2 < SiX_2 < GeX_2 < SnX_2 < PbX_2$

B.

$CX_2 < < SiX_2 < < GeX_2 < < SnX_2 < < PbX_2$

C.

$CX_2 < < SiX_2 < < GeX_2 < < SnX_2 < PbX_2$

D. $CX_2 < < SiX_2 < GeX_2 < < SnX_2 < PbX_2$

Answer: C

View Text Solution

15. Which is the correct ascending order for the acidic strength of methane, ammonia, water and hydrogen fluoride ?

A. $HF > > H_2O > > NH_3 > > CH_4$

B. $CH_4 < < NH_3 < < H_2O < < HF$

C. $HF < < H_2O < < NH_3 < < CH_4$

D. $CH_4 < < HF < < H_2O < < NH_3$

Answer: B

View Text Solution

16. The aqueous solution of $AlCl_3$ shows ..... property.

A. Amphoteric

B. Basic

C. Neutral

D. Acidic

Answer: D

View Text Solution

17. In the reaction $BF_3 + NH_3 \rightarrow BF_3 \leftarrow NH_3BF_3$ and NH_3 are .....

A. conjugate acid, base.

B. lewis base, lewis acid.

C. acid, conjugate base.

D. lewis acid, lewis base.

Answer: D

View Text Solution

18. Compounds of which of the following elements can act as the catalyst in aromatic substitution reaction ?

A. Ga,Tl

B. In,Tl

C. B,Al

D. Ga,In

Answer: C

View Text Solution

19. $4H_3BO_3 + X \xrightarrow{\Delta} Na_2B_4O_7 + 6H_2O + Y$

In this reaction, X and Y are ..... respectively.

A. $NaBO_2, CO_2$

B. Na_2CO_3, CO_2

C. $NaHCO_3, NaBO_2$

D. $NaOH, CO_2$

Answer: B

View Text Solution

20. Which of the following statement is correct for Fullerene ?

A. There are twenty rings having five carbon atoms in Fullerene.

B. Fullerene possesses molecular structure.

C. In Fullerene, carbon atom has sp^3 hybridization.

D. Fullerene is the synthetic amorphous form of carbon.

Answer: B

View Text Solution

21. Which of the following compounds can combine as ligand in complex compound formation ?

A. SnO_2

B. GeO_2

C. SiO_2

D. CO

Answer: D

View Text Solution

22. Which of the following elements has $[Ar]3d^{10}4s^24p^1$ electronic configuration ?

A. B

B. Al

C. Ga

D. In

Answer: C

View Text Solution

23. Which of the following compounds possesses H-bond ?

A. Borazine

B. Boric acid

C. Diborane

D. Borax

Answer: B

View Text Solution

24. Which of the following carbides is used for welding ?

A. Be_4C

B. WC

C. CaC_2

D. SiC

Answer: C

View Text Solution

25. Charcoal possesses adsorption property, because

A. it is a non-conductor of electricity.

B. it is a conductor of electricity.

C. it is porous.

D. it is amorphous.

Answer: C

View Text Solution

26. Traces of which metal is present in the sulphide ore of Zn ?

A. Indium

B. Aluminium

C. Gallium

D. Thallium

Answer: A

View Text Solution

27. ..... is used for making moulds for making coins.

A. SiC

B. CaC_2

C. Be_4C

D. WC

Answer: D

View Text Solution

28. Carbogen is used for the artificial respiration to the victims suffering from ..... gas poisoning.

A. CO_2

B. NO

C. CO

D. SO_2

Answer: C

View Text Solution

29. ..... is obtained during hydrolysis of $SiCL_4$

A. Silicic acid

B. Silicon trioxide

C. Sillcones

D. Silicon dioxide

Answer: A

View Text Solution

30. In which industry, ZSM-5 catalyst is used ?

A. Colour industry

B. Petroleum industry

C. Pharmaceutical industry

D. Polymer industry

Answer: B

View Text Solution

31. $p\pi - p\pi$ overlapping of C-atom with other elements is not effective when .....

