



CHEMISTRY

AAKASH INSTITUTE ENGLISH

THE P-BLOCK ELEMENTS

Example

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

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2. Possible oxidation states of boron family elements are :

A. +1

B. +2

C. +3

D. +4

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3. Give colour of bead when glassy bead reacts with TiO .

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4. What is the basicity of orthoboric acid ?

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5. Why boron fibre is used in body armour?

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6. The control rods used in a nuclear reactor can be made up of

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7. Name an aluminium compound that can be used in chromatography.

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8. On moving down the group in carbon family stability of group oxidation state +4 decreases why?

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9. At room temperature, CO_2 is a gas while SiO_2 is a solid because

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10. Why $[SiCl_6]^-$ cannot exist?

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11. Give correct order of increasing first ionization energy in carbon family.

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12. For $N_2 + 3H_2 \rightleftharpoons 2NH_3$, one mole of N_2 and three moles of H_2 are at pressure of 4 atm. Equilibrium pressure is found to be 3 atm. Hence, K_p is:

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13. Which element of the carbon family does not dissolve in aqueous NaOH to evolve hydrogen gas?

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14. Given three reasons for anomalous behaviour of carbon.

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15. What is hybridisation of carbon in CO_2 ?

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16. Silicones are used as.



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17. Why silicon dioxide is non-reactive?



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18. (a) Though nitrogen exhibits +5 oxidation state, it does not form pentahalide. Give reason.

(b) PH_3 has lower boiling point than NH_3 . Why?



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19. PH_3 has lower boiling point than NH_3 . Why?



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20. Write the reaction of thermal decomposition of sodium azide

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21. Why does NH_3 acts as a Lewis base?

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22. why does NO_2 dimerise?

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23. How can it be proved that PH_3 is basic in nature?

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24. Why does PCl_3 fume in moisture ?

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25. In PCl_5 phosphorus is in sp^3d hybridised state but all its five bonds are not equivalent. Justify your answer with reason.

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26. How do you account for reducing behaviour of H_3PO_2 on the basis of its structure?

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27. Write the structure of pyrophosphoric acid.

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28. Which among the elements of group 16 is radioactive ?

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29. H_2S is less acidic than H_2Te . Why?

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30. Why is H_2S less acidic than H_2Te ?

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31. Predict hybridisation and shape of SF_4 molecule.

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32. What happens when

(i) Concentrated H_2SO_4 is added to calcium fluoride

(ii) SO_3 is passed through water?

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33. Give one example each of acidic, basic, amphoteric and neutral oxides.

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34. Draw structure of peroxodisulphuric acid.

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35. Why do halogens have maximum negative electron gain enthalpy in the respective periods of the periodic table?

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36. Although $\Delta_{eg}H$ of fluorine is less negative than that of chlorine, but fluorine is a stronger oxidising agent than chlorine. Why?

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37. Fluorine exhibits only -1 oxidation state whereas other halogens show +1, +3, +5 and +7 oxidation states also. Explain.

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38. Give correct order of boiling point of hydride of group 17.

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39. Write balanced equation for reaction of Cl_2 with hot and conc. NaOH is this reaction a disproportionation one? Justify.

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40. Give two use of Cl_2

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41. When HCl reacts with finely powdered iron, it forms ferrous chloride and not ferric chloride, why?

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42. Deduce the molecular shape of BrF_3 on the basis VSEPR theory.

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43. Why elements of group 18 known as noble gases?

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44. Why do noble gases have low boiling points ?

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45. Does the hydrolysis of XeF_6 lead to a redox reaction?

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46. AlF_3 is insoluble in anhydrous HF but when little KF is added to the compound it becomes soluble. On addition of BF_3 , AlF_3 is precipitated. Write balanced chemical equation.

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47. A mixture $Al(OH)_3$ and $Fe(OH)_3$ is given to you. How would you separate it??

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Try yourself

1. $BF_3 + HF \rightarrow$

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2. Give one method of preparation of $Na_2B_4O_7$

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3. Give hydrolysis product of trihalides of boron family.

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4. What is the oxidation number of Fe and Cr in $FeCr_2O_4$

A. +2 and +3

B. 0 and +2

C. +2 and +6

D. +3 and +6

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5. What happens when aluminium is treated with conc. HNO_3 ?

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6. Give oxidation state of all boron atom in borax.

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7. Give chemical composition of glassy bead.

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8. Give colour of bead produced when glassy bead reacts with CuO

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9. How would you prepare boric anhydride from boric acid?

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10. How would you prepare tetraboric acid from boric acid?

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11. Name anhydride of boron family which is highly unstable.

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12. Name a compound which is artificial Lapis-Lazuli.

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13. Give an example of the following:

A carbon compound containing two double bonds.

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14. Give one use of alum.

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15. Name an aluminium compound that can be used in manufacture of dyes, drugs and perfumes.

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16. Which is the hardest compound of boron?

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17. Give one use of borax.

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18. The order of catenation power is

A. $C > Si > Ge > Sn$

B. $Si > C > Ge > Sn$

C. $Ge > Sn > Si > C$

D. $Ge > Sn > C > Si$

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19. Explain, why is the +2 oxidation state of lead more stable than the +2 oxidation state of tin.

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20. Why m.p. and b.p. of group 14 elements are higher in comparison to group 13?

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21. Why tetrahalides other than carbon can increase its coordination number?

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22. Name the type of bonding in lead.

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23. A compound of Xe and F is found to have 53.3% Xe (At. mass =133). Oxidation number of Xe in this compound is

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24. Name the element in carbon family that can be affected by water.

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25. name two form of graphite.

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26. What is the type of graphite structure?



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27. Explain why graphite is soft and can be used as a lubricant.



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28. How can you obtain lamp black?



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29. It requires 40.05 ml of $1M Ce^{4+}$ to titrate 20ml of 1 M Sn^{2+} to Sn^{4+} . What is the oxidation state of the cerium in the product



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30. How will you prepare fullerene?



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31. The oxidation number of C atom in CH_2Cl_2 and CCl_4 are respectively



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32. What is glass?



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33. Compound that is used as catalyst in petrochemical industries.



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34. Name one natural silicate and one synthetic silicate?



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35. What is the hybridisation of silicon in orthosilicate?



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36. Why are pentahalides of P, As, Sb and Bi more covalent than their trihalides?



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37. Why is BiH_3 the strongest reducing agent amongst all the hydrides of Group 15 elements ?



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38. Why is N_2 less reactive at room temperature?

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39. Mention the conditions required to maximise the yield of ammonia

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40. How does ammonia react with a solution of Cu_2^+ ?

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41. (a) Bond angle in PH_4^+ is higher than that in PH_3 . Why?

(b) What is formed when PH_3 reacts with an acid?

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42. What happens when white phosphorus is heated with concentrated NaOH solution in an inert atmosphere of CO_2 ?

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43. What happens when PCl_5 is heated ?

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44. Write a balanced equation for the reaction of PCl_5 with water.

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45. What happens when phosphorus acids (H_3PO_3) is heated ?

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46. List the important sources of sulphur.

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47. Why is H_2O a liquid and H_2S a gas ?

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48. Write the order of thermal stability of the hydrides of Group 16 elements

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49. Anomalous behaviour of oxygen is due to

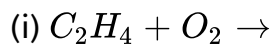
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50. Which of the following does not react with oxygen directly?

Zn, Ti, Pt, Fe

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51. Complete the following reactions:



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52. Why does O_3 act as a powerful oxidising agent?

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53. How is O_3 estimated quantitatively?

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54. What happens when sulphur dioxide is passed through an aqueous solution of Fe(III) salt?

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55. Comment on the nature of two S–O bonds formed in SO_2 molecule. Are the two S–O bonds in this molecule equal ?

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56. How is the presence of SO_2 detected ?

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57. Mention three areas in which H_2SO_4 plays an important role.

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58. Write the conditions to maximise the yield of H_2SO_4 by Contact proces.

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59. Why is $K_{a2} < < K_{a1}$ for H_2SO_4 in water ?

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60. Considering the parameters such as bond dissociation enthalpy, electron gain enthalpy and hydration enthalpy, compare the

oxidising power of F_2 and Cl_2

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61. Give two examples to show the anomalous behaviour of fluorine.

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62. Give two examples to show the anomalous behaviour of fluorine.

 [Watch Video Solution](#)

63. Sea is the greatest source of some halogens. Comment.

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64. Name two poisonous gases which can be prepared from chlorine gas.

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65. Why is ICl more reactive than I_2 ?

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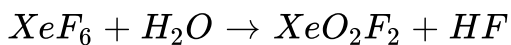
66. Draw structure and give hybridisation of IF_7 .

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67. Why is helium used in diving apparatus?

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68. Balance the following equation:



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69. Why has it been difficult to study the chemistry of radon?

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70. List the uses of neon and argon gases.

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71. Complete the reaction : $\text{BF}_3 + \text{HF} \rightarrow$

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72. give one method of preparation of $Na_2B_4O_7$

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73. Give hydrolysis product of trihalides of boron family.

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74. $2Sn (s) + 2 NaOH (aq) + 2H_2O \rightarrow$

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84. Give one use of Alum.

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87. Give one use of borax.

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88. Give decreasing order of catenation of carbon family .

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89. Why +2 oxidation state is more predominant for lead compounds ?

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90. Why m.p. and b.p. of group 14 elements are higher in comparison to group 13?

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91. Give hydrolysis product of CCl_4 .

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92. Give hydrolysis product of SiF_4 .

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95. Name the type of bonding in SnF_4 and PbF_4

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99. What is the type of graphite structure?

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100. Why graphite is preferred over grease as lubricating agent?

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101. How can you obtain lampblack?

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102. Name the superior quality of coal which burns with non-smoky flame.

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103. How will you prepare fullerene?

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104. The Avogadro's number is 6.02×10^{23} per gm mole and electronic charge is $1.6 \times 10^{-19} \text{C}$. The Faraday's number is

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114. What is the covalence of nitrogen in N_2O_5 ?



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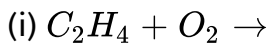
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137. Sea is the greatest source of some halogens. Comment.

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138. Give the reason for bleaching action of Cl_2 .

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139. Name three gases which can be prepared from chlorine gas.

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140. Why is ICl more reactive than I_2 ?

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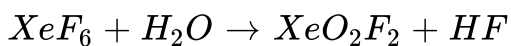
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143. Balance the following equation:



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144. Why has it been difficult to study the chemistry of radon?

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145. List out the uses of Neon.

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Assignment Section-A)

1. How do the Density property vary on moving down the group 13?

- A. Increases
- B. Decreases
- C. First decreases then increases
- D. Remains same

Answer: A

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2. Boron has an extremely high melting point because of

- A. Small covalent molecule
- B. Giant covalent molecule
- C. Giant covalent solid
- D. Giant ionic molecule

Answer: C

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3. Which element of group 13 forms covalent compounds only

- A. Size of ions is small
- B. Sum of three ionisation energies is very high
- C. Electronegativity values are high
- D. All of these

Answer: D

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4. On moving down the group, the basic nature of hydroxide of boron family.

- A. Decreases
- B. Increases
- C. First decreases then increases
- D. Remains same

Answer: B

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5. General oxidation state shown by group 13 elements is

A. +1 and +3

B. +1, +2 and +3

C. +2, +3 and +4

D. +1 and +4

Answer: A

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6. Which one of the following elements of group 13 can react with alkali solutions to give H_2 gas?

- A. Boron
- B. Aluminium
- C. Gallium
- D. All of these

Answer: D

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7. Why does the Lewis acid strength of boron halides follow the order $BBr_3 > BCl_3 > BF_3$?

- A. $Bl_3 > BBr_3 > BCl_3 > BF_3$
- B. $BF_3 > BCl_3 > BBr_3 > Bl_3$
- C. $BCl_3 > BF_3 > BBr_3 > Bl_3$
- D. $Bl_3 > BBr_3 < BF_3 < HCl_3$

Answer: A

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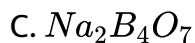
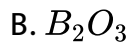
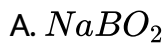
8. Dimer Al_2Cl_6 is formed because

- A. Al is electron rich
- B. Aluminium is having lone pair of electron
- C. aluminium forms covalent bonds with chlorine to complete its
octet
- D. Aluminium donates lone pair to form bridge

Answer: C

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9. When we heat borax strongly then it will yield the following compound



D. Both 1 and 2

Answer: D

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10. $B(OH)_3$ will accept how many OH^- ions?

A. 1

B. 2

C. 3

D. 4

Answer: A



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11. Boric acid is polymeric due to

(a) its acidic nature , (b) the presence of hydrogen bonds

(c) its monobasic nature , (d) its geometry

A. Basic nature

B. Acidic nature

C. Hydrogen bonds

D. Co-ordinate bonds

Answer: C



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12. Select the incorrect statement for B_2H_6

- A. It contains B-B ionic bond
- B. Each boron is sp^3 hybridised
- C. it has two types of hydrogen bonds
- D. All of these

Answer: A



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13. If diborane each boron has three electrons bonds around each B atom and form

- A. Two

B. Three

C. Four

D. Five

Answer: C

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14. Which of the following structure is similar to graphite.

A. Boron nitride

B. Boron carbide

C. Aluminium oxide

D. Aluminium carbide

Answer: A

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15. The number of sigma and pi bonds present in inorganic benzene are respectively

A. 3σ , 12π

B. 12σ , 3π

C. 3σ , 3π

D. 12σ , 12π

Answer: B

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16. Why are alloys used for making standard resistance coils?

A. Resistance to corrosion

B. Poor conductivity

C. heaviness

D. All of these

Answer: A



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17. Which of the following alkali metal does not form alum ?

A. Li

B. Na

C. K

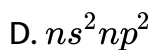
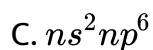
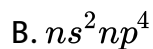
D. All of these

Answer: A



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18. Write the general valence shell electronic configuration of group 14 elements.



Answer: D

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19. Tendency of carbon for catenation is because carbon-carbon atoms bond energy is

A. Low

B. High

C. Zero

D. Negative

Answer: B

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20. All elements except carbon have tendency to show maximum covalency of six

A. Due to absence of vacant d-orbitals

B. Due to presence of vacant d-orbitals

C. Due to presence of partially filled d-orbitals.

D. Due to presence of completely filled d-orbitals.

Answer: B

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21. Most abundant metal in earth crust is :

- A. Silicon
- B. Germanium
- C. Aluminium
- D. Arsenic

Answer: C



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22. Metalloid among the following is

- A. Carbon.
- B. Germanium
- C. Lead

D. All of these

Answer: B

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23. On moving down the group, acidic nature of oxides of group 14.

A. Decreases

B. Increases

C. Remains same

D. Increases then decreases

Answer: A

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24. Which one of the following elements forms double or triple bond involving $p\pi - p\pi$ bonding?

A. Carbon

B. Silicon

C. Germanium

D. Tin

Answer: A

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25. Allotropy is due to

A. Difference in the number of atoms in the molecules in the crystal

- B. difference in the preparation
- C. Difference in physical properties
- D. All of these

Answer: D

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26. Which of the following elements exhibit maximum number of allotropes ?

- A. Tin
- B. Germanium
- C. Silicon
- D. Lead

Answer: A



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27. For diamond, state the element present at the lattice sites, the number of nearest neighbours for each atom and the type of cell.

State the hybridization of the carbon atom in diamond.

- A. sp^3 hybridisation
- B. sp hybridisation
- C. sp^2 hybridisation
- D. sp^3d^2 hybridisation

Answer: A



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28. Graphite has a two dimensional sheet-like structure in which each carbon atom is sp^2 hybridized .

A. 2-D sheet structure

B. Van der waals forces between different layers

C. sp^2 hybridised carbon linked with other three carbon atoms in hexagonal planar structure

D. All of these

Answer: D

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29. Assertion : Fullerenes are the only pure form of carbon.

Reason : It contains twenty, five membered rings and twelve, six membered rings.

A. Interlocking of hexagonal carbon rings

B. Interlocking of pentagonal carbon rings

C. Interlocking of hexagonal and pentagonal carbon rings

D. Interlocking of hexagonal and heptagonal carbon rings

Answer: C

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30. Graphite is

A. Ionic

B. Covalent

C. Co-ordinate

D. Metallic

Answer: B

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31. Which one of the following is properties of CO gas?

- A. It is a colourless gas
- B. it is an odourless gas
- C. it is a neutral oxide
- D. All of these

Answer: D

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32. Carbonic acid is a

- A. Weak tribasic acid
- B. Weak dibasic acid
- C. Strong tribasic acid

D. Strong dibasic acid

Answer: B

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33. Organosilicon polymers containing Si-O-Si linkage is called

A. Silicates

B. Silicones

C. Glass

D. Silica

Answer: B

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34. Number of points at which tetrahedral units are linked in pyrosilicates is

- A. Five point
- B. Six point
- C. Two point
- D. One point

Answer: D

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35. The geometry of SiO_4^{4-} ion is

- A. Triangular
- B. Tetrahedral

C. Pentagonal bipyramidal

D. Linear

Answer: B



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36. A liquid which is permanently supercooled is frequently called a

..... .

A. Glass

B. Silicates

C. Silicones

D. Silica garden

Answer: A



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37. Which is mismatched ?