A. the size of atomic orbital is small.

B. the size of atomic orbital is big.

C. the size of atomic orbital is same.

D. the size of atomic orbital is same and big.

Answer: B

View Text Solution

32. Buckminster Fullerene contains ..... Number of Carbon atoms.

A. C_{70}

B. C_{60}

C. C_{40}

D. C_{17}

Answer: B

View Text Solution

Section C Mcqs Mcqs Asked In Jee Neet Aieee

1. An example of a double salt is

A. Bleaching powder

B. $K_4\left[Fe(CN)_6\right]$

C. Hypo

D. Potash Alum

Answer: D

View Text Solution

2. The substance used as a smoke screen in warfare is

A. $SiCl_4$

B. PH_3

C. PCl_5

D. Acetylene

Answer: A

View Text Solution

3. Glass is a .....

A. liquid

B. solid

C. supercooled liquid.

D. transparent organic polymer.

Answer: C

View Text Solution

4. Which of the following types of forces bind together the carbon atoms in diamond ?

A. Ionic

B. Covalent

C. Dipolar

D. Van der Waals

Answer: B

View Text Solution

5. Water gas is produced by

A. Passing steam through a red hot coke bed.

B. Saturating hydrogen with moisture.

C. Mixing oxygen and hydrogen in the ratio of 1:2.

D. Heating a mixture of CO_2 and CH_4 in petroleum refineries.

Answer: A

View Text Solution

6. Which of the following elements is extracted commercially by the electrolysis of an aqueous solution of its compound ?

A. Cl

B. Br

C. Al

D. Na

Answer: C

View Text Solution

7. Which of the following statements about H_3BO_3 is not correct ?

A. It is a strong tribasic acid.

B. It is prepared by acidifying an aqueous solution of borax.

C. It has a layer structure in which planar BO_3 units are joined by hydrogen bonds.

D. It does not act as proton donor but acts as a Lewis acid by accepting a lone pair of electrons.

Answer: A

View Text Solution

8. In graphite, electrons are .....

A. localised on every third C-atom.

B. present in anti-bonding orbital.

C. localised on each C-atom.

D. spread out between the structure.

Answer: D

View Text Solution

9. Glass reacts with IIF to produce

A. SiF_4

B. H_2SiF_6

C. H_2SiO_3

D. Na_3AlF_6

Answer: B

View Text Solution

10. Which of the following have a planner structure ?

A. XeO_2F_2

B. X_3O_4

C. XeF_4

D. XeF_6

Answer: C

View Text Solution

11. In borax bead test which compound is formed ?

A. Ortho-borate

B. Meta-borate

C. Double oxide

D. Tetra-borate

Answer: B

View Text Solution

12. State the electron pair possessed by Xe in XeF_2, XeF_4 and XeF_6 respectively.

A. 2,1,3

B. 3,2,1

C. 3,2,0

D. 0,2,3

Answer: B

View Text Solution

13. How many (σ) sigma bonds are present in P_4O_{10} ?

A. 6

B. 8

C. 18

D. 16

Answer: D

View Text Solution

14. Which of the following statements is not true ?

A. HF is a stronger acid than HCl

B. Among halide ions, iodide is the most powerful reducing agent

C. Fluorine is the only halogen that does not show a variable oxidation state

D. HOCl is a stronger acid than HOBr

Answer: A

View Text Solution

15. Which one of the following statements about the zeolites is false ?

A. They are used as cation exchangers

B. They have open structure which enables them to take up small molecules.

C. Zeolites are aluminosilicates having three dimensional network.

D. Some of the SiO_4^{4-} units are replaced by AlO_4^{5-} and AlO_6^{9-} ions in zeolites.

Answer: D

View Text Solution

16. Which of the following is a square planner ?

A. $[NiCl_4[\ \hat{}\ (2-)$

B. SF_4

C. XeF_4

D. $\left[Ni(CN)_4\right]^{2-}$

Answer: C

View Text Solution

17. How many H atoms are directly attached with Patom in hypophosphorus acid ?

A. 0

B. 3

C. 2

D. 1

Answer: C

View Text Solution

18. Select the correct order of thermal stability ?

A. $HI > HBr > HF > HCl$

B. $HI > HBr > HCl > HF$

C. $HF > HCl > HBr > HI$

D. $HI > HF > HBr > HCl$

Answer: B

View Text Solution

19. Which of the following reaction shows the oxidising nature of H_2SO_4 ?

A. $Ca(OH)_2 + H_2SO_4 \rightarrow CaSO_4 + 2H_2O$

B. $NaCl + H_2SO_4 \rightarrow NaHSO_4 + HCl$

C. $2PCl_5 + H_2SO_4 \rightarrow 2POCl_3 + 2HCl + SO_2Cl_2$

D. $2HI + H_2SO_4 \rightarrow I_2 + SO_2 + 2H_2O$

Answer: D

View Text Solution

20. Which of the following is a correct statement ?

A. HF is a strong acid than HCl in aqueous medium.

B. $HClO_4$ is a weak acid than $HClO_3$

C. HNO_3 is a strong acid than H_2SO_3

D. H_3PO_5 is a strong acid than H_2SO_3

Answer: C

View Text Solution

21. Which of the following molecule/ion do not have all the identical bond ?

A. SiF_4

B. XeF_4

C. BF_4^-

D. SF_4

Answer: D

View Text Solution

22. Which one of the following orders is not in accordance with the property stated against it ?

A. $HI > HBr > HCl > Hf$: Acidic property in water

B. $F_2 > Cl_2 > Br_2 > I_2$: Electronegativity

C. $F_2 > Cl_2 > Br_2 > I_2$: Bond dissociation energy

D. $F_2 > Cl_2 > Br_2 > I_2$: oxidising power

Answer: C

View Text Solution

23. Continuous use of which fertilizer increase the acidity of soil ?

A. Urea

B. Super phosphate of lime

C. Ammonium sulphate

D. None of these

Answer: C

View Text Solution

24. The tendency of BF_3, BCl_3 and BBr_3 to behave as Lewis acid decreases in the sequence:

A. $BCl_3 > BF_3 > BBr_3$

B. $BBr_3 > BCl_3 > BF_3$

C. $BBr_3 > BF_3 > BCl_3$

D. $BF_3 > BCl_3 > BBr_3$

Answer: B

View Text Solution

25. Ozone have a angular shape and it has -

A. 2σ and 2π bond

B. 1σ and 1π bond

C. 2σ and 1π bond

D. 1σ and 2π bond

Answer: C

View Text Solution

26. Which xenon compound is not possible in following chemical reaction ?

A. $XeO_3 + 6HF \rightarrow XeF_6 + 3H_2O$

B. $3XeF_4 + 6H_2O \rightarrow 2Xe + XeO_3 + 12HF + 15O_2$

C. $2XeF_2 + 2H_2O \rightarrow 2Xe + 4HF + O_2$

D. $XeF_6 + RbF \rightarrow Rb[XeF_7]$

Answer: A

View Text Solution

27. Which product is given by sulphur trioxide on dissolution in to a sulphuric acid ?

A. H_2SO_3

B. H_2SO_5

C. $H_2S_2O_7$

D. $H_2S_2O_8$

Answer: C

View Text Solution

28. Which of the following have P-O-P bond ?

A. Hypo phosphorous acid

B. Phosphorous acid

C. Pyro phosphoric acid

D. Ortho phosphoric acid

Answer: C

View Text Solution

29. P_4O_{10} is an anhydride of which compound?

A. H_3PO_2

B. H_3PO_3

C. H_3PO_4

D. $H_4P_2O_7$

Answer: C

View Text Solution

30. The correct order of increasing bond angles in the following species are :

A. $Cl_2O < ClO_2 < ClO_2^-$

B. $ClO_2 < Cl_2O < ClO_2^-$