- A. halogens- group 17
- B. Chalcogens-group 16
- C. Pnictogens - group 14
- D. Noble gases - group 18

Answer: C



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38. Fluoroapatite is represented by the formula

- A. CaF_2
- B. Na_3AlF_6
- C. $Ca_3(PO_4)_2$



Answer: D



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39. Correct order of electronegativity of group 15

A. $N > P > As > Sb$

B. $Sb > As > P > N$

C. $N > As > P > Sb$

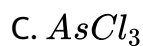
D. $N > As > Sb > P$

Answer: A



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40. Maximum covalent character is shown by

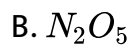


Answer: A



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41. HNO_2 on disproportionation gives HNO_3 and

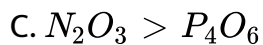
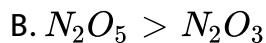
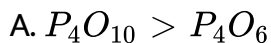


D. All of these can form

Answer: C

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42. The correct order of acidic character is

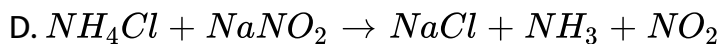
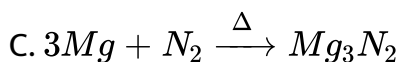
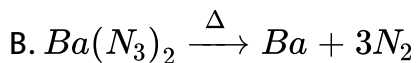
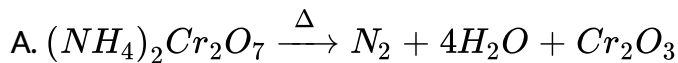


D. All of the above

Answer: D

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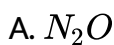
43. In which of the following reactions, products given are not correct?

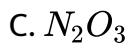


Answer: D

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44. Oxide of nitrogen which is acidic in nature and blue solid





Answer: C

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45. Valency and oxidation number of nitrogen in N_2O_5

A. 5,+5

B. 4,+5

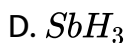
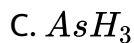
C. 3,+3

D. 3,+5

Answer: B

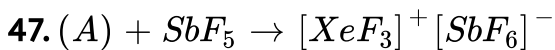
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46. Which has maximum bond angle?

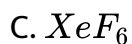
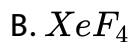


Answer: A

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Compound (A) is



D. Both 1 and 2

Answer: B

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48. Which set of oxide of nitrogen is paramagnetic in monomeric state?

A. NO , N_2O

B. NO_2 , N_2O

C. NO , NO_2

D. N_2O , NO , NO_2

Answer: C

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49. The incorrect statement among the following is

- A. Reducing character of hydrides of group 15 increases down the group
- B. Basicity of hydrides of group 15 increases down the group
- C. Phosphorus and arsenic can form $p\pi - d\pi$ bond
- D. NCl_5 does not exist

Answer: B

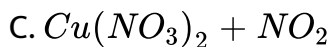


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50. $Cu + HNO_3 \rightarrow$ products
(*conc.*)

the products formed in above reaction is

- A. $CuO + NO$
- B. $Cu(NO_3)_2 + N_2O$



D. All of these can form

Answer: C

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51. Which of the following metals does not dissolve in concentrated HNO_3 ?

A. Cr

B. Zn

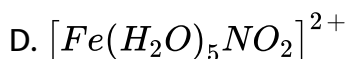
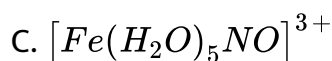
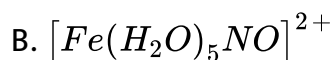
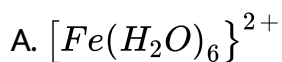
C. Al

D. Both 1 and 3

Answer: D

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52. In brown ring test for nitrate ions, brown ring is formed due to complex



Answer: B

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53. Allotrope of phosphorus which is polymeric consisting of chains of P_4 tetrahedral linked together is

A. White phosphorus

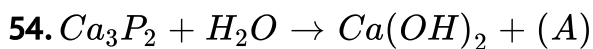
B. Red phosphorus

C. Black phosphorus

D. Both 1 and 2

Answer: B

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Product (A) is used in

A. Holme's signal

B. Smoke screen

C. Manufacture of NH_4NO_3

D. Both 1 and 2

Answer: D



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55. Which is dibasic?

- A. Orthosphoric acid
- B. Pyrophosphoric acid
- C. phosphorus acid
- D. Hypophosphorus acid

Answer: C



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56. In a cyclotrimetaphosphoric acid molecule, how many P-O single and double bonds are present ?

- A. 5,3

B. 3,5

C. 3,6

D. 5,6

Answer: C



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57. Which is mismatched regarding the formula?

A. Epsom salt – $MgSO_4 \cdot 7H_2O$

B. Baryte – $BeSO_4$

C. Copper pyrite – $CuFeS_2$

D. Galena – PbS

Answer: B



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58. The one with lowest electron affinity in group 16 is

- A. Oxygen
- B. Sulphur
- C. Selenium
- D. Tellurium

Answer: A



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59. The set having correct possible oxidation state for oxygen is

- A. 0, +4 only
- B. 0, -6 only

C. $-2, -1, +1, +2$

D. $0, +2, +4, +6$

Answer: C

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60. Which has maximum number of lone pair of electrons present on central atom i.e., xenon?

A. XeF_4

B. XeO_2F_2

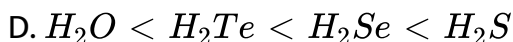
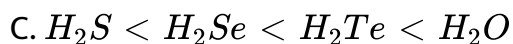
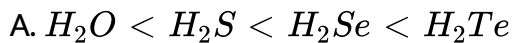
C. XeF_2

D. $XeOF_4$

Answer: C

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61. The boiling points of hydrides of group 16 are in the order



Answer: C



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62. Dioxygen can be prepared by

A. heating $KClO_3$

B. Thermal decomposition of oxides like Ag_2O , Pb_3O_4 etc.

C. Electrolysis of water

D. All of these

Answer: D

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63. The set containing acidic oxides only are

A. SO_2 , Cl_2O_7 , CO

B. Al_2O_3 , NO , N_2O_5

C. N_2O , N_2O_3 , N_2O_5

D. V_2O_5 , SO_2 , N_2O_5

Answer: D

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64. The incorrect statement regarding structure of ozone

- A. The two oxygen-oxygen bond length in ozone are identical
- B. It is linear
- C. Bond angle is less than 120°
- D. Both 2 and 3

Answer: B



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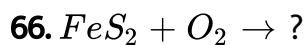
65. Form of sulphur which shows paramagnetic behaviour

- A. S_8 -Rhombic
- B. S_8 -Monoclinic
- C. S_2 is vapour state

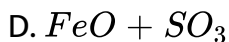
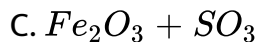
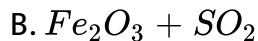
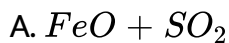
D. Not possible

Answer: C

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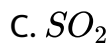
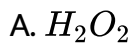
The product formed in above reaction is



Answer: B

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67. Which has bleaching action due to reducing property and it is temporary?



Answer: C

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68. On reaction of moist SO_2 with potassium permanganate (Acidic) which is correctly observed?

A. Colour of $KMnO_4$ is decolourised

B. SO_2 is oxidised to SO_3

C. MnO_4^- is reduced to MnO_2

D. All of these

Answer: A

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69. $S - S$ bond is present in

A. $H_2S_2O_7$

B. $H_2S_2O_8$

C. $H_2S_2O_6$

D. H_2SO_3

Answer: C

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70. In the reaction



H_2SO_4 behaves w.r.t. Cu as

- A. Dehydrating agent
- B. oxidising agent
- C. An acid
- D. All of these

Answer: B

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71. H_2SO_4 is manufactured by

- A. Ostwald process
- B. Haber's process

C. Contact process

D. Frasch process

Answer: C

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72. Radioactive element of group 17 is

A. Polonium.

B. Francium

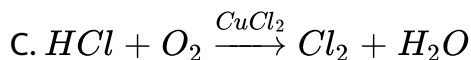
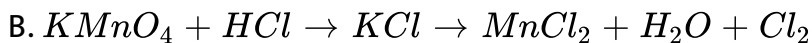
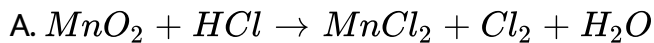
C. Astatine

D. Radium

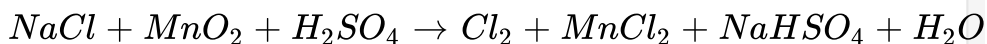
Answer: C

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73. Deacon's process of manufacture of chlorine is represented by the equation



D.



Answer: C

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74. The colour shown by halogen is incorrectly given by

A. F_2 =yellow

B. Cl_2 =colourless

C. Br_2 =Red

D. I_2 =Violet

Answer: B

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75. Which is incorrectly given according to order indicated?

A. $F_2 > Cl_2 > Br_2 > I_2$, Oxidising power

B. $Hl > HBr > HCl > HF$: Acidic strength

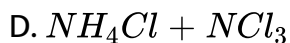
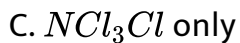
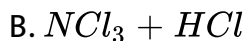
C. $F_2 > Cl_2 > Br_2 > I_2$, Bond dissociation enthalpy

D. $HF > Hl > HBr > HCl$, Boiling point

Answer: C

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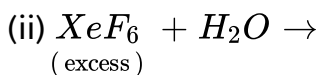
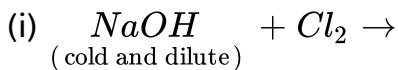
76. Cl_2 on reaction with excess of NH_3 gives



Answer: A

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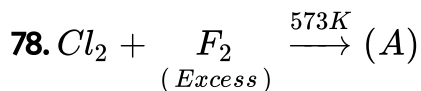
77. Complete the following chemical reaction equations :





Answer: A

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Shape of compound (A) is

A. (A) Linear

B. (B) Tetrahedral

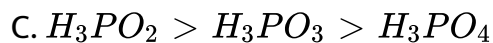
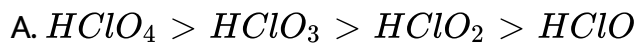
C. (C) Bent T Shape

D. (D) Trigonal bipyramidal

Answer: C

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79. The correct order of acidic strength is



D. All of these

Answer: D

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80. The one with maximum oxidising power is

A. Hypochlorous acid

B. Chlorous acid

C. Chloric acid

D. Perchloric acid

Answer: A

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81. Total number of F-I-F bond angles which are 90° present in IF_7 is

A. zero

B. Two

C. Five

D. Ten

Answer: D

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82. Assertion : Interhalogen compounds are more reactive than halogens (except fluorine)

Reason : They all undergo hydrolysis giving halide ion derived from the smaller halogen and anion derived from larger halogen.

A. F_2

B. Cl_2

C. Br_2

D. I_2

Answer: A



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83. Cl_2 is used in the preparation of poisonous gases, one of them is mustard gas, which can be represented by the formula

A. (a) $CHCl_3$

B. (b) $COCl_2$

C. (c) CCl_3NO_2

D. (d) $ClCH_2CH_2SCH_2CH_2Cl$

Answer: D



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84. Anamolous behaviour of fluorine in group 17 is due to

A. (a) Small size

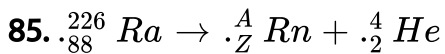
B. (b) High electronegativity

C. (c) Low F-F bond dissociation enthalpy and absence of vacant
d orbital

D. (d) All of these

Answer: D

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Radon is prepared by α -decay from radium, in above reaction A and

Z are respectively

A. (A) 226, 86

B. (B) 222, 90

C. (C) 222, 86

D. (D) 230, 90

Answer: C

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86. Noble gases are mostly inert. Assign reasons.

A. Completely filled electronic configuration

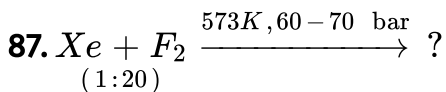
B. High ionisation enthalpy

C. More positive electron gain enthalpy

D. All of these

Answer: D

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The compound formed in above reaction is

A. XeF_2

B. XeF_4

C. XeF_6

D. $XeOF_4$

Answer: C



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88. Why is helium used in diving apparatus?

A. He, Ne

B. Ne, Ne

C. He, He

D. He, Ar

Answer: A



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89. Which is mismatched regarding the shape?

A. XeF_4 =Square planar

B. $XeOF_4$ =Square pyramidal

C. XeF_6 =Distorted octahedral

D. XeO_3 =Bent T shape

Answer: D



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90. Compound of which of the noble gases, are neither isolated nor identified?

A. He,Ne,Ar,Kr,Rn

B. He,Ne,Kr

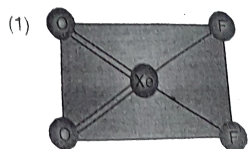
C. He,Ne,Ar

D. He only

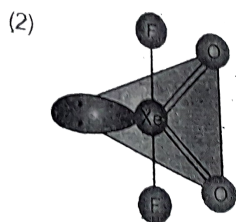
Answer: C

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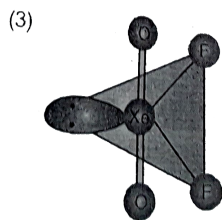
91. Structure of XeO_2F_2 is correctly represented by



A.



B.



C.

D. Both 2 and 3

Answer: B

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92. Why has it been difficult to study the chemistry of radon?

- A. it is radioactive with short half life
- B. it is chemically inert
- C. its compound is not isolated
- D. it has low boiling point

Answer: A

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93. The ease of liquefaction of noble gases decreases in the order

A. HegtNegtArgtKrgtXe

B. XegtKrgtArgtNegtHe

C. NegtArgtKrgtXegtHe

D. He=Ne=Ar=Kr=Xe

Answer: B



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94. Noble gases are sparingly soluble in water due to

A. London forces

B. Dipole-dipole interaction

C. dipole-induced dipole interaction

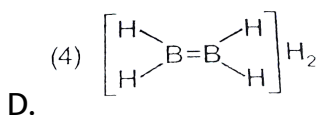
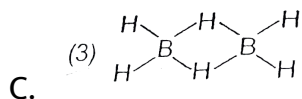
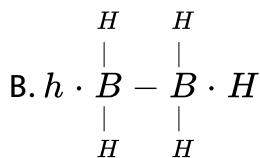
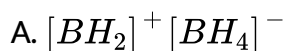
D. Ion-dipole interaction

Answer: C

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Assignment Section-B)

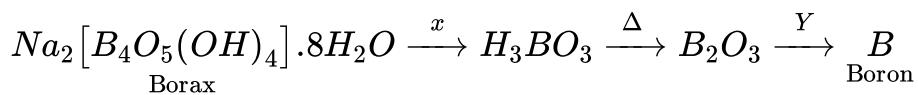
1. In the structure of diborane,



Answer: C

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2. The following sequence of reactions is used to convert borax into boron (B).



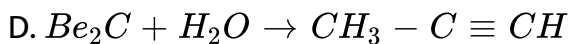
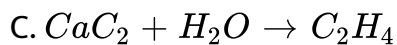
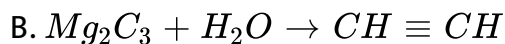
Reagents X and Y are respectively

- A. Acid, Al
- B. Base, C
- C. Base, Fe
- D. Acid, Mg

Answer: D

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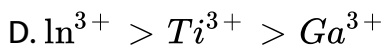
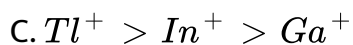
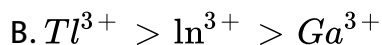
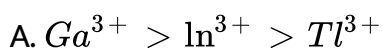
3. Which of the following reaction represents the correct product formation?



Answer: A

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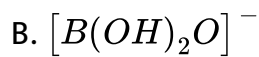
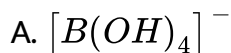
4. Stability of trivalent and mono valent cation of group 13 (Boron family) will be in order :



Answer: A

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5. Ionisation of boric acid in aqueous medium gives which one of the following?



Answer: A

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6. Shortest C-O bond is present in

A. Carbon monoxide

B. Carbon dioxide

C. Carbonate ion

D. Acetone

Answer: A



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7. Boron halides behave as Lewis acid because of their ___ nature.

A. Ionisation property

B. Electron deficient nature

C. Acidic nature

D. Covalent nature

Answer: B



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8. In graphite, electrons are

- A. Localised on each carbon-atom
- B. Localised on every third C-atom
- C. Delocalised within the layer
- D. Present in anti-bonding orbital

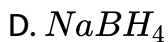
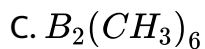
Answer: C



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9. From B_2H_6 , all the following can be prepared except

- A. H_3BO_3
- B. B_2O_3



Answer: C



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10. Thermodynamically the most stable form of carbon is

(a) diamond , (b) graphite

(c) fullerenes , (d) coal

A. Diamond

B. Graphite

C. Peat

D. Coal

Answer: B

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11. Specify the coordination geometry around and the hybridisation of N and B atoms in 1 : 1 complex of BF_3 and NH_3 .

A. N is tetrahedral, sp^3 , B is tetrahedral, sp^3

B. N is pyramidal, sp^3 , B is pyramidal, sp^3

C. N is pyramidal, sp^3 , B is planar, sp^2

D. N is pyramidal, sp^3 , B is tetrahedral sp^3

Answer: A

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12. Carbondioxide is used for extinguishing fire because

A. it has a relatively high critical temperature

B. In solid state, it is called dry ice

C. It is neither combustible nor a supporter of combustion

D. it is a colourless gas

Answer: C

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13. Boron nitride on reacting with steam gives

A. NH_3

B. N_2O

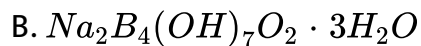
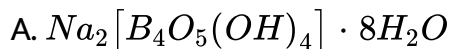
C. Na_2BO_2

D. NO_2

Answer: A

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14. Borax is written as



Answer: A



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15. Write the chemical reactions of P_4O_6 with cold and hot water.

A. Ortho phosphoric acid

B. Meta phosphoric acid

C. Pyrophosphoric acid

D. Hypophosphorous acid

Answer: A

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16. Which of following trihalides of nitrogen behaves as the weakest base?

A. NF_3

B. NCl_3

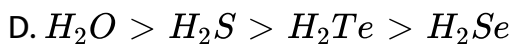
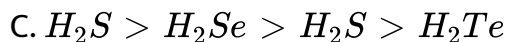
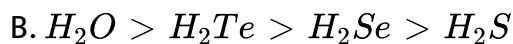
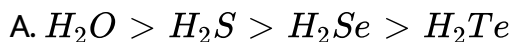
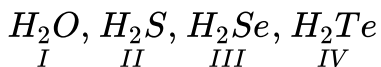
C. NBr_3

D. Nl_3

Answer: A

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17. Arrange the following molecules in the decreasing order of bond angle.