C. $Cl_2O^- < ClO_2^- < ClO_2$

D. $ClO_2^- < Cl_2O < ClO_2$

Answer: C

View Text Solution

31. Which of the following is a paramagnetic molecule ?

A. N_2

B. NO

C. CO

D. O_3

Answer: B

View Text Solution

32. With which of the following compound conc. HCl will give Cl_2 gas at room temperature ?

A. MnO_2

B. H_2S

C. $KMnO_4$

D. Cr_2O_3

Answer: C

View Text Solution

33. NO_2 gas is not obtained by heating which compound ?

A. $AgNO_3$

B. KNO_3

C. $Cu(NO_3)_2$

D. $Pb(NO_3)_2$

Answer: B

View Text Solution

34. What is not correct at normal temperature and pressure ?

A. P_4O_{10} is a white solid

B. SO_2 is a colorless gas

C. SO_3 is a colorless gas

D. NO_2 is a brown colored gas

Answer: C

View Text Solution

35. Which statement is wrong ?

A. The stability of hydride of group 15 increases as moving from top to bottom

B. Nitrogen cannot form $d\pi - d\pi$ bond

C. N-N bond is weaker then P-P bond

D. N_2O_4 having two resonance structure

Answer: A

View Text Solution

36. Which statement is wrong for sulphur ?

A. S_2 is a paramagnetic

B. At $200^\circ C$ temp. S_8 is in cyclic form

C. At $600^\circ C$ temp. S_2 gas is in vapour state

D. Oxidation state of sulphur in sulphur compounds is not less than +4.

Answer: D

View Text Solution

37. What is the structure of IF_7 ?

A. Square pyramidal

B. Trigonal bipyramidal

C. Octahedral

D. Pentagonal bipyramidal

Answer: D

View Text Solution

38. By heating which of the following the pure N_2 gas is obtained ?

A. NH_3 with CuO

B. NH_4NO_3

C. $(NH_4)_2Cr_2O_7$

D. $Ba(N_3)_2$

Answer: D

View Text Solution

39. (1) $4HCl_{(g)} + O_{2(g)} \xrightarrow{X} 2Cl_{2(g)} + 2H_2O_{(g)}$

(2) $2H_2O_{(aq)} \xrightarrow[\text{Heat}]{Y} + 2H_2O_{(l)} + O_{2(g)}$

Mention the formulas of X and Y.

A. $X = CuCl_2, Y = NO_2$

B. $X = Cu_2Cl_2, Y = MnO_2$

C. $X = CuCl_2, Y = MnO_2$

D. $X = V_2O_5, Y = MnO_2$

Answer: C

View Text Solution

40. $HNO_3 + P_2O_5 \rightarrow A + B$

A is an oxi acid of phosphorqus and B is a oxide of Nitrogen. What will be A & B ?

A. H_3PO_4, N_2O_3

B. HPO_3, N_2O_3

C. HPO_3, N_2O_5

D. H_3PO_3, N_2O_5

Answer: C

View Text Solution

41. Which of the following statement is wrong ?

A. The stability of hydrides increases from NH_3 to BiH_3 in group 15 of the periodic table.

B. Nitrogen cannot form $d\pi - p\pi$ bond

C. Single N-N bond is weaker than the single P-P bond.

D. N_2O_4 has two resonance structure.

Answer: A

View Text Solution

42. Which of the following statements regarding sulphur is incorrect ?

A. S_2 molecule is paramagnetic.

B. The vapour at $200^{\circ} C$ consists mostly of S_8 rings.

C. At $600^{\circ} C$ the gas mainly consists of S_2 molecules.

D. The oxidation state of sulphur is never less than +4 in its compounds.

Answer: D

View Text Solution

43. The structure of IF_7 is ....

A. square pyramid

B. trigonal bipyramid

C. octahedral

D. pentagonal bipyramid

Answer: D

View Text Solution

44. Which of the following pairs of ions isoelectronic and isostructural ?

A. CO_3^{2-}, SO_3^{2-}

B. ClO_3^-, CO_3^{2-}

C. SO_3^{2-}, NO_3^-

D. ClO_3^-, SO_3^{2-}

Answer: D

View Text Solution

45. Solubility of the alkaline earth's metal sulphates in water decreases in the sequence...

A. $Mg > Ca > Sr > Ba$

B. $Ca > Sr > Ba > Mg$

C. $Sr > Ca > Mg > Ba$

D. $Ba > Mg > Sr > Ca$

Answer: A

View Text Solution

46. The product obtained as a result of a reaction of nitrogen with CaC_2 is .....

A. CaCN

B. $CaCN_3$

C. Ca_2CN

D. $Ca(CN)_2$

Answer: D

View Text Solution

47. Boric acid is an acid because its molecule....

A. accepts OH^- from water releasing proton.

B. combines with proton from water molecule.

C. contains replaceable H^+ ion.

D. gives up a proton.

Answer: A

View Text Solution

48. AlF_3 is soluble in HF only in presence of KF. It is due to the formation of...

A. AlH_3

B. $K[AlF_3H]$

C. $K_3[AlF_3H_3]$

D. $K_3[AlF_6]$

Answer: D

View Text Solution

49. The heats of combustion of carbon and carbon monoxide are -393.5 and -283.5 kJ mol^{-1}, respectively. The heat of formation (in kJ) of carbon monoxide per mole is .....

A. -110.5

B. 110.5

C. 676.5

D. -676.5

Answer: A

View Text Solution

50. Which one of the following elements is unable to form MF_6^{-3} ion ?

A. B

B. Al

C. Ga

D. In

Answer: D

View Text Solution

51. Which of the following is incorrect statement ?

A. SnF_4 is ionic in nature

B. PbF_4 is covalent in nature

C. $SiCl_4$ is easily hydrolysed

D. GeX_4(X=F, Cl,Br,I) is more stable than GeX_2 .

Answer: B

View Text Solution

52. Which of the following species is not stable ?

A. $[SiCl_6]^{2-}$

B. $[SiF_6]^{2-}$

C. $[GeCl_6]^{2-}$

D. $[Sn(OH)_6]^{2-}$

Answer: A

View Text Solution

53. The number of 2-centre-2-electron and 3-centre-2-electron bonds in B_2H_6, respectively, are.....

A. 2 and 4

B. 2 and 2

C. 2 and 1

D. 4 and 2

Answer: D

View Text Solution

54. Correct statements among (a) to (d) regarding silicones are....

(a) They are polymers with hydrophobic character.

(b) They are biocompatible.

(c) In general, they have high thermal stability and low dielectric strength. (d) Usually, they are resistant to oxidation and used as greases.

A. (a),(b) and (d) only

B. (a),(b) , (c) and (d)

C. (a),(b) and (c) only

D. (a) and (b) only

Answer: A

View Text Solution

55. Aluminium is usually found in +3 oxidation state. In contrast, thallium exists in +1 and +3 oxidation states. This is due to....

A. Lattice effect

B. Lanthanoid contraction

C. Diagonal relationship

D. Inert pair effect

Answer: D

View Text Solution

56. C_{60} , an allotrope of carbon contains :

A. 20 hexagons and 12 pentagons.

B. 12 hexagons and 20 pentagons.

C. 18 hexagons and 14 pentagons.

D. 16 hexagons and 16 pentagons.

Answer: A

View Text Solution

Section D Ncert Exemplar Solution Mcqs

1. The element which exists in liquid state for a wide range of temperature and can be used for measuring high temperature is .....

A. B

B. Al

C. Ga

D. In

Answer: C

View Text Solution

2. Which of the following is a Lewis acid ?

A. $AlCl_3$

B. $MgCl_2$

C. $CaCl_2$

D. $BaCl_2$

Answer: A

View Text Solution

3. The geometry of a complex species can be understood from the knowledge of type of hybridization of orbitals of

central atom. The hybridization of orbitals of central atom in $\left[Be(OH)_4\right]^-$ and the geometry of the complex are respectively .....

A. sp^3 , tetrahedral

B. sp^3, square planar

C. sp^3d^2 , octahedral

D. dsp^2 , square planar

Answer: A

View Text Solution

4. Which of the following oxides is acidic in nature ?

A. B_2O_3

B. Al_2O_3

C. Ga_2O_3

D. In_2O_3

Answer: A

View Text Solution

5. The exhibition of highest coordination number depends on the availability of vacant orbitals in the central atom. Which of the following elements is not likely to act as central atom in MF_6^{3-} ?

A. B

B. Al

C. Ga

D. In

Answer: A

View Text Solution

6. Boric acid is an acid because its molecule....

A. contains replaceable H^+ ion.

B. gives up a proton.

C. accepts OH^- from water releasing proton.

D. combines with proton from water molecule.

Answer: C

View Text Solution

7. Catenation i.e., linking of similar atoms depends on size and electronic configuration of atoms. The tendency of catenation in group-14 elements follows the order :

A. $C > Si > Ge > Sn$

B. $C > \ > Si > Ge \approx Sn$

C. $Si > C > Sn > Ge$

D. $Ge > Sn > Si > C$

Answer: B

View Text Solution

View Text Solution

8. Silicon has a strong tendency to form polymers like silicones. The chain length of silicone polymer can be controlled by adding .....

A. $MeSiCl_3$

B. Me_2SiCl_2

C. Me_3SiCl

D. Me_4Si

Answer: C

View Text Solution

9. Ionization enthalpy $(\Delta_i H \mathrm{kJ\ mol}(-1))$ for the elements of group-13 follows the order.

A. $B > Al > Ga > In > Tl$

B. $B < Al < Ga < In < Tl$

C. $B < Al > Ga < In > Tl$

D. $B > Al < Ga > In < Tl$

Answer: D

View Text Solution

10. In the structure of diborane....

A. All hydrogen atoms lie in one plane and boron atoms lie in a plane perpendicular to this plane.

B. 2 boron atoms and 4 terminal hydrogen atoms lie in the same plane and 2 bridging hydrogen atoms lie in the perpendicular plane.

C. 4 bridging hydrogen atoms and boron atoms lie in one plane and two terminal hydrogen atoms lie in a plane perpendicular to this plane.

D. All the atoms are in the same plane.

Answer: B

View Text Solution

11. A compound X, of boron reacts with NH_3 on heating to give another compound Y which is called inorganic benzene. The compound X can be prepared by treating BF_3 with lithium aluminum hydride. The compounds X and Y are represented by the formulas...