Answer: B

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18. The colour of I_2 is violet because it

A. Absorbs violet light

- B. Does not absorb light
- C. Absorbs yellow and green light
- D. property of I_2

Answer: C

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19. When $(NH_4)_2Cr_2O_7$ is heated, the gas evolved is

- A. Heating NH_4NO_2
- B. Heating NH_4NO_3
- C. $Mg_3N_2 + H_2O$
- D. NH_4Cl

Answer: A

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the oxidation state of chromium changes from

A. +12 to +6

B. +3 to +6

C. +6 to +3

D. +6 to +4

Answer: C

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21. N_2O_4 is a mixed anhydride because it

A. Is a mixture of N_2O_3 and N_2O_5

B. Decomposes into two oxides of nitrogen

C. Reacts with water to give nitric acid

D. Reacts with water to form two acids

Answer: D

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22. The percentage of available chlorine in a commercial sample of bleaching powder is

A. 0.12

B. 0.35

C. 0.58

D. 0.85

Answer: B

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23. A certain compound when burned gives three oxides. The first turned lime water milky, the second turned anhydrous $CuSO_4$ blue and the third formed an aqueous solution of low pH. The elements present in the compound are

A. (a) C,S,Ca

B. (b) N,S,K

C. (c) C,H,S

D. (d) C,H,Ca

Answer: A



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24. Which of the following gas has highest solubility in water?

A. NO

B. CO_2

C. SO_3

D. CO

Answer: C



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25. Which of the following compound is paramagnetic?

A. N_2O_4

B. ClO_2

C. Cl_2O_7

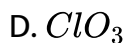
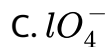
D. N_2O

Answer: B



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26. The strongest oxidising agent among the following is



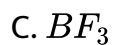
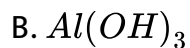
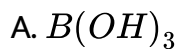
Answer: B



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Assignment Section-C)

1. Which of the following compounds are acidic?



Answer: A::C::D

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2. Which of the following compounds contain boron?

A. Borax

B. Colemanite

C. Feldspar

D. kernite

Answer: A::B::D



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3. Which of the following compound react with BF_3 ?

A. Ethers

B. H_2O

C. Ethylalcohol

D. NH_3

Answer: A::B::C::D



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4. Which of the following statement is/are correct regarding B-F bond in BF_3 ?

- A. All the three B-F bond lengths are equal and each of them is shorter than the sum of the covalent radii of boron and fluorine
- B. The bond energy of the B-F bond is very high, higher than for any other single bond
- C. The unusual shortness and strength of the B-F bond may be explained by $p\pi - p\pi$ interaction between boron and fluorine atoms
- D. The unusual shortness and strength of the bonds may be explained by a $p\pi - d\pi$ interaction between boron and fluorine atoms.

Answer: A::B::C

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5. Which of the following compound react with B_2H_6 ?



Answer: A::B::C::D

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6. Which of the following statement is/are correct?

A. $B(OH)_3$ partially reacts with water to form H_3O^+ and $[B(OH_4)]^-$ and behaves like a weak acid

B. $B(OH)_3$ behaves like a strong monobasic acid in presence of sugars and this acid can be titrated against NaOH solution

using phenolphthalein as an indicator

C. $B(OH)_3$ does not donate a proton and hence does not form any salt with NaOH

D. $B(OH)_3$ reacts with NaOH, forming $Na[B(OH)_4]$

Answer: A::B::D



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7. Which of the following molecules have zero dipole?

A. CS_2

B. CO_2

C. CCl_4

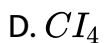
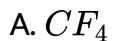
D. CH_2Cl_2

Answer: A::B::C



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8. Which of the following halides of carbon are solids?

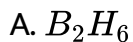


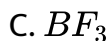
Answer: C::D



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9. Borazine is the product of reaction between



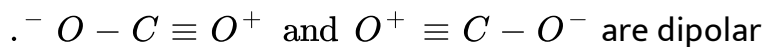


Answer: A::B

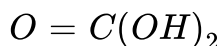
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10. Which of the following statements is/are correct?

A. The carbon-di-oxide molecule behaves as a nonpolar molecule even through two of its resonating structures.



B. Carbon di-oxide is the anhydride of the unstable dibasic acid



C. The carbon dioxide molecule is linear because the carbon atom utilizes its sp orbitals to form σ bonds

D. The carbon atom is sp^2 - hybridised in the CO_2 molecule as well as the molecule of its hydrate H_2CO_3

Answer: A::B::C

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11. Which of the following statement is/are correct?

- A. Aluminium carbide as well as beryllium carbide produce methane gas on treatment with water
- B. On reacting with water, calcium carbide (CaC_2) produces acetylene while magnesium carbide (Mg_2C_3) gives propyne
- C. Calcium carbide has one sigma and two pi bonds
- D. Diamond is more stable than graphite.

Answer: A::B::C



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12. Choose the correct statement regarding oxy acids of halogens

- A. F does not form oxy acid
- B. $HClO_4$ is stronger acid than $HBrO_4$
- C. All oxy acids are monobasic
- D. $HClO_4$ is stronger oxidising agent than $HBrO_4$

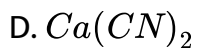
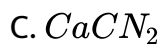
Answer: B::C



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13. Which of the following compounds give ammonia with water?

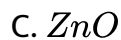
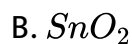
- A. Mg_3N_2
- B. AlN



Answer: A::B::C

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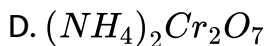
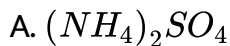
14. Which of the following oxides are amphoteric?



Answer: B::C::D

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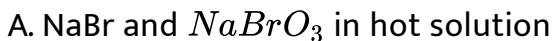
15. Which of the following ammonium salt evolves N_2 on heating?



Answer: B::D

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16. Bromine react with NaOH to produce

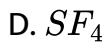
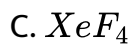
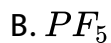
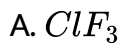


D. Only NaBr in cold and NaBrO in hot

Answer: A::B

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17. Which of the following compounds have same hybridisation?



Answer: A::B::D

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18. Which of the following statement is/are correct regarding halogens?

- A. All halogens form oxyacids
- B. Oxidising power of halogen $F_2 > Cl_2 > Br_2 > I_2$
- C. Electron affinity of fluorine is highest
- D. All halogens show oxidation state from -1 to +7.

Answer: A::B

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19. Which of the following are correctly matched?

- A. $HClO < HClO_2 < HClO_3 < HClO_4 \rightarrow$ Thermal stability
- B. $HClO < HClO_2 < HClO_3 < HClO_4 \rightarrow$ Acid strength.

C. $HClO < HClO_2 < HClO_3 < HClO_4 \rightarrow$ Oxidising power

D. $Hl < HCl < HBr < H - F \rightarrow$ Acidic strength

Answer: A::B

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20. For H_3PO_3 and H_3PO_4 the correct choice is

A. H_3PO_3 is a dibasic acid

B. H_3PO_4 is a tribasic acid

C. H_3PO_4 is a reducing agent

D. H_3PO_3 is a reducing agent

Answer: A::B::D

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21. Which of the following pairs are correctly matched?

- A. Habar's process (NH_3)
- B. Bayer's process (H_2SO_4)
- C. Birkeland-Eyde process (HNO_3)
- D. Solvay process (Na_2CO_3)

Answer: A::C::D

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22. Which of the following compounds show self ionisation in liquid state?

- A. NO_2
- B. ClF_3
- C. BrF_5

D. PCl_5

Answer: A::B::C

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23. Which of the following compound(s) contains(s) N-N bond?

A. N_2O_3

B. N_2O_5

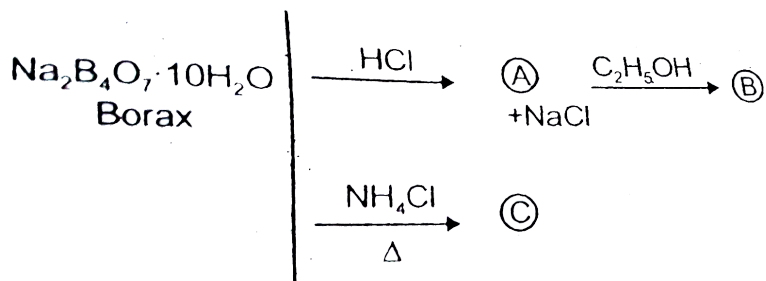
C. N_3H

D. N_2O_4

Answer: A::C::D

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Assignment Section-D)



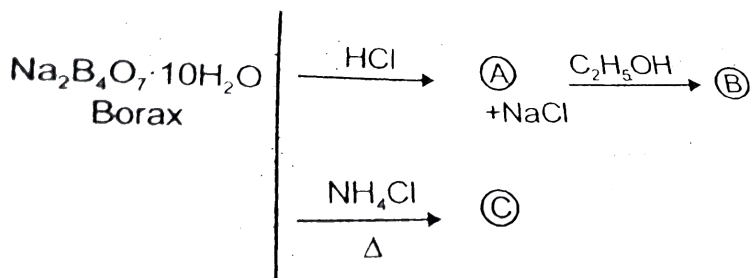
1.

Q. In the above reaction the product (C) resembles with

- A. Graphite
- B. Benzene
- C. Fullerene
- D. Diamond

Answer: A

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2.

Q. Hybridization of B in compound (B) is

A. sp^3 hybridisation

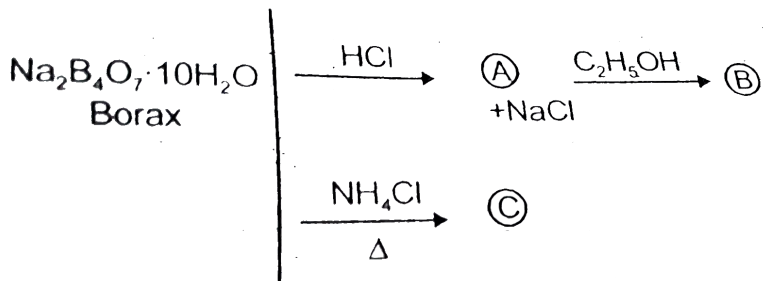
B. sp^2

C. dsp^2

D. sp^3d^2

Answer: B

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3.

Q. Borax structure contains

A. Two BO_4 groups and two BO_3 groups

B. Four BO_4 groups only

C. Three BO_4 and one BO_3 groups

D.

Answer: A



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4. Q. Which of the following statement is correct regarding C_{60} fullerene?

- A. It contains 20, six membered ring and 12, five membered rings
- B. It contains 12, six membered ring and 20, five membered rings
- C. It consist of 25, six membered and 12, five membered rings
- D. It consists of 12, six membered and 25, five membered rings.

Answer: B

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5. Allotropes of carbon: There are three forms of carbon. i.e., diamond, graphite and fullerene which exist in crystalline form. Graphite and diamond occur in nature. The structure of diamond is tetrahedral with sp^3 hybridisation and diamond exist in 3-D netowrk solid. in graphite, carbon is sp^2 hybridised. each carbon linked to

other carbon linked to other carbon atom forms hexagonal ring. it has a layered structure. diamond and graphite are purest form of carbon. Fullerene constitute a new family of carbon allotropes.

Consisting of large spheroidal molecule of compound with general formula C_{2n} . common fullerene C_6 , C_{70} , contain 5 and 6 membered rings.

Q. Which of the following statement is incorrect for graphite?

- A. Very small, the layers being tightly packed
- B. Many times larger than the covalent radius of carbon
- C. More than twice the covalent radius of carbon
- D. The same as the covalent radius of carbon

Answer: C



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6. Allotropes of carbon: There are three forms of carbon. i.e., diamond, graphite and fullerene which exist in crystalline form. Graphite and diamond occur in nature. The structure of diamond is tetrahedral with sp^3 hybridization and diamond exist in 3-D network solid. in graphite, carbon is sp^2 hybridized. Each carbon linked to other carbon atom forms hexagonal ring. it has a layered structure. Diamond and graphite are purest form of carbon. Fullerene constitute a new family of carbon allotropes.

Consisting of large spheroidal molecule of compound with general formula C_{2n} . common fullerene C_6 , C_{70} , contain 5 and 6 membered rings.

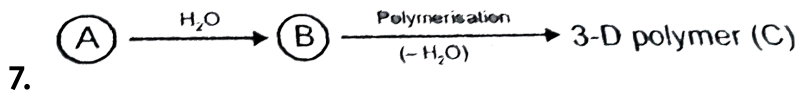
Q. Which of the following statement is incorrect for graphite?

- A. Its density is lower than that of diamond
- B. It has a layered structure and the bonding
- C. its layers are very tightly packed, almost without any space between them

D. it cleaves easily between the layers which accounts for the remarkable softness of the crystals

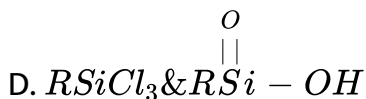
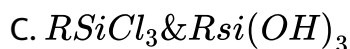
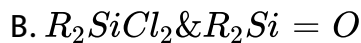
Answer: C

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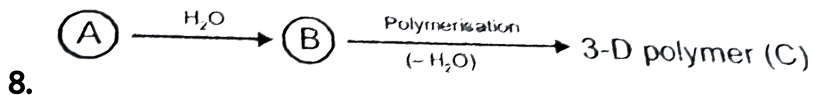
If (C) is silicone, then answer the following questions.

Q. (A) and (B) are



Answer: C

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If (C) is silicone, then answer the following questions.

Q. Mode by which polymerisation is undergoing is

A. Addition

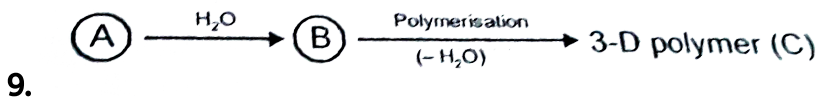
B. Substitution

C. Elimination

D. Condensation.

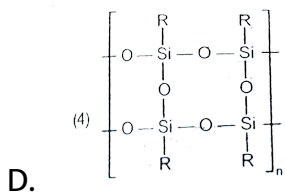
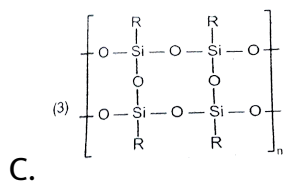
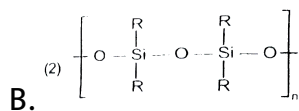
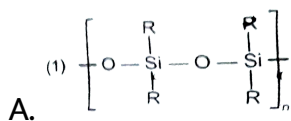
Answer: D

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If (C) is silicone, then answer the following questions.

Q. Structure of 'C' is



Answer: D

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10. Nitrogen forms largest number of oxides in which oxidation state of nitrogen varies from +1 to +5 N_2O , NO , N_2O_3 , N_2O_4 and N_2O_5 respectively. The largest number of oxides are formed due to capability of forming stable multiple bonds by nitrogen with oxygen.

Q. Which of the following is/are correct statement(s)?

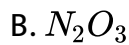
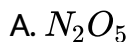
- A. In N_2O_4 the N-N bond length is longer than the usual N-N single bond distance
- B. NO_2 molecule is angular and N-O bond length is intermediate between a single and a double bond
- C. N_2O is linear molecule and has small dipole moment
- D. All of these

Answer: D

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11. Nitrogen forms largest number of oxides in which oxidation state of nitrogen varies from +1 to +5 N_2O , NO , N_2O_3 , N_2O_4 and N_2O_5 respectively. The largest number of oxides are formed due to capability of forming stable multiple bonds by nitrogen with oxygen.

Q. Which of the following oxides is known as anhydride of nitric acid?



D. All of these

Answer: A



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12. Nitrogen forms largest number of oxides in which oxidation state of nitrogen varies from +1 to +5 N_2O , NO , N_2O_3 , N_2O_4 and N_2O_5 respectively. The largest number of oxides are formed due to capability of forming stable multiple bonds by nitrogen with oxygen.

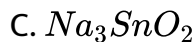
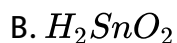
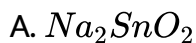
Q. Which of the following statements is/are correct regarding oxides of nitrogen?

- A. Dinitrogen trioxide dissolves in KOH forming potassium nitrate
- B. Aqueous solution by nitrogen dioxide behave both as a reducing and as an oxidising agent
- C. Nitrous oxide is fairly soluble in cold water and turns blue litmus red
- D. Nitrogen dioxide is soluble in water to form nitric acid only

Answer: B

13. Tin and lead form divalent Sn (II) and lead (II) and tetravalent i.e., Tin (IV) and lead. (IV) compounds. Tetravalent and dioxides of lead and Tin are amphoteric in nature. Lead tetra fluoride is ionic solid whereas $PbCl_4$ is covalent. Pbl_4 does not exist. Lead (II) halides are white whereas Pbl_2 is yellow in colour.

Q. Reaction of SnO with NaOH gives



Answer: A

14. Tin and lead form divalent Sn (II) and lead (II) and tetravalent i.e., Tin (IV) and lead (IV) compounds. Tetravalent dioxides of lead and Tin are amphoteric in nature. Lead tetra fluoride is ionic solid whereas $PbCl_4$ is covalent. Pbl_4 does not exist. lead (II) halides are white whereas Pbl_2 is yellow in colour.

Q. Pbl_4 does not exist due to

- A. Inert pair effect
- B. High reducing power of I^-
- C. High oxidising power of I^-
- D. High electronegativity of I.

Answer: B



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15. Tin and lead form divalent Sn (II) and lead (II) and tetravalent i.e., Tin (IV) and lead. (IV) compounds. Tetravalent and dioxides of lead and Tin are amphoteric in nature. Lead tetra fluoride is ionic solid whereas $PbCl_4$ is covalent. Pbl_4 does not exist. lead (II) halides are white whereas Pbl_2 is yellow in colour.

Q. $SnCl_2$ is solid whereas $SnCl_4$ is liquid, this is because?

- A. $SnCl_2$ is ionic whereas $SnCl_4$ is covalent
- B. $SnCl_2$ is covalent whereas $SnCl_4$ is ionic
- C. $SnCl_2$ exist in polymeric form
- D. $SnCl_2$ is linear and $SnCl_4$ is square planar in-structure.

Answer: A



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1. Assertion : Boron forms only covalent compounds. ,

Reason : Boron has very small size.

A. Statement-1 is true, statement-2 is true, statement-2 is a correct explanation for statement-1

B. Statement-1 is true, statement-2 is true, statement-2 is not correct explanation for statement-1

C. Statement-1 is true, statement-2 is false

D. Statement-1 is false, statement-2 is true

Answer: A

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2. Statement-1: White P is considered as the elemental state of P.

Statement-2: White P is most stable allotropic state of P.

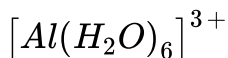
- A. Statement-1 is true, statement-2 is true, statement-2 is a correct explanation for statement-1
- B. Statement-1 is true, statement-2 is true, statement-2 is not correct explanation for statement-1
- C. Statement-1 is true, statement-2 is false
- D. Statement-1 is false, statement-2 is true

Answer: C

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3. Statement-1: Aluminium chloride has chloro-bridged structure in vapour phase.

Statement-2: Aluminium chloride in acidified aqueous solution forms



- A. (a) Statement-1 is true, statement-2 is true, statement-2 is a correct explanation for statement-1
- B. Statement-1 is true, statement-2 is true, statement-2 is not correct explanation for statement-1
- C. Statement-1 is true, statement-2 is false
- D. Statement-1 is false, statement-2 is true

Answer: B

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4. Statement-1: $B(OH)_3$ behaves as a lewis acid.

Statement-2: Second ionisation is very much difficult in boric acid.

- A. (a) Statement-1 is true, statement-2 is true, statement-2 is a correct explanation for statement-1

- B. (b) Statement-1 is true, statement-2 is true, statement-2 is not correct explanation for statement-1
- C. (c) Statement-1 is true, statement-2 is false
- D. (d) Statement-1 is false, statement-2 is true

Answer: B

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5. Statement-1: B does not form $[BF_6]^{3-}$

Statement-2: Co-ordination number of B is 4.

- A. (a) Statement-1 is true, statement-2 is true, statement-2 is a correct explanation for statement-1
- B. (b) Statement-1 is true, statement-2 is true, statement-2 is not correct explanation for statement-1

C. (c) Statement-1 is true, statement-2 is false

D. (d) Statement-1 is false, statement-2 is true

Answer: B

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6. Statement-1: B_2H_6 on heating with excess of ammonia forms boron nitride.

Statement-2: B_2H_6 contain three centre two electron pair bonds.

A. Statement-1 is true, statement-2 is true, statement-2 is a correct explanation for statement-1

B. Statement-1 is true, statement-2 is true, statement-2 is not correct explanation for statement-1

C. Statement-1 is true, statement-2 is false

D. Statement-1 is false, statement-2 is true

Answer: B

 [Watch Video Solution](#)

7. Statement-1: BCl_3 and CCl_4 do not undergo hydrolysis.

Statement-2: Both B and carbon do not have empty d-orbitals.

A. Statement-1 is true, statement-2 is true, statement-2 is a correct explanation for statement-1

B. Statement-1 is true, statement-2 is true, statement-2 is not correct explanation for statement-1

C. Statement-1 is true, statement-2 is false

D. Statement-1 is false, statement-2 is true

Answer: D



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8. Statement-1: Silicones are used as high class industrial insulators.

Statement-2: Silicones are large covalent solids so bad conductors of electricity.

- A. Statement-1 is true, statement-2 is true, statement-2 is a correct explanation for statement-1
- B. Statement-1 is true, statement-2 is true, statement-2 is not correct explanation for statement-1
- C. Statement-1 is true, statement-2 is false
- D. Statement-1 is false, statement-2 is true

Answer: A



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9. Statement-1: Pyro-silicates are 1-D polymers.

Statement-2: In pyro-silicates two orthosilicates are connected through one oxygen atom common.

- A. Statement-1 is true, statement-2 is true, statement-2 is a correct explanation for statement-1
- B. Statement-1 is true, statement-2 is true, statement-2 is not correct explanation for statement-1
- C. Statement-1 is true, statement-2 is false
- D. Statement-1 is false, statement-2 is true

Answer: D

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10. Statement-1: Interstitial carbides are formed when heavy metals react chemically with C(gas).

Statement-2: In such carbides 'C' occupy voids available in heavy metals.

A. Statement-1 is true, statement-2 is true, statement-2 is a correct explanation for statement-1

B. Statement-1 is true, statement-2 is true, statement-2 is not correct explanation for statement-1

C. Statement-1 is true, statement-2 is false

D. Statement-1 is false, statement-2 is true

Answer: D

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11. Assertion: All clathrate compound of noble gas are the compounds in which the molecules of noble gases are trapped in cavities in the crystal lattice of other compounds.

Reason: He and Ne having smaller size do not form clathrate compound molecules because they are small enough to escape from cavities.

- A. Statement-1 is true, statement-2 is true, statement-2 is a correct explanation for statement-1
- B. Statement-1 is true, statement-2 is true, statement-2 is not correct explanation for statement-1
- C. Statement-1 is true, statement-2 is false
- D. Statement-1 is false, statement-2 is true

Answer: A



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12. 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. (a) Statement-1 is true, statement-2 is true, statement-2 is a correct explanation for statement-1
- B. (b) Statement-1 is true, statement-2 is true, statement-2 is not correct explanation for statement-1
- C. (c) Statement-1 is true, statement-2 is false
- D. (d) Statement-1 is false, statement-2 is true

Answer: A



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13. Statement-1: Bond energy of HI is smaller than that of HBr.

Statement-2: HBr is stronger acid than HI.

A. Statement-1 is true, statement-2 is true, statement-2 is a correct explanation for statement-1

B. Statement-1 is true, statement-2 is true, statement-2 is not correct explanation for statement-1

C. Statement-1 is true, statement-2 is false

D. Statement-1 is false, statement-2 is true

Answer: C

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14. Statement-1: NCl_3 is hydrolysed by water by NF_3 is not hydrolysed.

Statement-2: N does not has vacant orbital for expansion of octet.

- A. Statement-1 is true, statement-2 is true, statement-2 is a correct explanation for statement-1
- B. Statement-1 is true, statement-2 is true, statement-2 is not correct explanation for statement-1
- C. Statement-1 is true, statement-2 is false
- D. Statement-1 is false, statement-2 is true

Answer: B

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15. Statement-1: Peroxomonosulphuric acid has low basicity.

Statement-2: It has one O-O bond.

- A. (a) Statement-1 is true, statement-2 is true, statement-2 is a correct explanation for statement-1
- B. (b) Statement-1 is true, statement-2 is true, statement-2 is not correct explanation for statement-1
- C. (c) Statement-1 is true, statement-2 is false
- D. (d) Statement-1 is false, statement-2 is true

Answer: B

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16. Statement-1: HF is weaker acid than HCl.

Statement-2: F^- has high hydration energy than Cl^-

- A. Statement-1 is true, statement-2 is true, statement-2 is a correct explanation for statement-1

- B. Statement-1 is true, statement-2 is true, statement-2 is not correct explanation for statement-1
- C. Statement-1 is true, statement-2 is false
- D. Statement-1 is false, statement-2 is true

Answer: B

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17. Statement-1: ICl_2^\ominus is a linear compound.

Statement-2: In ICl_2^\ominus , I is sp hybridised.

- A. Statement-1 is true, statement-2 is true, statement-2 is a correct explanation for statement-1
- B. Statement-1 is true, statement-2 is true, statement-2 is not correct explanation for statement-1

C. Statement-1 is true, statement-2 is false

D. Statement-1 is false, statement-2 is true

Answer: C



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18. Statement-1: NH_3 is more basic than NF_3

Statement-2: F is more electronegative than H.

A. Statement-1 is true, statement-2 is true, statement-2 is a correct explanation for statement-1

B. Statement-1 is true, statement-2 is true, statement-2 is not correct explanation for statement-1

C. Statement-1 is true, statement-2 is false

D. Statement-1 is false, statement-2 is true

Answer: A

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19. Statement-1: H_2S is weak diprotic acid.

Statement-2: Salt of aq. Na_2S has pH greater than 7.

- A. (a) Statement-1 is true, statement-2 is true, statement-2 is a correct explanation for statement-1
- B. (b) Statement-1 is true, statement-2 is true, statement-2 is not correct explanation for statement-1
- C. (c) Statement-1 is true, statement-2 is false
- D. (d) Statement-1 is false, statement-2 is true

Answer: B

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20. Statement-1: All noble gases are considered as unreactive.

Statement-2: Down the group, melting and boiling point increases.

A. Statement-1 is true, statement-2 is true, statement-2 is a correct explanation for statement-1

B. Statement-1 is true, statement-2 is true, statement-2 is not correct explanation for statement-1

C. Statement-1 is true, statement-2 is false

D. Statement-1 is false, statement-2 is true

Answer: D

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21. Statement-1: NH_4NO_3 evolve a gas on addition of NaOH.

Statement-2: Same gas is evolved on addition of NaOH on $NaNO_3$

in presence of Cu.

- A. Statement-1 is true, statement-2 is true, statement-2 is a correct explanation for statement-1
- B. Statement-1 is true, statement-2 is true, statement-2 is not correct explanation for statement-1
- C. Statement-1 is true, statement-2 is false
- D. Statement-1 is false, statement-2 is true

Answer: B

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22. Statement-1: O_2F_2 is an unstable orange yellow coloured solid.

Statement-2: In O_2F_2 , bond order of O-F is less than 1.

- A. Statement-1 is true, statement-2 is true, statement-2 is a correct explanation for statement-1
- B. Statement-1 is true, statement-2 is true, statement-2 is not correct explanation for statement-1
- C. Statement-1 is true, statement-2 is false
- D. Statement-1 is false, statement-2 is true

Answer: B

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23. Statement-1: All oxy acid of P are good oxidising agents.

Statement-2: H_3PO_2 is monobasic.

- A. Statement-1 is true, statement-2 is true, statement-2 is a correct explanation for statement-1

- B. Statement-1 is true, statement-2 is true, statement-2 is not correct explanation for statement-1
- C. Statement-1 is true, statement-2 is false
- D. Statement-1 is false, statement-2 is true

Answer: D

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24. Statement-1: HBr can be obtained by treating NaBr with H_3PO_4 .

Statement-2: H_3PO_4 is stronger acid than HBr.

- A. (a) Statement-1 is true, statement-2 is true, statement-2 is a correct explanation for statement-1
- B. (b) Statement-1 is true, statement-2 is true, statement-2 is not correct explanation for statement-1

C. (c) Statement-1 is true, statement-2 is false

D. (d) Statement-1 is false, statement-2 is true

Answer: C

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Assignment Section-F)

1. Match the following

Column-I

- (A) $\text{Bi}^{3+} \rightarrow (\text{BiO})^+$
- (B) $(\text{AlO}_2)^- \rightarrow \text{Al}(\text{OH})_3$
- (C) $\text{SiO}_4^{4-} \rightarrow \text{Si}_2\text{O}_7^{6-}$
- (D) $\text{B}_4\text{O}_7^{2-} \rightarrow [\text{B}(\text{OH})_3]$

Column-II

- (p) Heat
- (q) Hydrolysis
- (r) Acidification
- (s) Dilution by water

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2. Match the following

Column-I

- (A) Colemanite
- (B) Bauxite
- (C) Borax
- (D) Inorganic Benzene

Column-II

- (p) $B_3N_3H_6$
- (q) $Ca_2B_6O_{11} \cdot 5H_2O$
- (r) $Al_2O_3 \cdot 2H_2O$
- (s) $Na_2B_4O_7 \cdot 10H_2O$

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3. Match the following

Column-I

- (A) Borax
- (B) Borontrifluoride
- (C) Diborane
- (D) Boric acid

Column-II

- (p) sp^3 hybridization of B
- (q) sp^2 hybridization of B
- (r) Triangular unit
- (s) Tetrahedral unit

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4. Match the following

Column-I

- (A) Diamond
- (B) Graphite
- (C) Beryl
- (D) MgSiO_3

Column-II

- (p) Good conductor
- (q) sp^3 hybridised
- (r) Cyclic structure
- (s) Chain structure
- (t) Covalent molecule



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5. Match the following

Column-I

- (A) Nitric oxide
- (B) Nitrogen dioxide
- (C) Nitrogen pentoxide
- (D) Nitrogen trioxide

Column-II

- (p) Nitric acid
- (q) Nitrous acid
- (r) Acidic oxide
- (s) Neutral oxide



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6. Match the following

Column-I

- (A) $\text{NaNO}_3 \xrightarrow{\Delta}$
(B) $\text{AgNO}_3 \xrightarrow{\Delta}$
(C) $\text{Mg}(\text{NO}_3)_2 \xrightarrow{\Delta}$
(D) $\text{FeSO}_4 \cdot 7\text{H}_2\text{O} \xrightarrow{\Delta}$

Column-II (Gas evolved)

- (p) O_2
(q) NO_2
(r) SO_2
(s) SO_3



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7. Match the following

Column I

- (A) Solid $[\text{PCl}_4]$
(B) $(\text{SO}_3)_2$
(C) B_2H_6
(D) P_2O_{10}

Column II

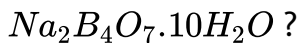
- (p) sp^3d
(q) Co-ordination number of at least one atom = 6
(r) Co-ordination number of at least one atom = 4
(s) dπ - pπ bond
(t) On reaction with water gives acid



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Assignment Section-G)

1. How many water molecules of crystallisation are present in borax,



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2. Determine the product of metalloids and the radio-active elements present in group-13 & group -14

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3. Number of oxygen atoms shared per SiO_4^{4-} tetrahedron in single chain silicates are _____.

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4. How many nitrogen is/are sp^2 . Hybridised in hydrazoic acid?

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5. What is the Oxidation number of Xe in mixture of XeF_6 and XeF_4 ?

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6. How many N-O bonds are present in product when NH_4NO_3 is strongly heated (above $300^\circ C$)?

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7. What will be the maximum valency of P with Cl?

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8. How many P-P bonds are present in P_4S_5 ?

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9. $XeF_6 + H_2O \xrightarrow{\text{excess}}$ Product.

How many hybrid orbitals will be present in Xe in product?

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Assignment Section-H)

1. Statement-1: Sodium silicate is called water glass.

Statement-2: Salts of lead are poisonous in nature.

Statement-3: Producer gas is a mixture of CO and N.

A. TTT

B. TFT

C. FFT

D. FTF

Answer: A

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2. Statement-1: In CO_2 molecule resonance is possible.

Statement-2: CO is used in purification of Ni.

Statement-3: H_2CO_3 is more acidic than H_2SiO_3 .

A. TTT

B. TFT

C. FFT

D. FTF

Answer: A

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3. Statement-1: Al forms H_2 when reacts with NaOH.

Statement-2: Al_2O_3 is amphoteric by nature.

Statement-3: Al_2O_3 is a neutral oxide.

A. FFT

B. FTT

C. TFF

D. TTF

Answer: D

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4. Statement-1: R_2SiCl_2 is the starting material for linear polymer of silicone.

Statement-2: R_2SiCl_2 is the starting material for 3-D polymer of silicone.

Statement-3: R_3SiCl is the starting material for 3-D polymer of silicone.

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5. Statement-1: Molten state of IF_5 is slightly conducting.

Statement-2: ICl is more reactive than Cl_2 .

Statement-3: In molten state of ClF_3 , chlorine may possess sp^3d^2 hybridisation.

A. FTF

B. TFT

C. TTT

D. FFF

Answer: C

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6. Statement-1: O_3 reacts with KOH and forms a paramagnetic compound.

Statement-2: KO_3 is paramagnetic.

Statement-3: O_2 gives O_2^- when heated with Na / NH_3

A. (a) FTF

B. (b) TFT

C. (c) TTT

D. (d) FFF

Answer: C



7. Statement-1: HNO_4 acid never exists.

Statement-2: $H_2S_2O_3$ is a thionic acid.

Statement-3: $H_2S_2O_7$ contain S-S bond.

A. TFT

B. FTF

C. FTT

D. FFF

Answer: B

8. Statement-1: HBr can be obtained by treating NaBr with H_2SO_4 .

Statement-2: HBr is good oxidising agent.

Statement-3: NaBr is soluble in water.

A. FTT

B. TTT

C. FFT

D. TFT

Answer: A

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9. Statement-1: All halogens are coloured.

Statement-2: Halogens exist in diatomic gaseous state.

Statement-3: F_2 is more reactive than Cl_2

A. TTT

B. TFT

C. FTT

D. TFF

Answer: B



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10. Statement-1: PCl_5 exists in ionic solid.

Statement-2: PCl_5 is a covalent compounds.

Statement-3: All P-Cl bond lengths in PCl_5 are equal.

A. TFF

B. TFT

C. FTT

D. TTF

Answer: D

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Assignment Section-I)

1. (a) Explain why BF_3 exists whereas BH_3 does not.
(b) Compare the B-F bond length in BF_3 and BF_4^-

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2. How is boron obtained from borax ? Give the chemical reactions involved. Draw the structure of B_2H_6 and give its reaction with HCl .

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3. Boric acid can be titrated against sodium hydroxide using methyl orange as indicator only in the presence of polyhydroxy compounds like catechol, mannitol etc. explain.

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4. (a) BF_3 and BrF_3 molecule has different shapes. Explain.