A. $B_2H_6, B_3N_3H_6$

B. $B_2O_3, B_3N_3H_6$

C. $BF_3, B_3N_3H_6$

D. $B_3N_3H_6, B_2H_6$

Answer: A

View Text Solution

12. Quartz is extensively used as a piezoelectric material, it contains .....

A. Pb

B. Si

C. Ti

D. Sn

Answer: B

View Text Solution

13. The most commonly used reducing agent is .....

A. $AlCl_3$

B. $PbCl_3$

C. $SnCl_4$

D. $SnCl_2$

Answer: D

View Text Solution

14. Dry ice is....

A. Solid NH_3

B. Solid SO_2

C. Solid CO_2

D. Solid N_2

Answer: C

View Text Solution

15. Cement, the important building material is a mixture of oxides of several elements. Besides calcium, iron and sulphur, oxides of elements of which of the group (s) are present in the mixture ?

A. Group-2

B. Group-2,13 and 14

C. Group-2 and 13

D. Group-2 and 14

Answer: B

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Section D Ncert Exemplar Solution Mcqs More Than One Correct Answer

1. The reason for small radius of Ga compared to Al is .....

A. poor screening effect of d and f-orbitals.

B. increase in nuclear charge.

C. presence of higher orbitals.

D. higher atomic number.

Answer: A::B

View Text Solution

2. The linear shape of CO_2 is due to .....

A. sp^3 hybridization of carbon.

B. sp hybridization of carbon.

C. $p\pi - p\pi$ bonding between carbon and oxygen.

D. sp^3 hybridization of carbon.

Answer: B::C

View Text Solution

3. Me_3SiCl is used during polymerization of organosilicons because....

A. chain length of organo silicon polymers can be controlled by adding Me_3SiCl.

B. Me_3SiCl blocks the end terminal of silicone polymer.

C. Me_3SiCl improves the quality and yield of the polymer.

D. Me_3SiCl acts as a catalyst during polymerization.

Answer: A::B

View Text Solution

4. Which of the following statements correct ?

A. Fullerenes have dangling bonds

B. Fullerenes are cage-like molecules

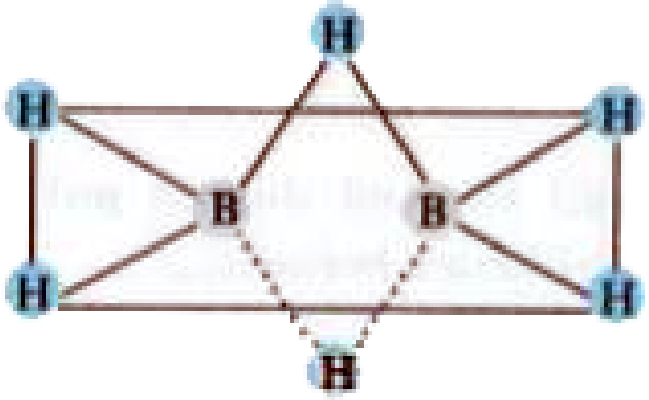
C. Graphite is thermodynamically most stable allotrope of carbon

D. Graphite is slippery and hard and therefore used as a dry lubricant in machines

Answer: B::C

View Text Solution

5. Which of the following statements are correct. Answer on the basis of Fig. given below.



A. The two bridged hydrogen atoms and the two boron atoms lie in one plane.

B. Out of six B-H bonds two bonds can be described in terms of 3 centre 2 electron bonds.

C. Out of six B-H bonds four B-H bonds can be described in terms of 3 centre 2 electron bonds.

D. The four terminal B-H bonds are two centre-two electron regular bonds.

Answer: A::B::D

View Text Solution

6. Identify the correct resonance structures of carbon dioxide from the ones given below :

A. $O - C \equiv O$

B. $O = C = O$

C. $.^{-} O \equiv C - O^{+}$

D. $.^{-} O - C \equiv O^{+}$

Answer: B::D

View Text Solution

Section D Ncert Exemplar Solution Mcqs Short Answer

1. Draw the structures of BCl_3. NH_3 and $AlCl_3$ (dimer).

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2. Explain the nature of boric acid as a Lewis acid in water.

View Text Solution

3. Draw the structure of boric acid showing hydrogen bonding. Which species is present in water ? What is the hybridizations of boron in this species ?

View Text Solution

4. Explain why the following compounds behave as Lewis acids ?

(A)BCl_3 , (B)$AlCl_3$

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5. Give reasons for the following:

CCl_4 is immiscible in water, whereas $SiCl_4$ is easily hydrolyzed.