(b). CCl_4 cannot be hydrolysed but $SiCl_4$ can be, why?

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5. Although boric acid $B(OH)_3$, contains three hydroxyl groups yet it behaves as a monobasic acid. Explain why?

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6. An aqueous solution containing one mole of HgI_2 and two moles of NaI is orange in colour. On addition of excess NaI the solution becomes colourless. The orange colour reappears on subsequent addition of $NaOCl$. Explain with equation.

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7. (a) On boiling a mineral (A) with Na_2CO_3 solution, a white precipitate (B) is formed.

(b) The precipitate is filtered and the filtrate contains two compounds (C) and (D). The compound (C) is removed by crystallisation and when CO_2 is passed through the mother liquor left, (D) changes to (C).

(c) On strongly heating (C), two compounds (D) and (E) are formed.

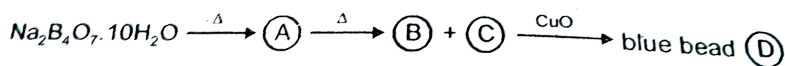
(d) (E) on heating with cobalt oxide provides blue-coloured

substance (*F*).

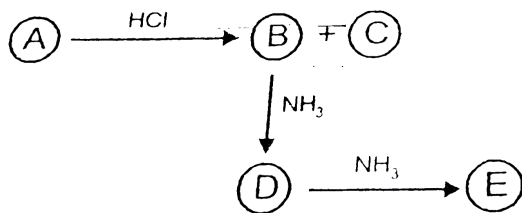
Identify (*A*) to (*F*) and give chemical reaction for (*a*) to (*d*).

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8. Complete the following



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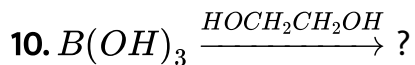


'E' is same as graphite, identify (A) to (E)

9.

'E' is same as graphite, identify (A) to (E)

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11. Indicate whether the following statements are true or false.

Explain your answer in brief.

(i) The decreasing order of electron affinity of F, Cl, Br is



(ii) HBr is stronger acid than HI because of hydrogen bonding.

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12. Write balanced equations for the reactions of the following compounds with water. (i) Al_4C_3 , (ii) $CaNCN$, (iii) BF_3 , (iv) NCl_3 ,

(v) XeF_4



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13. On gradual addition of KI solution to $Bi(NO_3)_3$ solution initially produces a dark brown precipitate which dissolves in excess of KI to give a clear yellow solution. Given an explanation for above observations.



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14. An inorganic Lewis acid (X) shows the following reactions :

(a) It fumes in moist air.

(b) The intensity of fumes increase when a rod dipped in NH_4OH is brought near it.

(c) To an aqueous solution of (X), addition of NH_4Cl and NH_4OH gives a precipitate which dissolves in $NaOH$ solution.

(d) An acidic solution of (X) does not give a precipitate with H_2S .

Identify (X) and give chemical reactions for (a) to (d).



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15. Write balanced equation for reaction of XeF_4 with water. Also name the reaction.



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16. Arrange in increasing order of extent of hydrolysis $[CCl_4, MgCl_2, AlCl_3, PCl_5, SiCl_4]$.



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Assignment Section-J)

1. Correct among the follownig

A. BF_3 is a better Lewis base than BCl_3

B. BF_3 does not form dimer as B-F bond is less polar.

C. Hydrides are the only species which may form 3 centre $2 e^-$ bond

D. All the hydrides form 3 centre i.e., bonds.

Answer: A

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2. Incorrect among the following

A. $(BN)_x$ is molecule with sp state of hybridisation

B. $(BN)_x$ is a molecule with graphite like structure

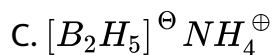
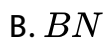
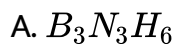
C. $(BN)_x$ is a molecule with sp^2 hybridisation

D. BN is prepared by reaction of B_2O_3 and NH_3

Answer: A:D

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3. B_2H_6 reacts with NH_3 to form



D. `All of these

Answer: A:B

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4. SiC is a/an

- A. Abrasive
- B. A hard material
- C. Covalent carbide
- D. Diamond like structure

Answer: A::B::C::D



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5. SiO_2 is solid while CO_2 is gas. Why?

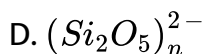
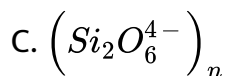
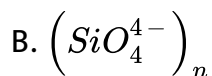
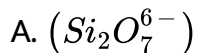
- A. 3-D broad network solid
- B. An insulator
- C. Silica
- D. An acidic oxide

Answer: A::B::C::D



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6. Chain silicates can be represented as



Answer: C



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7. Which of the following halogens can oxidise H_2S to S?



C. Br_2

D. All of these

Answer: D

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To obtain this product in large amount, we should use

A. Tap water as medium

B. Glue or gelatine in medium

C. Heavy metal ion in solution

D. by takin NaOCl in excess amount

Answer: B

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9. Which of the following oxide does not form dimer?

A. NO

B. ClO_2

C. NO_2

D. All of these

Answer: B



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10. Choose the correct statement regarding ice.

A. Hexagonal rings are present.

B. In ice, one oxygen is surrounded by four hydrogen atoms

C. In ice, movement of H^+ is faster than water

D. All of these

Answer: D

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11. Pure oxygen is colourless gas but liquid and solid O_2 is pale blue or blue coloured, this is because

- A. Due to electronic transition triplet to singlet formation is not favourable in gaseous state
- B. Density of gas is less than density of liquid
- C. Singlet state is diamagnetic
- D. O_2 cannot absorb photon in gaseous state.

Answer: A

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12. Choose the correct regarding heating of S.

- A. At 160° , the S_8 rings break and the diradicals so formed polymerise forming long chains of up to a million atoms
- B. Due to heating viscosity decreases regularly
- C. Due to heating viscosity increases regularly
- D. at $200^\circ C$ all S_8 molecule break up to S_2 .

Answer: A

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13. In which, degree of hydrolysis is expected to be highest?

- A. Na_2S
- B. CdS

C. MoS

D. CuS

Answer: A

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14. Choose the correct regarding bond length

A. $CO^+ < CO$

B. $NO^+ < NO$

C. $N < N_2^+$

D. `All of these

Answer: D

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15. Br_2 gas is of red brown colour and I_2 gas is of violet colour. This is because of

- A. Br is more E.N. than I
- B. Energy difference between two consecutive level is lesser for iodine than bromine
- C. Br has small size than I
- D. I_2 has longer van der Waal's forces than Br_2 .

Answer: B

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16. Which of the following halides has Cl^- as a bridging atom?

- A. $BeCl_2$ (solid)
- B. Al_2Cl_6 (liquid)

C. Fe_2Cl_6

D. All of these

Answer: D

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EXAMPLES

1. Give electronic configuration of Ga.

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2. Boron compound behave as Lewis acid because of

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3. Write oxidation state of boron family .

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4. How many B atoms are sp^2 hybridised in borax structure ?

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5. Give colour of bead when glassy bead reacts with TiO .

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6. What is the basicity of orthoboric acid ?

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7. Why boron fibre is used in body armour?

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8. How boron isotope controls nuclear reaction?

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9. Name an aluminium compound that can be used in chromatography.

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10. On moving down the group in carbon family stability of group oxidation state +4 decreases why?

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11. SiO_2 is solid while CO_2 is gas. Why?

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12. Why $[SiCl_6]^-$ cannot exist?

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13. Give correct order of increasing first ionization energy in carbon family.

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14. Name two elements of carbon family which have nearly same catenation tendency.



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15. Which element of the carbon family does not dissolve in aqueous NaOH to evolve hydrogen gas?



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16. Give three reasons for anomalous behaviour of carbon.



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17. Thermodynamically the most stable form of carbon is

(a) diamond , (b) graphite

(c) fullerenes , (d) coal



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18. What is hybridisation of carbon in CO_2 ?

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19. Give the uses of silicones.

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20. Why silicon dioxide is non-reactive?

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21. Though nitrogen exhibits +5 oxidation state, it does not form pentahalide. Give reason.

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22. PH_3 has lower boiling point than NH_3 . Why?

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23. Why does NH_3 act as a Lewis base ?

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24. Why does NH_3 acts as a Lewise base?

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25. In what way can it be proved that PH_3 is basic in nature?

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26. Why does NO_2 dimerise ?

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27. Why does PCl_3 fume in moisture ?

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28. (a) Why does PCl_3 fume in moisture ?

(b) Are all the five bonds in PCl_5 molecule equivalent ? Justify your answer.

(c) How do you account for the reducing behavior of H_3PO_2 on the basis of its structure ?

(d) Give the disproportionation reaction of H_3PO_3 .

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29. (a) Why does PCl_3 fume in moisture ?

(b) Are all the five bonds in PCl_5 molecule equivalent ? Justify your answer.

(c) How do you account for the reducing behavior of H_3PO_2 on the basis of its structure ?

(d) Give the disproportionation reaction of H_3PO_3 .

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30. Write the structure of pyrophosphoric acid.

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31. Name the radioactive element of Group 16 .

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32. H_2S is less acidic than H_2Te . Why?

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33. Why is H_2S less acidic than H_2Te ?

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34. the structure of SF_6 is octahedral. what is the structure of SF_4

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35. Which form of sulphur shows paramagnetic behaviour ?

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36. What happens when :

(i) Concentrated H_2SO_4 is added to calcium fluoride ?

(ii) SO_3 is passed through water ?

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37. Give one example each of acidic, basic, amphoteric and neutral oxides.

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38. Draw the structure of peroxodisulfuric acid.

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39. (a) Halogens have maximum negative gain enthalpy in the respective periods of the periodic table. Why?

(b) Although electron gain enthalpy of fluorine is less negative as compared to chlorine, fluorine is a stronger oxidising agent than chlorine. Why?

Fluorine exhibits only -1 oxidation state, whereas other halogens exhibit +1, +3, +5, and +7 oxidation states also. Explain.

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40. Halogens have maximum negative electron gain enthalpy in the respective periods of the periodic table. Why?

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41. Fluorine exhibits only -1 oxidation state whereas other halogens show +1, +3, +5 and +7 oxidation states also. Explain.

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42. Give correct order of boiling point of hydride of group 17.

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43. Write balanced equation for reaction of Cl_2 with hot and conc. NaOH. Is this reaction a disproportionation one? Justify.

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44. Give two use of Cl_2

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45. When HCl reacts with finely powdered iron, it forms ferrous chloride and not ferric chloride, why?

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46. When HCl reacts with finely powdered iron, it forms ferrous chloride and not ferric chloride. Why?

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47. Why are the elements of group 18 called noble gases?

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48. Noble gases have very low boiling points. Why?

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49. Does the hydrolysis of XeF_6 lead to a redox reaction?

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50. Give equation for preparation of Radon from Radium .

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EXERCISE

1. Number of B-O-B bond in borax

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2. Among the group 13 the only element which is non-metal

A. B

B. Al

C. Ga

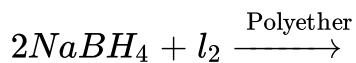
D. In

Answer: A



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3. Products formed are



A. HI, NaI and H_2

B. B_2H_6 , NaI and HI

C. B_2H_6 , NaI and H_2

D. $H_3BO_3 + H_2$

Answer: C

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4. What is the hybridisation state of B and N in inorganic benzene respectively ?

A. sp^2 and sp^3

B. sp^3 and sp^2

C. Both have sp^2

D. Both have sp^3

Answer: C

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5. Which type of hydride is BH_3 ?

- A. covalent hydride
- B. Electron precise
- C. Electron excess
- D. Lewis base

Answer: A



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6. Which one of the following is the correct statement ?

- A. The hydroxide of boron is basic in nature
- B. The hydroxide of boron is neutral in nature
- C. The hydroxide of boron is acidic in nature

D. Boron shows maximum oxidation state of +1 due to inert pair effect

Answer: C

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7. Which of the following statement is incorrect regarding B_2H_6 ?

- A. Each boron atom is sp^3 hybridised
- B. B_2H_6 is electron deficient
- C. B_2H_6 has banana bond
- D. All of these

Answer: D

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8. Boric acid is polymeric due to

- (a) its acidic nature , (b) the presence of hydrogen bonds
(c) its monobasic nature , (d) its geometry

- A. Its acidic nature
B. The presence of hydrogen bonds
C. its monobasic nature
D. Its geometry

Answer: B

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9. Which one of the following elements has the highest melting point?

- A. Al

B. Ga

C. B

D. In

Answer: C

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10. In which of the following compounds banana bond is present ?

A. BCl_3

B. B_2H_6

C. $B(OH)_3$

D. All of these

Answer: B

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11. Which allotropic of carbon is thermodynamically more stable ?

A. Fullerence

B. Diamond

C. Graphite

D. Coke

Answer: C



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12. What is the correct order of I.E. ?

A. $C < Si < Ge < Pb < Sn$

B. $C > Si > Pb > Ge > Sn$

C. $C > Si > Ge > Sn > Pb$

D. $C > Si > Ge > Sn > Pb$

Answer: C

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13. In group 14 , which element show inert pair effect ?

A. Si

B. Pb

C. C

D. Ge

Answer: B

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14. Which of the following is neutral oxide?

A. CO

B. CO_2

C. SiO_2

D. Na_2O

Answer: A



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15. Which of the following halide cannot hydrolysed ?

A. CCl_4

B. $SiCl_4$

C. $GeCl_4$

D. SiF_4

Answer: A



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16. Which polymorph of carbon act as hardest allotrope ?

A. Diamond

B. Fullerenes

C. Graphite

D. All of these

Answer: A



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17. SiC is popular with name

- A. Acetylide
- B. Methanide
- C. Carborundum
- D. Plumbago

Answer: C



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18. On heating oxalic acid with H_2SO_4 , we get

- A. H_2CO_3
- B. CO_2 and O_2
- C. CO_2 and CO



Answer: C

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19. Which allotrope of carbon leads to the formation of bucky ball ?

A. Graphite

B. Diamond

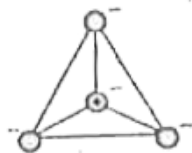
C. Fullerenence

D. Nano tube

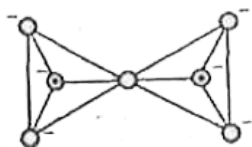
Answer: C

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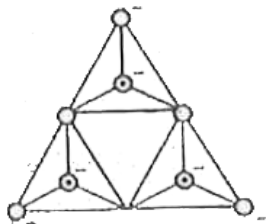
20. Which of the following is correct structure of anion of pyrosilicates ?



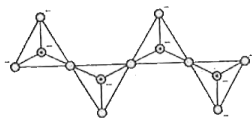
A.



B.



C.

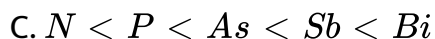
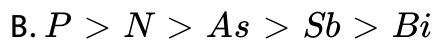
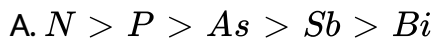


D.

Answer: B

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21. Catenation property of group 15 elements follow the order

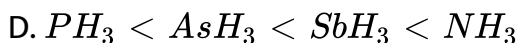
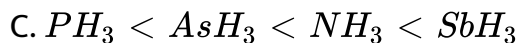
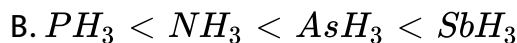
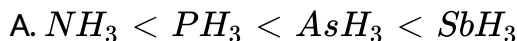


Answer: B



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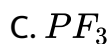
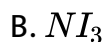
22. Melting point of hydrogen of nitrogen family follows the order



Answer: D

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23. Which of the following halides of group 15 is not hydrolysed ?



D. Both (1) & (3)

Answer: D

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24. Choose the correct answer from the options given below :

The brown ring test is used for detection of :

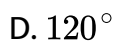


Answer: B



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25. White phosphorus occurs as discrete P_4 units , where P atom lie at the corners of a regular tetrahedron . The PPP bond angle is



Answer: C

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26. Orthophosphorus acid on heating gives _____

- A. Hypophosphorus acid
- B. Orthophosphoric acid
- C. Phosphene gas
- D. Both (2) & (3)

Answer: D

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27. Which of the following is correct ?

A. H_3PO_3 is dibasic and reducing

B. H_3PO_3 is dibasic and non-reducing

C. H_3PO_4 is tribasic and reducing

D. H_3PO_3 is tribasic and non-reducing

Answer: A



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28. The correct order of decreasing acidic strength of oxyacids of group 15 elements is

A. $HNO_3 > H_3SbO_4 > H_3AsO_4 > H_3PO_4$

B. $H_3PO_4 > H_3AsO_4 > H_3SbO_4 > HNO_3$

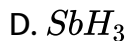
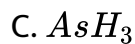
C. $HNO_3 > H_3PO_4 > H_3AsO_4 > H_3SbO_4$

D. $HNO_3 > H_3AsO_4 > H_3PO_4 > H_3SbO_4$

Answer: C

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29. Which has maximum bond angle?



Answer: A

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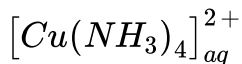
30. When excess of NH_3 (aq) is added to a blue solution containing

$Cu_{(aq)}^{2+}$ ions

A. Solution turns red due to formation of Cu^{+} ions

B. Solution becomes red due to formation of $[Cu(NH_3)_4]_{aq}^{2+}$

C. Solution become deep blue due to formation of



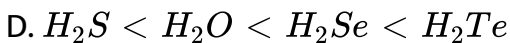
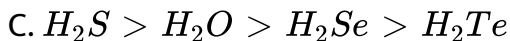
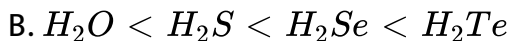
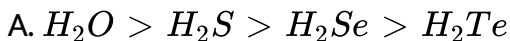
D. Solution becomes colourless due to excess colourless NH_3

Answer: C



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31. The correct order of acidity of hybridised of oxygen family



Answer: B

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32. S and O both are non-metals in the oxygen family , but their melting points are targely different , O = 90 K and S = 718 K . This is because

A. S is large in size than O

B. S exhibits more oxidation state +2, +4 and +6 whereas O exhibits only -2 and $+2$ oxidation states

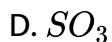
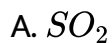
C. O exists as diatomic molecule whereas S exists as polyatomic molecule (S_8)

D. S has more allotropes than O

Answer: C

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33. Which of the following is not a reducing oxide ?

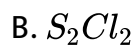
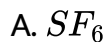


Answer: D



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34. Which of the following compound does not exist ?



C. SCl_2

D. $SeBr_2$

Answer: D

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35. O_3 molecule is a resonance hybrid of the two structures I and II .



The two oxygen - oxygen bond lengths in ozone molecule are

A. Identical

B. Slightly different

C. Largely different

D. Cannot be measured due to resonance

Answer: A

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36. S_8 ring of both rhombic sulphur and monoclinic sulphur has crown shaped structure . The S- S -S bond angle in S_8 ring is

A. $109^\circ 28'$

B. 107°

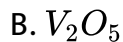
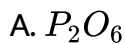
C. 104°

D. 120°

Answer: B

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37. In the contact process of manufacturing of H_2SO_4 the catalyst used is



Answer: B

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38. Number of S = O bonds in pyrosulphuric acid are

A. Two

B. Four

C. Five

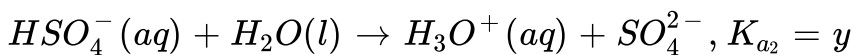
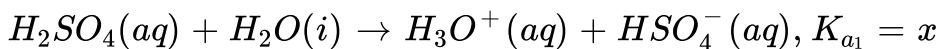
D. Six

Answer: B



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39. H_2SO_4 in aqueous medium ionises in two steps



What is relation between x and y ?

A. $x < y$

B. $x = y$

C. $x > y$

D. $x > > y$

Answer: D

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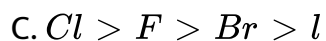
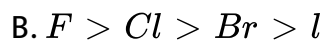
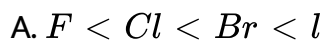
40. What is the product when Mg react with SO_2 ?

- A. Mg O
- B. $MgSO_4$
- C. Mg S
- D. Both (1) & (3)

Answer: D

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41. The decreasing order of electron affinity of halogen's is



Answer: C



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42. Halogens exist in $-1, +1, +3, +5$ and $+7$ oxidation states. The halogen that exists only -1 state is

A. I

B. Br

C. F

D. Cl

Answer: C

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43. When F_2 gas reacts with H_2O it forms

A. O_2 gas

B. O_2F_2 gas

C. HOF

D. Both (2) & (3)

Answer: A

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44. F_2 combines with O_2 to form O_2F_2 which are

A. diOxygen difluorides

B. Oxides of fluorine

C. Anhydride of HOF

D. Both (2) & (3)

Answer: A



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45. The order of acidity of oxides of chlorine .

Cl_2O Cl_2O_3 Cl_2O_5 Cl_2O_7 is
I *II* *III* *IV*

A. $I < II < III < IV$

B. $I > II > III > IV$

C. $I > III > II > IV$

D. $IV > I > II > III$

Answer: A

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46. Deacon's process is used for the manufacture of

A. HNO_3

B. I_2

C. Cl_2

D. Br_2

Answer: C

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47. Aqua regia , which is used for dissolving noble metals like gold and platinum etc. is

A. 1: 3 mixture of conc. HCl and conc. HNO_3

B. 3: 1 mixture of conc. HCl and conc. HNO_3

C. 1: 1 mixture of conc. HCl and conc. HNO_3

D. 3: 1 mixture of dil. HCl and conc. HNO_3

Answer: B

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48. Halogens react with oxygen to form many oxoacids , commonly named as hypohalous acid , halous acid , halic acid and perhalic acid

. The halogen(s) which form (s) halous acid is/are

A. F_2

B. Cl_2

C. Cl_2 , Br_2 and I_2

D. F_2 , Cl_2 and Br_2

Answer: B

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49. The number of peroxide linkages in perchloric acid is

A. Zero

B. One

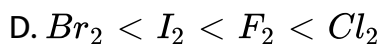
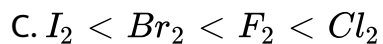
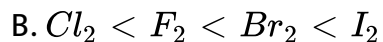
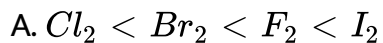
C. Two

D. Four

Answer: A

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50. Which is the correct order of bond length ?



Answer: A



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ASSIGNMENT (SECTION - A) (Objective Type Questions)

1. On moving down the group 13 density

A. Increase

B. Decrease

C. First decreases then increases

D. Remains same

Answer: A

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2. High melting point of boron is due to its existence as

A. Small covalent molecule

B. Giant covalent molecule

C. Giant covalent solid

D. Giant ionic molecule

Answer: C

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3. Which element of group 13 forms covalent compounds only

- A. Size of ions is small
- B. Sum of three ionization energies is very high
- C. Electronegativity values are high
- D. All of these

Answer: D

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4. Group 13 elements show

- A. +1 and +3
- B. +1, +2 and +3
- C. +2, +3 and +4

D. +1 and +4

Answer: A

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5. Which one of the following elements of group 13 can react with alkali solutions to give H_2 gas?

A. Boron

B. Aluminium

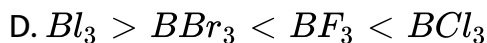
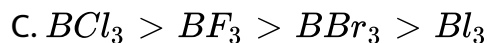
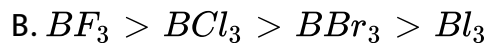
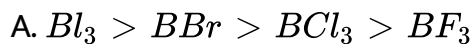
C. Gallium

D. All of these

Answer: D

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6. The correct order of Lewis acidic strength of boron trihalides :



Answer: A



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7. Dimer Al_2Cl_6 is formed because

A. Al is electron rich

B. Aluminium is having lone pair of electron

C. Aluminium forms coordinate bonds with chlorine to complete its octet.

D. Aluminium donates lone pair to form bridge

Answer: C

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8. What happens when Borax is heated strongly.

A. $NaBO_2$

B. B_2O_3

C. $Na_2B_4O_7$

D. Both (1) & (2)

Answer: D

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9. $B(OH)_3$ accept how many OH^- ions ?

A. 1

B. 2

C. 3

D. 4

Answer: A



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10. Boric acid is polymeric due to

(a) its acidic nature , (b) the presence of hydrogen bonds

(c) its monobasic nature , (d) its geometry

A. Basic nature

B. Acidic nature

C. Hydrogen bonds

D. Co-ordinate bonds

Answer: C

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11. Select the incorrect statement for B_2H_6

A. It contains B- B ionic bonds

B. Each boron is sp^3 hybridised

C. It has two types of hydrogen bonds

D. All of these

Answer: A

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12. If diborane each boron has three electrons bonds around each B atom and form

- A. Two bonds
- B. Three bonds
- C. Four bonds
- D. Five bonds

Answer: C



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13. Which of the following structure is similar to graphite.

- A. Boron nitride
- B. Boron carbide
- C. Aluminium oxide

D. Aluminium carbide

Answer: A

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14. The number of sigma and pi bonds present in inorganic benzene are respectively

A. 3σ , 12π

B. 12σ , 3π

C. 3σ , 3π

D. 12σ , 12π

Answer: B

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15. Aluminium is used for making alloys because of its

A. Resistance to corrosion

B. Poor conductivity

C. Heaviness

D. All of these

Answer: A

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16. Element of group 14 (IV A) have outer electronic configuration of

A. ns^2

B. ns^2np^4

C. ns^2np^4

D. ns^2np^2

Answer: D

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17. Tendency of carbon for catenation is because carbon-carbon atoms bond energy is

A. Low

B. High

C. Zero

D. Negative

Answer: B

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18. All elements except carbon have tendency to show maximum covalency of six

- A. Due to absence of vacant d-orbitals
- B. Due to presence of vacant d-orbitals
- C. Due to presence of partially filled d-orbitals
- D. Due to presence of completely filled d- orbitals

Answer: B

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19. Most abundant metal in earth crust is :

- A. Silicon
- B. Germanium

C. Aluminium

D. Arsenic

Answer: C



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20. Metalloid among the following is

A. Carbon

B. Germanium

C. Lead

D. All of these

Answer: B



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21. On moving down the group, acidic nature of oxides of group 14.

- A. Decreases
- B. Increases
- C. Remains same
- D. Increases then decreases

Answer: A

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22. Which one of the following elements forms double or triple bond involving $p\pi - p\pi$ bonding?

- A. Carbon
- B. Silicon
- C. Germanium

D. Tin

Answer: A



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23. Allotropy is due to

- A. Differences in the number of atoms in the molecules
- B. Difference in the arrangement of atoms in the molecule in the crystal
- C. Difference in chemical properties
- D. All of these

Answer: B



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24. Hybridisation of carbon atoms in diamond is

- A. sp^3 hybridised
- B. sp hybridisation
- C. sp^2 hybridisation
- D. sp^3d^2 hybridisation

Answer: A

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25. Graphite has

- A. 2- D sheet structure
- B. Van der Waals forces between different layers

C. sp^2 hybridised carbon linked with other three carbon atoms in hexagonal planar structure

D. All of these

Answer: D

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26. In graphite, the bond is

A. Ionic

B. Covalent

C. Co-ordinate

D. Metallic

Answer: B

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27. Which one of the following is properties of CO gas?

- A. It is a colourless gas
- B. It is an odourless gas
- C. It is a neutral oxide
- D. All of these

Answer: D



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28. Carbonic acid is a

- A. Weak tribasic acid
- B. Weak dibasic acid

C. Strong tribasic acid

D. Strong dibasic acid

Answer: B

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29. Organosilicon polymers containing Si-O-Si linkage is called

A. Silicates

B. Silicones

C. Glass

D. Silica

Answer: B

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30. SiO_4^{4-} ion has geometry

- A. Triangular
- B. Tetrahedral
- C. Pentagonal bipyramidal
- D. Linear

Answer: B

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31. Maximum covalent character is shown by

- A. NCl_3
- B. PCl_3
- C. AsCl_3

D. $SbCl_3$

Answer: A



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32. HNO_2 on disproportionation gives HNO_3 and

A. NO_2

B. N_2O_5

C. NO

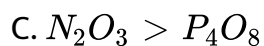
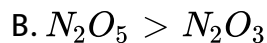
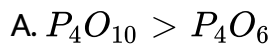
D. All of these can form

Answer: C



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33. The correct order of acidic character is

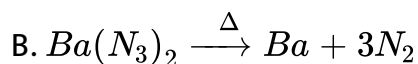
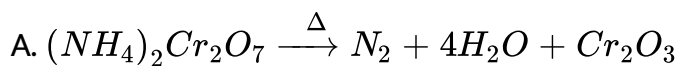


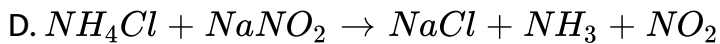
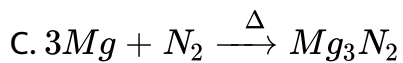
D. All of these

Answer: D

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34. In which of the following reactions, products given are not correct?

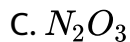
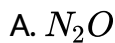




Answer: D

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35. Oxide of nitrogen which is acidic in nature and blue solid



Answer: C

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36. Valency and oxidation number of nitrogen in N_2O_5

A. 5, + 5

B. 4, + 5

C. 3, + 3

D. 3, + 5

Answer: B

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37. Which of the following solid has maximum melting points?

A. NH_3

B. PH_3

C. AsH_3

D. SbH_3

Answer: A



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38. In which of the following N-N bond is not present ?

A. N_2O_5

B. N_2O

C. N_2O_4

D. N_2O_3

Answer: A



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39. Which set of oxide of nitrogen is paramagnetic in monomeric state?

A. NO , N_2O

B. NO_2 , N_2O

C. NO , NO_2

D. N_2O , NO , NO_2

Answer: C

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40. The incorrect statement among the following is

A. Reducing character of hydrides of group 15 increases down the group

B. Basicity of hydrides of group 15 increases down the group

C. Phosphorus and arsenic can form $p\pi - d\pi$ bond but not nitrogen

D. NCl_5 does not exist

Answer: B



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41. Metal which become passive with conc. HNO_3

A. Cr

B. Zn

C. Al

D. Both (1) & (3)

Answer: D



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42. In brown ring test for nitrate ions, brown ring is formed due to complex

- A. $[Fe(H_2O)_6]^{2+}$
- B. $[Fe(H_2O)_5NO]^{2+}$
- C. $[Fe(H_2O)_5NO]^{3+}$
- D. $[Fe(H_2O)_5NO_2]^{2+}$

Answer: B



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43. Allotrope of phosphorus which is polymeric consisting of chains of P_4 tetrahedral linked together is

A. White phosphorus

B. Red phosphorus

C. Yellow phosphorus

D. Both (1) & (2)

Answer: B



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44. Which is dibasic?

A. Orthophosphoric acid

B. Pyrophosphoric acid

C. Orthophosphorus acid

D. Hypophosphorus acid

Answer: C



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45. Cyclotrimeta phosphoric acid has total number of P=O & P-O bonds respectively

A. 5 , 3

B. 3 , 9

C. 3 , 6

D. 5 , 6

Answer: B



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46. The one with lowest electron affinity in group 16 is

A. Oxygen

B. Sulphur

C. Selenium

D. Tellurium

Answer: A

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47. Write down the hybridization of central atom and shape of SF_4 .

A. sp^3d^2 , square planar

B. sp^3d^2 , octahedral

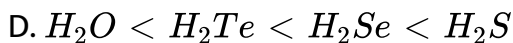
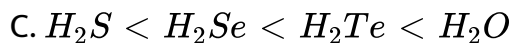
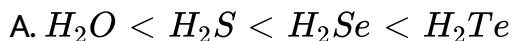
C. sp^3d , see saw

D. sp^3d , trigonal bipyramidal

Answer: C

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48. The correct order of boiling point is :

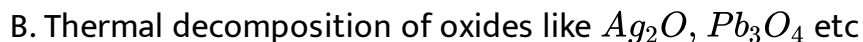
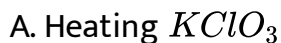


Answer: C



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49. Dioxygen can be prepared by



C. Electrolysis of water

D. All of these

Answer: D

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50. The set containing acidic oxides only are

A. SO_2 , Cl_2O_7 , CO

B. Al_2O_3 , NO , N_2O_5

C. NO , N_2O_3 , N_2O_5

D. N_2O_3 , SO_2 , N_2O_5

Answer: D

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51. The incorrect statement regarding structure of ozone

- A. The two oxygen- oxygen bond length in ozone are identical
- B. It is linear
- C. Bond angle is less than 120°
- D. Both (2) & (3)

Answer: B

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52. Which form of sulphur shows paramagnetic behaviour ?

- A. S_8 - Rhombic
- B. S_8 - Monoclinic
- C. S_2 in vapour state

D. Not possible

Answer: C

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53. Which has bleaching action due to reducing property and it is temporary?

A. H_2O_2

B. O_3

C. SO_2

D. Cl_2

Answer: C

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54. On reaction of moist SO_2 with potassium permanganate (Acidic) which is correctly observed?

A. Colour of $KMnO_4$ is decolourised

B. SO_2 is oxidised to SO_3

C. MnO_4^- is reduced to MnO_2

D. All of these

Answer: A

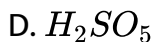
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55. $S - S$ bond is present in

A. $H_2S_2O_7$

B. $H_2S_2O_8$

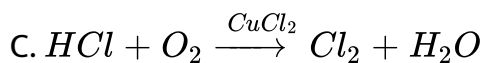
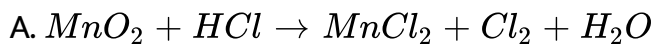
C. $H_2S_2O_6$



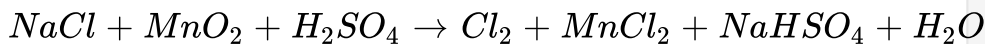
Answer: C

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56. Deacon's process of manufacture of chlorine is represented by the equation



D.



Answer: C

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57. The colour shown by halogen is incorrectly given by

A. F_2 - yellow

B. Cl_2 - Colourless

C. Br_2 - Red

D. I_2 - Violet

Answer: B



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58. Which is incorrectly given according to order indicated?

A. $F_2 > Cl_2 > Br_2 > I_2$, Oxidising power

B. $Hl > HBr > HCl > HF$, Acidic strength

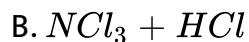
C. $F_2 > Cl_2 > Br_2 > I_2$, Bond dissociation enthalpy

D. $HF > HI > HBr > HCl$, Boiling point

Answer: C

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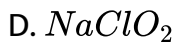
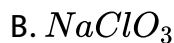
59. Cl_2 on reaction with excess of NH_3 gives



Answer: A

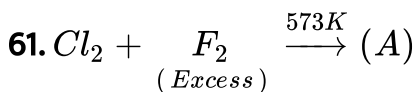
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60. When cold NaOH reacts with Cl_2 which of the following is formed



Answer: A

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Shape of compound (A) is

A. Linear

B. Tetrahedral

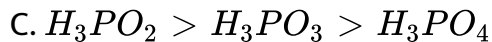
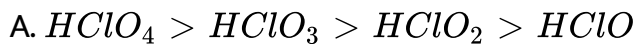
C. T- shape

D. Trigonal bipyramidal

Answer: C

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62. The correct order of acidic strength is



D. All of these

Answer: D

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63. The one with maximum oxidising power is

A. Hypochlorous acid

B. Chlorous acid

C. Chloric acid

D. Perchloric acid

Answer: A

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64. Which is mismatched regarding the shape?