View Text Solution

6. Give reasons for the following:

Carbon has a strong tendency for catenation compared to silicon.

View Text Solution

7. Explain the following :

CO_2 is a gas whereas SiO_2 is a solid.

View Text Solution

8. Explain the following :

Silicon forms SiF_6^{2-} ion whereas corresponding fluoro compound of carbon is not known.

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9. The +1 - oxidation state in group-13 and +2 oxidation state in group-14 becomes more and more stable with increasing atomic number. Explain.

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10. Carbon and silicon both belong to the group 14, but inspite of the stoichiometric similarity, the dioxides, (i.e., carbon dioxide and silicon dioxide), differ in their structures. Comment.

View Text Solution

11. If a trivalent atom replaces a few silicon atoms in three dimensional network of silicon dioxide, what would be the type of charge on overall structure ?

View Text Solution

12. When BCl_3 is treated with water, it hydrolyses and forms $\left[B(OH)_4\right]^-$ only whereas $AlCl_3$ in acidified aqueous solution forms $\left[Al(H_2O)_6\right]^{3+}$ ion. Explain what is the hybridizations of boron and aluminium in these species ?

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13. Aluminium dissolves in mineral acids and aqueous alkalis and thus shows amphoteric character. A piece of aluminium foil is treated with dilute hydrochloric acid or dilute sodium hydroxide solution in a test tube and on bringing a burning match stick near the mouth of the test tube, a pop sound indicates the evolution of hydrogen gas.

The same activity when performed with concentrated nitric acid, reaction doesn't proceed . Explain the reason.

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14. Explain the following :

Gallium has higher ionisation enthalpy than aluminium .

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15. Explain the following :

Boron does not exist as B^{3+} ion.

View Text Solution

16. Explain the following :

Aluminium forms $[AlF_6]^{3-}$ ion but boron does not form $[BF_6]^{3-}$ ion.

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17. Explain the following :

PbX_2 is more stable than PbX_4

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18. Explain the following :

Pb^{4+} acts as an oxidizing agent but Sn^{2+} acts as a reducing agent .

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19. Explain the following :

Electron gain enthalpy of chlorine is more negative as compared to fluorine.

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20. Explain the following :

$Tl(NO_3)_3$ acts as an oxidizing agent.

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21. Explain the following :

Carbon shows catenation property but lead does not.

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22. Explain the following :

BF_3 does not hydrolyze.

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23. Explain the following :

Why does the element silicon, not form a graphite like structure whereas carbon does.

View Text Solution

24. Identify the compounds A,X and Z in the following reactions :

(i) $A + 2HCl + 5H_2O \rightarrow 2NaCl + X$

(ii) $X \xrightarrow[370\ \mathrm{K}]{\Delta} HBO_2 \xrightarrow[>370K]{\Delta} Z$

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25. Complete the following chemical equations :

$$Z + 3LiAlH_4 \rightarrow X + 3LiF + 3AlF_3$$

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26. Complete the following chemical equations :

$$X + 6H_2O \rightarrow Y + 6H_2$$

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27. Complete the following chemical equations :

$$3X + 3O_2 \xrightarrow{\Delta} B_2O_3 + 3H_2O$$

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Section D Ncert Exemplar Solution Mcqs Matching The Columns

1. Match the species given in Column-I with the properties mentioned in Column-II.

Column-I	Column-II
(A) BF_4^-	(1) Oxidation state of central atom is +4
(B) $AlCl_3$	(2) Strong oxidizing agent
(C) SnO	(3) Lewis acid
(D) PbO_2	(4) Can be further oxidized
	(5) Tetrahedral shape

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2. Match the species given in Column-I with the properties mentioned in Column-II.

Column-I	Column-II
(A) Diborane	(1) Used as a flux for soldering metals
(B) Galluim	(2) Crystalline form of silica
(C) Borax	(3) Banana bonds
(D) Alumino -silicate	(4) Low melting, high boiling, useful for measuring high temperatures
(E) Quartz	(5) Used as catalyst in petrochemical industries

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3. Match the species given in Column-I with the hybridizations given in Column-II.

Column-I	Column-II
(A) Boron in $[B(OH_4)]^-$	(1) sp^2
(B) Aluminum in $[Al(H_2O)_6]^{3+}$	(2) sp^3
(C) Boron in B_2H_6	(3) sp^3d^2
(D) Carbon in Buckminsterfullerene	
(E) Silicon in SiO_4^{4-}	
(F) Germanium in $[GeCl_6]^{2-}$	

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Section D Ncert Exemplar Solution Mcqs Assertion Reason

1. Assertion (A): If aluminum atoms replace a few silicon atoms in three dimensional network of silicon dioxide, the overall structure acquires a negative charge.