A. XeF_4 - Square planar

B. $XeOF_4$ - Square pyramidal

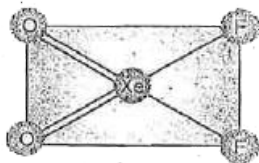
C. XeF_6 - Distorted octahedral

D. XeO_3 - Bent T shape

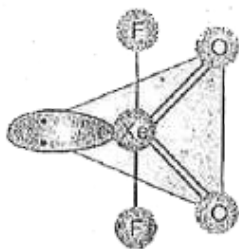
Answer: D

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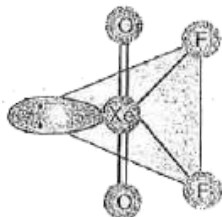
65. Structure of XeO_2F_2 is correctly represented by



A.



B.



C.

D. Both (2) & (3)

Answer: B

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ASSIGNMENT (Section - B) (Objective Type Questions)

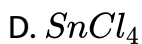
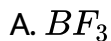
1. Why boron compounds behave as lewis acid ?

- A. Acidic nature
- B. Covalent nature
- C. Ionisation nature
- D. Electron deficient nature

Answer: D

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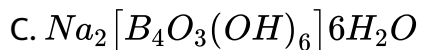
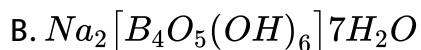
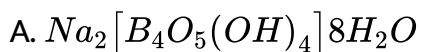
2. The compound that is not a Lewis acid is

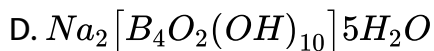


Answer: C

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3. Borax is





Answer: A

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4. In Diborane , the incorrect statement is

A. All 6 B-H bond are on same plane

B. 4 B- H bonds are on the plane and two B- H bonds above and below the plane

C. It is the $12 e^-$ species

D. Two BH_3 are attached with three centre electron pair bond

Answer: A

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5. On strong heating boric acid yields

A. B

B. B_2H_6

C. B_2O_3

D. BO_2

Answer: C

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6. In which of the following reaction boron does not act as reducing agent ?

A. $B + CO_2 \rightarrow$

B. $B + Mg \rightarrow$

C. $B + SiO_2 \rightarrow$



Answer: B

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7. Which of the following statement is correct ?

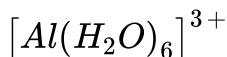
- A. Boron and aluminium halides behave as Lewis acids
- B. Al forms $[AlF_6]^{3-}$ ion but B does not form $[BF_6]^{3-}$ ion
- C. The $p\pi - p\pi$ back bonding occurs in the halides of boron and not in those of aluminium
- D. All of these

Answer: D

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8. Statement-1: Aluminium chloride has chloro-bridged structure in vapour phase.

Statement-2: Aluminium chloride in acidified aqueous solution forms



A. Tetrahedral $[Al(H_2O)_4]^{+3}$ ion

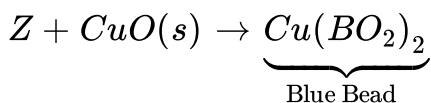
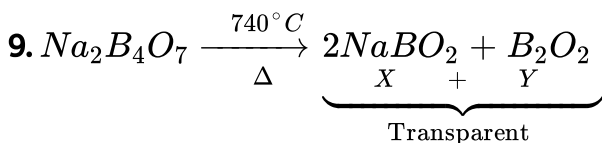
B. Octahedral $[Al(H_2O)_4]^{3+}$ ion

C. Tetrahedral $[Al(H_2O)_6]^{+3}$ ion

D. Octahedral $[Al(H_2O)_6]^{+3}$ ion

Answer: D

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The Z will be

A. X

B. Y

C. Mixture of X & Y in 2: 1 ratio

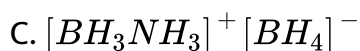
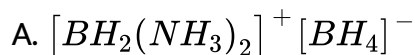
D. Mixture of X & Y in 1 : 2 ratio

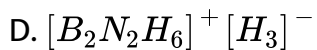
Answer: B

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10. Reaction of ammonia with diborane gives initially $B_2H_6 \cdot 2NH_3$

which can also be written as

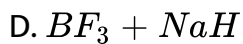
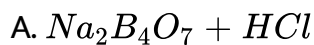




Answer: A

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11. Diborane can't be obtained from



Answer: A

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

- A. Decomposition of $AlCl_3$
- B. Hydrolysis of $AlCl_3$ liberating H_2 gas
- C. Hydrolysis of $AlCl_3$ liberating Cl_2 gas
- D. Hydrolysis of $AlCl_3$ liberating HCl gas

Answer: D

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13. Number of hydroxy group attached to Boron in Borax are

- A. Four
- B. Five

C. Six

D. Ten

Answer: A



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14. The correct match is

A. C_{60} - Buckminster fullerence

B. $Na_2B_4O_7 \cdot 4H_2O$ - Kemite

C. Borazole - $B_3N_3H_6$

D. All of these

Answer: D



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15. The correct match is

A. $B(OH)_3$ - basic

B. SnO, PbO - amphoteric

C. GeO_2 - basic

D. PbO_2 - only acidic

Answer: B

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16. In which complex C-O bond length is maximum ?

A. CH_3CHO

B. CO_2

C. CO



Answer: D

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17. Dry ice piece is composed of

A. Solid He

B. Solid CO_2

C. Solid SO_2

D. Solid C_6H_6

Answer: B

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18. The metallic character of element of group 14

- A. Decreases from top to bottom
- B. Increases from top to bottom
- C. Does not change gradually
- D. Metallic character is not seen

Answer: B



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19. The tendency of group 14 elements to show +2 oxidation state increases in the order of

- A. $Ge < Sn < Pb$
- B. $Pb < Sn < Ge$

C. $Sn < Ge < Pb$

D. $Sn < Pb < Ge$

Answer: A

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20. Which one of the following is correct statement of fullerenes - C_{60} ?

- A. Fullerenes are made by heating of graphite in an electric arc in the presence of Hydrogen
- B. Fullerenes are the only impure form of carbon due to presence of dangling bonds
- C. Both (1) & (2)

D. It contains twenty six - membered rings and twelve five membered rings

Answer: D

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21. The mixture of CO and H_2 is known as

- A. Water gas or producer gas
- B. Water gas or synthesis gas
- C. Synthesis gas or producer gas
- D. Producer gas

Answer: B

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22. When $SiCl_4$ is allowed to undergo hydrolysis it gives

- A. SiO_2 - Silicic acid
- B. $Si(OH)_4$ - Silicic acid
- C. $Si(OH)Cl_3$ - Silicic acid
- D. $SiCl_4$ do not undergo hydrolysis

Answer: B

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23. Which of the following is correct for a carbon family?

- A. Tin mainly occurs as Cassiterite , SnO_2
- B. Silicon is the third most abundant element on earth's crust
- C. Only two isotopes of carbon are present C^{12} and C^{13}

D. Germanium is most abundant than other members of carbon family

Answer: A

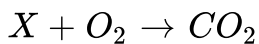
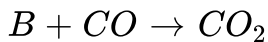
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24. $p\pi - p\pi$ multiple bond is seen in

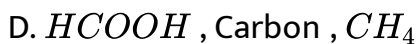
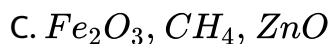
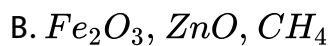
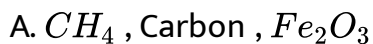
- A. Mostly carbon
- B. All carbon family member
- C. Sn but not in carbon
- D. Boron family and not in carbon family

Answer: A

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A, B & X respectively are



Answer: B

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26. The geometry of $SiCl_4$ is

A. Tetrahedral

B. Square planar

C. Octahedral

D. Planar triangular

Answer: A

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27. The silicates which contain discrete anions are

A. Sheet silicates

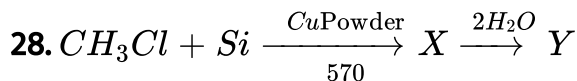
B. Ortho silicates

C. Three dimensions silicates

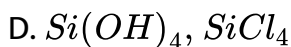
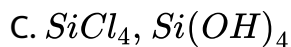
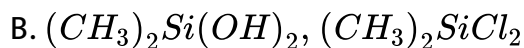
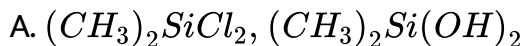
D. Pyrosilicate

Answer: B

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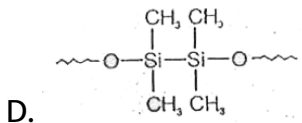
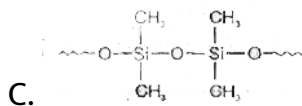
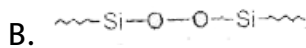
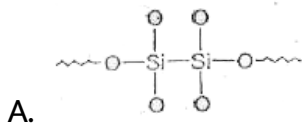
Y & X respectively are



Answer: B

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29. Hydrolysis of dimethyldichloro silane , $(\text{CH}_3)_2\text{SiCl}_2$ followed by condensation polymerisation yields straight chain polymer of



Answer: C

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30. Silicones are

- A. Water repelling in nature
- B. With high thermal stability
- C. With high dielectric strength
- D. All of these

Answer: D

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31. Which one is correct statement for zeolite ?

- A. They are alumino silicates
- B. Hydrated zeolites are used as ion exchangers in hardening of soft water
- C. ZSM - 5 is used to convert gasoline to alcohol
- D. All of these

Answer: A

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32. The correct statement is

A. Diamond is covalent yet it has high melting point

B. $[SiF_6]^{2-}$ is known whereas $[SiCl_6]^{2-}$ is not

C. *SiO* only exist at high temp

D. All of these

Answer: D



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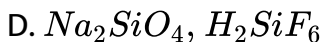
33. (i) $SiO_2 + NaOH \rightarrow ?$

(ii) $SiO_2 + HF \rightarrow ?$

The products of (ii) & (i) respectively are

A. H_2SiF_6, SiO_4^{4-}

B. SiF_4, Na_2SiO_3



Answer: B



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34. Assertion : Calcium carbide on hydrolysis gives methane.

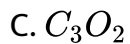
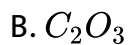
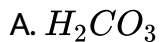
Reason : Calcium carbide contains C_2^{2-} anion.

- A. If both A and R are true and R is the correct explanation for A.
- B. If both A and R are true and R is not the correct explanation for A.
- C. If A is true and R is false.
- D. If A is false and R is true.

Answer: B

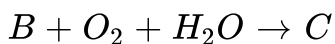
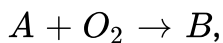
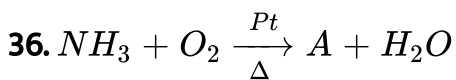
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35. Carbon Suboxide has the formula



Answer: C

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A, B and C are:

A. NO , NO_2 , and HNO_3

B. NO_2 , NO and HNO_3

C. NO_2 , HNO_3 and N_2O

D. N_2O , NO and HNO_3

Answer: A



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37. Which of the following will be hydrolysed with warm water

A. TeF_6

B. NCl_3

C. SF_6

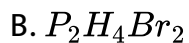
D. All of these

Answer: D



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38. Phosphine on reaction with hydrobromic acid gives



Answer: D



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39. In P_4O_{10} the number co-ordinate bonds is

A. 1

B. 8

C. 3

D. 4

Answer: D

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40. Calomel (Hg_2Cl_2) on reaction with ammonium hydroxide gives

A. Hg_2O

B. HgO

C. $HgNH_2Cl$

D. NH_2Hg_2Cl

Answer: C

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41. XeF_6 on complete hydrolysis gives

A. Xe

B. XeO_2

C. XeO_3

D. XeO_2F_2

Answer: C

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42. Which of the following is most basic ?

A. Cl^-

B. F^-

C. I^-

D. Br^-

Answer: B

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43. Nitrogen is obtained when $NaNO_2$ reacts with

A. NH_4Cl

B. NH_4NO_3

C. $(NH_4)_2CO_3$

D. NH_4OH

Answer: A

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44. Which of the following compound will not form during the hydrolysis of XeF_6 ?



Answer: D

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45. The final product formed , when alkaline KI solution reacts with ozone and water is



C. Hl

D. Reaction will not occur

Answer: A

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46. Which of the following is a sesqui oxide ?

A. N_2O_4

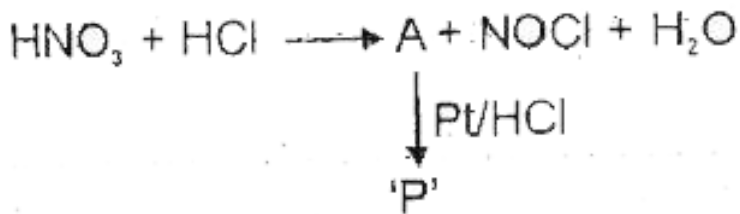
B. N_2O_3

C. N_2O

D. N_2O_5

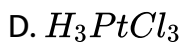
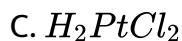
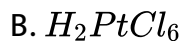
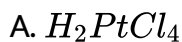
Answer: B

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47.

The product 'P' will be



Answer: B

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48. What is the product formed when NH_3 reacts with excess of Cl_2 ?

A. NH_4Cl & HCl

B. NH_4Cl & N_2

C. NCl_3 & HCl

D. NH_4Cl & NCl_3

Answer: C



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49. Hybridisation of central N atom in N_2O is

A. sp

B. sp^2

C. sp^3

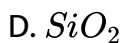
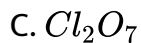
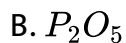
D. sp & sp^2

Answer: A



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50. The most acidic oxide among the following is

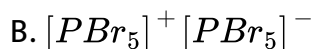
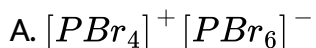


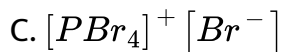
Answer: C



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51. PCl_5 in solid state exists as.





Answer: C

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52. Which metal gives NH_4NO_3 , when react with dilute HNO_3 acid?

A. Fe

B. Ti

C. Cu

D. Hg

Answer: A

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53. In iodide of Million's base formed by the reaction of Nessler's reagent with NH_3 , the coordination number of Hg will be

A. 2

B. 3

C. 4

D. 6

Answer: A

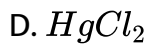
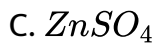


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54. The compound insoluble in aqueous NH_3 is

A. AgI

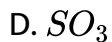
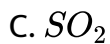
B. $AgCl$



Answer: A

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55. When Cu is reacted with hot concentrated solution of H_2SO_4 then the gas obtained is



Answer: C

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56. A metal X when burnt in air ,X -forms oxide and nitride both , X can be

A. Mg

B. Rb

C. Na

D. Li

Answer: B



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57. In xenon fluorides most reactive in XeF_6 , XeF_4 and XeF_2 is

A. XeF_6

B. XeF_2

C. XeF_4

D. All are equally reactive

Answer: A



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58. The shape of ClF_2^- , is

A. Linear

B. Trigonal bipyramidal

C. Square pyramidal

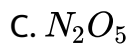
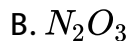
D. T -shape

Answer: A



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59. Which of the following is called mixed anhydride ?



D. All of these

Answer: A

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60. Reaction of Cl_2 with hot and conc. $NaOH$ produces



D. NaClO_2

Answer: B



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61. Which of the following do not exist ?

A. NCl_5

B. PH_5

C. $[\text{BCl}_6]^{3-}$

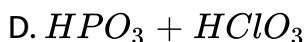
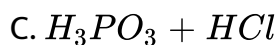
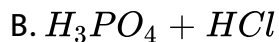
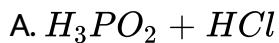
D. All of these

Answer: D



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62. $PCl_3 + H_2O \rightarrow A + B$. What are A and B



Answer: C



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63. Thermodynamically the most stable form of carbon is

(a) diamond , (b) graphite

(c) fullerenes , (d) coal

A. Fullerene

B. Diamond

C. Graphite

D. All are equally stable

Answer: C



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ASSIGNMENT (Section - C) (Previous Years Questions)

1. Name the gas that can readily decolourise acidified $KMnO_4$ solution.

A. CO_2

B. SO_2

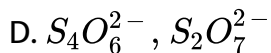
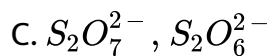
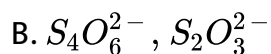
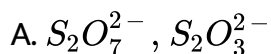
C. NO_2

D. P_2O_5

Answer: B

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2. In which pair of ions both the species contain S-S bond ?



Answer: B

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3. It is because of inability of ns^2 electrons of the valence shell to participate in bonding that

A. Sn^{2+} is reducing while Pb^{4+} is oxidising

B. Sn^{2+} is oxidising while Pb^{4+} is reducing

C. Sn^{2+} and Pb^{2+} are both oxidising and reducing

D. Sn^{4+} is reducing while Pb^{4+} is oxidising

Answer: A

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4. Match the interhalogen compounds of column I with the geometry in column II and assign the correct code

Column I

(a) XX'

(b) XX'_2

(c) XX'_3

(d) XX'_7

Column II

(i) T-shape

(ii) Pentagonal bipyramidal

(iii) Linear

(iv) Square-pyramidal

(v) Tetrahedral

A. a(iii) , b(iv) , c (i) , d (ii)

B. a (iii) , b (i) , c(iv) , d(ii)

C. a (v) , b (iv) , c (iii) , d(ii)

D. a(iv) , b(iii) , c (ii) , d (i)

Answer: B



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

A. $K_3[AlF_3H_3]$

B. $K_3[AlF_6]$

C. AlH_3

D. $K[AlF_3H]$

Answer: B

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6. When copper is heated with conc. HNO_3 it produces

- A. $Cu(NO_3)_2$ and N_2O
- B. $Cu(NO_3)_2$ and NO_2
- C. $Cu(NO_3)_2$ and NO
- D. $Cu(NO_3)_2$, NO and NO_2

Answer: B

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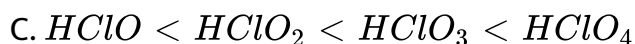
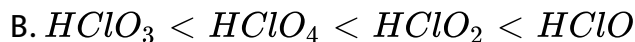
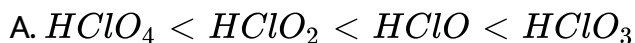
7. Which is the correct statement for the given acids ?