Reason (R) : Aluminum is trivalent while silicon is tetravalent.

A. Both Assertion and Reason are correct and Reason is the correct explanation of Assertion.

B. Both Assertion and Reason are correct but Reason is not the correct explanation of Assertion.

C. Both Assertion and Reason are not correct

D. Assertion is not correct but Reason is correct

Answer: D

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2. Assertion (A) : Silicones are water repelling in nature.

Reason (R) : Silicones are organosilicon polymers, which have $(--R_2SiO--)$ as repeating unit.

A. Both Assertion and Reason are correct and Reason is the correct explanation of Assertion.

B. Both Assertion and Reason are correct but Reason is not the correct explanation of Assertion.

C. Both Assertion and Reason are not correct

D. Assertion is not correct but Reason is correct

Answer: B

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Section D Ncert Exemplar Solution Mcqs Long Answer

1. Describe the general trends in the following properties of the elements in Groups-13

Atomic size

View Text Solution

2. Describe the general trends in the following properties of the elements in Groups-13

Ionization enthalpy

View Text Solution

3. Describe the general trends in the following properties of the elements in Groups-13

Metallic character

View Text Solution

4. Describe the general trends in the following properties of the elements in Groups-13

Oxidation states

View Text Solution

5. Describe the general trends in the following properties of the elements in Groups-13

Nature of halides

View Text Solution

6. Describe the general trends in the following properties of the elements in Groups-14

Atomic size

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Oxidation states

View Text Solution

10. Describe the general trends in the following properties of the elements in Groups-14

Nature of halides

View Text Solution

11. Account for the following observations :

$AlCl_3$ is a Lewis acid.

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12. Account for the following observations :

Though fluorine is more electronegative than chlorine yet BF_3 is a weaker Lewis acid than Cl_3.

View Text Solution

13. Account for the following observations :

PbO_2 is a stronger oxidizing agent than SnO_2.

View Text Solution

14. Account for the following observations :

The +1 oxidation state of thallium is more stable than its +3 state.

View Text Solution

View Text Solution

15. When aqueous solution of borax is acidified with hydrochloric acid, a white crystalline solid is formed which is soapy to touch. Is this solid acidic or basic in nature ? Explain.

View Text Solution

16. Three pairs of compounds are given below. Identify that compound in each of the pairs which has group-13 element in more stable oxidation state. Give reason for your choice. State the nature of bonding also.

$TlCl_3, TlCl$

View Text Solution

17. Three pairs of compounds are given below. Identify that compound in each of the pairs which has group-13 element in more stable oxidation state. Give reason for your choice. State the nature of bonding also.

$AlCl_3$, $AlCl$

View Text Solution

18. Three pairs of compounds are given below. Identify that compound in each of the pairs which has group-13 element in more stable oxidation state. Give reason for your choice. State the nature of bonding also.

$InCl_3$, $InCl$

View Text Solution

19. BCl_3 exists as monomer whereas $AlCl_3$ is dimerized through halogen bridging. Give reason. Explain the structure of the dimer of $AlCl_3$ also.

View Text Solution

20. Boron fluoride exists as BF_3 but boron hydride doesn't exist as BF_3. Give reason. In which form, does it exist ? Explain its structure.

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21. What are silicones ? State the uses of silicones.

View Text Solution

22. What are boranes ? Give chemical equation for the preparation of diborane.

View Text Solution

23. A compound (A) of boron reacts with NMe_3 to give an adduct (B) which on hydrolysis gives a compound (C) and hydrogen gas. Compound (C) is an acid. Identify the compounds A, B and C. Give the reactions involved.

View Text Solution

24. A nonmetallic element of group-13, used in making bullet proof vests is extremely hard solid of black colour. It can exist in many allotropic forms and has unusually high melting point. Its trifluoride acts as Lewis acid towards ammonia. The element exhibits maximum covalence of four. Identify the element and write the reaction of its trifluoride with ammonia. Explain why does the trifluoride acts as a Lewis acid.

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25. A tetravalent element forms monoxide and dioxide with oxygen. When air is passed over heated element

(1273 K), producer gas is obtained. Monoxide of the element is a powerful reducing agent and reduces ferric oxide to iron.

Identify the element and write formulas of its monoxide and dioxide. Write chemical equations for the formation of producer gas and reduction of ferric oxide with the monoxide.

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