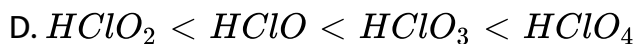
- A. Phosphinic acid is a diprotic acid while phosphonic acid is a monoprotic acid
- B. Phosphinic acid is a monoprotic acid while phosphoric acid is a diprotic acid
- C. Both are diprotic acids
- D. Both are triprotic acids

Answer: B

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8. Among the following the correct order of acidity is

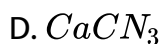
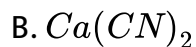
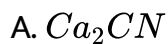




Answer: C

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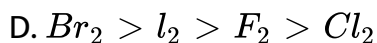
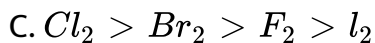
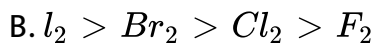
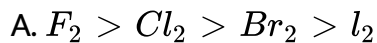
9. The product obtained as a result of a reaction of nitrogen with CaC_2 is



Answer: B

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10. Which one the following orders is correct for the bond dissociation enthalpy of halogen molecules?



Answer: C

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11. Stability of monovalent and trivalent cations of Ga , In , Tl lie in following sequence :



C. $Ga < In < Tl$

D. $Ga < In < Tl$

Answer: D

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12. The variation of the boiling point of the hydrogen halides is in the order $HF > HI > HBr > HCl$. What explains the higher boiling point of hydrogen fluoride?

- A. The bond energy of HF molecules is greater than in other hydrogen halides
- B. The effect of nuclear shielding is much reduced in fluorine which polarises the HF molecule

C. The electronegativity of fluorine is much higher than for other elements in the group

D. There is strong hydrogen bonding between HF molecules

Answer: D

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13. Which of the statements given below is incorrect ?

A. ONF is isoelectronic with O_2N^-

B. OF_2 is an oxide of fluorine

C. Cl_2O_7 is anhydride of perchloric acid

D. O_3 molecule is bent

Answer: B

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14. Strong reducing behaviour of H_3PO_2 is due to

- A. Low oxidation state of phosphorus
- B. Presence of two -OH groups and one P-H bond
- C. Presence of one -OH group and two P-H bonds
- D. High electron gain enthalpy of phosphorus

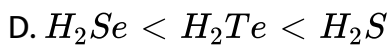
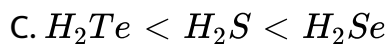
Answer: C



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15. Acidity of diprotic acids in aqueous solutions increases in the order

- A. $H_2S < H_2Se < H_2Te$
- B. $H_2Se < H_2S < H_2Te$



Answer: A

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16. Which of the following structure is similar to graphite.

A. B

B. B_4C

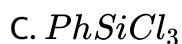
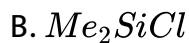
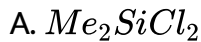
C. B_2H_6

D. BN

Answer: D

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17. Which of these is not a monomer for a high molecular mass silicon polymer

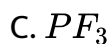
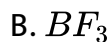


Answer: B



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18. Which of these is least likely to act as a Lewis base ?



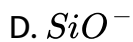
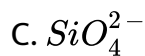
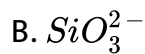
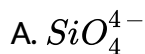
D. CO

Answer: B



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19. The basic structural unit of silicates is

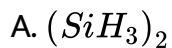


Answer: A



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20. Which of the following is electron deficient ?

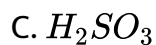


Answer: B



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21. Which is the strongest acid in the following ?



D. H_2SO_4

Answer: B



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22. Roasting of sulphides gives the gas X as a by-product. This is a colourless gas with choking smell of burnt sulphur and causes great damage to respiratory organs as a result of acid rain. Its aqueous solution is acidic acts as a reducing agent and its acid has never insolated. The gas X is

A. SO_2

B. CO_2

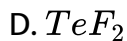
C. SO_3

D. H_2S

Answer: A

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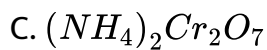
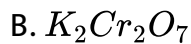
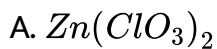
23. XeF_2 is isostructural with



Answer: A

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24. Which of the following does not give oxygen on heating?

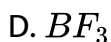
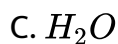


Answer: C



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25. Which of the following species contains three bond pairs and one lone pair around the central atom?



Answer: B

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26. When Cl_2 gas reacts with hot and concentrated sodium hydroxide solution, the oxidation number of chlorine changes from

- A. Zero to -1 and zero to $+3$
- B. Zero to $+1$ and zero to -3
- C. Zero to $+1$ and zero to -5
- D. Zero to -1 and zero to $+5$

Answer: D

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27. A mixture of potassium chlorate, oxalic acid and sulphuric acid is heated. During the reaction which element undergoes maximum change in the oxidation number?

A. Cl

B. C

C. S

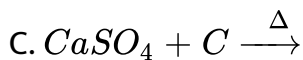
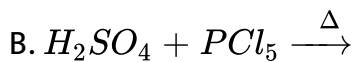
D. H

Answer: A

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28. Sulphur trioxide can be obtained by which of the following reaction?





Answer: D

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29. Which of the following statement is not valid for oxoacids of phosphorus?

- A. All oxoacids contain tetrahedral four coordinated phosphorus
- B. All oxoacids contain atleast one P = O unit and one P-OH group
- C. Orthophosphoric acid is used in the manufacture of triple superphosphate
- D. Hypophosphorous acid is a diprotic acid

Answer: D

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30. In which of the following arrangements, the sequence is not strictly according to the property written against it ?

A. $HF < HCl < HBr < HI$: Increasing acidic strength

B. $(H_2O) < H_2S < H_2Se < H_2Te$: increasing pK_a values

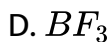
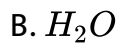
C. $NH_3 < PH_3 < AsH_3 < SbH_3$: Increasing acidic character

D. $CO_2 < SiO_2 < SnO_2 < PbO_2$: Increasing oxidising power

Answer: B

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31. Which of the following is least likely to behave as Lewis base ?



Answer: D

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32. Name the type of the structure of silicate in which one oxygen atom of $[\text{SiO}_4]^{4-}$ is shared ?

A. Three dimensional

B. Linear chain silicate

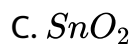
C. Sheet silicate

D. Pyrosilicate

Answer: D

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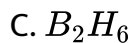
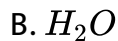
33. Which of the following oxide is amphoteric?



Answer: C

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34. Which one of the following molecules hydrides acts as a Lewis acid ?

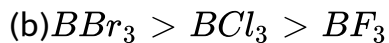


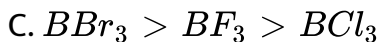
Answer: C



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

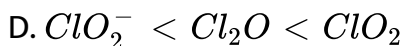
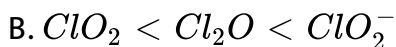




Answer: B

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36. The correct order of increasing bond angles in the following species is



Answer: C



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37. How many bridging oxygen atoms are presents in P_4O_{10} ?

A. 6

B. 4

C. 2

D. 5

Answer: A

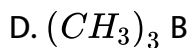
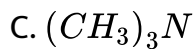


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38. Which of the following molecules acts as a Lewis acid ?

A. $(CH_3)_2O$

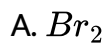
B. $(CH_3)_3P$



Answer: D

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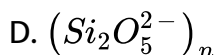
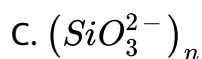
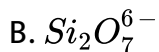
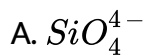
39. Which of the following is the strongest oxidising agent ?



Answer: D

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40. Which one of the following anions is present in the chain structure silicates ?

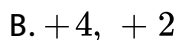
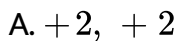


Answer: D



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41. Which of the following oxidation states are the most characteristics for lead and tin respectively?



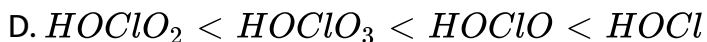
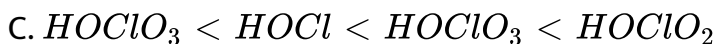
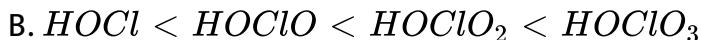
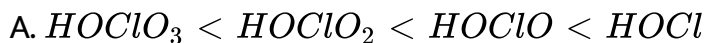
C. +2, +4

D. +4, +4

Answer: C

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42. Which one of the following orders correctly represents the increasing acid strengths of the given acids:



Answer: B

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43. Al_2O_3 can be converted into anhydrous $AlCl_3$ by heating

A. Al_2O_3 with HCl gas

B. Al_2O_3 with NaCl in solid state

C. A mixture of Al_2O_3 and carbon in dry Cl_2 gas

D. Al_2O_3 with Cl_2 gas

Answer: C



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44. Which of the following is the most basic oxide ?

A. Al_2O_3

B. Sb_2O_3

C. Bi_2O_3



Answer: C

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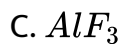
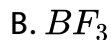
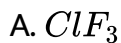
45. Which of the following is not isostructural with $SiCl_4$?



Answer: A

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46. In which of the following molecules are all the bonds not equal ?

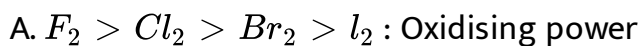


Answer: A



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



C. $F_2 > Cl_2 > Br_2 > I_2$, Electronegativity

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

Answer: D

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48. Which of the following is the electron deficient molecule -

A. B_2H_6

B. C_2H_6

C. PH_3

D. SiH_4

Answer: A

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49. Which statement is wrong ?

- A. Feldspars are not aluminosilicates
- B. Beryl is an example of cyclic silicate
- C. Mg_2SiO_4 is orthosilicate
- D. Basic structural unit in silicates SiO_4^{4-} is the tetrahedron

Answer: A

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50. Carbon and silicon belong to group *IV*. The maximum coordination number of carbon in commonly occurring compounds is four whereas that of silicon is six. This is due to

- A. Availability of low lying d-orbitals in silicon
- B. Large size of silicon

C. More electropositive nature of silicon

D. Both (2) & (3)

Answer: A

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

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

B. It does not act as proton donor but acts as a Lewis acid by accepting hydroxyl ion

C. It is a strong tribasic acid

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

Answer: C



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52. Aluminium (III) chloride forms a dimer because aluminium

- A. Belongs to 3rd group
- B. Can have higher coordination number
- C. Cannot form a trimer
- D. Has high ionization energy

Answer: B



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53. Why boron compounds behave as lewis acid ?

- A. Ionisation property
- B. Electron deficient nature

C. Acidic nature

D. Covalent nature

Answer: B

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54. In graphite, electrons are

A. Localised on each C-atom

B. Localised on every third C-atom

C. Delocalised within the layer

D. Present in anti-bonding orbital

Answer: C

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55. In borax bead test which compound is formed ?

A. Orthoborate

B. Metaborate

C. Double oxide

D. Tetraborate

Answer: B

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56. Which one of the following statements about the zeolite 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



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57. The straight chain polymer is formed by

A. Hydrolysis of $(CH_3)_2SiCl_2$ followed by condensation polymerisation

B. Hydrolysis of $(CH_3)_2SiCl$ followed by condensation polymerisation

C. Hydrolysis of CH_3SiCl_3 followed by condensation polymerisation

D. Hydrolysis of $(CH_3)_4Si$ by addition polymerisation

Answer: A

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58. The metal oxide which cannot be reduced to metal by carbon is

A. Fe_2O_3

B. Al_2O_3

C. PbO

D. ZnO

Answer: B

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59. Oxalic acid on treatment with conc. H_2SO_4 gives

A. CO only

B. CO_2 only

C. $CO_2 + H_2O$

D. $CO + CO_2 + H_2O$

Answer: D

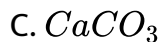


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60. Chemical formula of phosgene is :

A. $COCl_2$

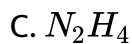
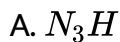
B. $CaOCl_2$



Answer: A

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61. In which of the following compounds, nitrogen exhibits highest oxidation state?



Answer: A

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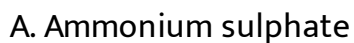
62. Which of the following displaces Br_2 from an aqueous solution containing bromide ions ?



Answer: C

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63. Repeated use of which one of the following fertilizers would increase the acidity of the soil ?



B. Superphosphate of lime

C. Urea

D. Potassium nitrate

Answer: A

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64. Which of the following oxides is most acidic ?

A. As_2O_5

B. P_2O_5

C. N_2O_5

D. Sb_2O_5

Answer: C

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65. Which of the following is phosphorus is the most reactive ?

A. Scarlet phosphorus

B. White phosphorus

C. Red phosphorus

D. Violet phosphorus

Answer: B

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66. The decomposition of organic compounds, in the presence of oxygen and without the development of odoriferous substances, is called

A. Nitrification

B. N_2 - fixation

C. Decay

D. Denitrification

Answer: C



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67. Nitrogen forms stable N_2 molecule but phosphorus is converted to P_4 from P_2 because

A. Triple bond present between phosphorus atom

B. $p\pi - p\pi$ bonding is weak

C. $p\pi - p\pi$ bonding is strong

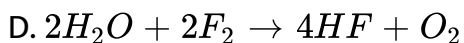
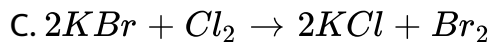
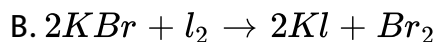
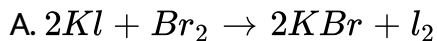
D. Multiple bonds form easily

Answer: B



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68. Which reaction is not feasible ?



Answer: B



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69. Which one of the following statements is not true

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

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

C. HOCl is a stronger acid than $H\text{OBr}$

D. HF is a stronger acid than HCl

Answer: D



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70. Oxidation states of P in $H_4P_2O_5$, $H_4P_2O_6$, $H_4P_2O_7$ respectively are

A. +3, +4, +5

B. +3, +5, +4

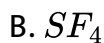
C. +5, +3, +4

D. +5, +4, +3

Answer: A

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71. In which one of the following species the central atom has the type of hybridisation which is not the same as that present in the other three ?



Answer: D

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72. Least volatile hydrogen halide is

- A. HF
- B. HCl
- C. HBr
- D. HI

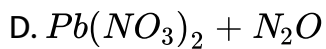
Answer: A



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73. Pb on reaction with conc. HNO_3 gives

- A. $Pb(NO_3)_2 + NO_2$
- B. $PbNO_3 + N_2O$
- C. $Pb(NO_3)_2 + N_2O_3$

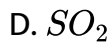
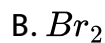


Answer: A



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74. Which has ability to release bromine from KBr ?

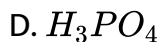
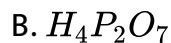
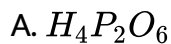


Answer: C



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75. Which of the following has P-P linkage ?



Answer: A



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76. The bonds present in N_2O_5 are .

A. Only covalent

B. Only ionic

C. Covalent and coordinate

D. Covalent and ionic

Answer: C

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77. Which of the following dissolves in water but does not give any oxyacid solution ?

A. SO_2

B. OF_2

C. SCl_4

D. SO_3

Answer: B

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78. Which of the following is used during the preparation of fluorine by Whytlaw-Gray met

A. $KF(aq)$

B. $HF(aq)$

C. Molten KHF_2

D. NH_4F

Answer: C

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ASSIGNMENT (Section - D) (Assertion-Reason Questions)

1. A : Borazine is more reactive than benzene .

R : Borazine is isostructural with benzene

- A. If both Assertion & Reason are true and the reason is the correct explanation of the assertion , then mark (1)
- B. If both Assertion & Reason are true but the reason is not the correct explanation of the assertion , then mark (2)
- C. If Assertion is true statement but Reason is false , then mark (3)
- D. If both Assertion and Reason are false statements , then mark (4)

Answer: B

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2. A : In Diborane containing eight -B-H bonds only four B-H bonds are on the plane .

R : Boron in B_2H_6 is sp^2 hybridised .

A. If both Assertion & Reason are true and the reason is the correct explanation of the assertion , then mark (1)

B. If both Assertion & Reason are true but the reason is not the correct explanation of the assertion , then mark (2)

C. If Assertion is true statement but Reason is false , then mark (3)

D. If both Assertion and Reason are false statements , then mark (4)

Answer: C

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3. A : All the oxides of boron family with the general formula M_2O_3 are basic .

R : From B_2O_3 to Tl_2O_3 basic character decreases .

- A. If both Assertion & Reason are true and the reason is the correct explanation of the assertion , then mark (1)
- B. If both Assertion & Reason are true but the reason is not the correct explanation of the assertion , then mark (2)
- C. If Assertion is true statement but Reason is false , then mark (3)
- D. If both Assertion and Reason are false statements , then mark (4)

Answer: D

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4. A : When borax is strongly heated it forms transparent glassy bead .

R : Borax is the other name for sodium tetraborate decahydrate.

- A. Both Assertion & Reason are true and the reason is the correct explanation of the assertion
- B. Both Assertion & Reason are true but the reason is not the correct explanation of the assertion
- C. Assertion is true statement but Reason is false
- D. Both Assertion and Reason are false statements

Answer: B

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5. A : CBr_4 is thermally more stable than Cl_4 .

R : C- Br bond energy is more than C-Cl

- A. If both Assertion & Reason are true and the reason is the correct explanation of the assertion , then mark (1)

B. If both Assertion & Reason are true but the reason is not the correct explanation of the assertion , then mark (2)

C. If Assertion is true statement but Reason is false , then mark (3)

D. If both Assertion and Reason are false statements , then mark (4)

Answer: A

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6. A : Boric acid is weak monobasic acid .

R : Boric acid give one H^+ ion .

A. If both Assertion & Reason are true and the reason is the correct explanation of the assertion , then mark (1)

B. If both Assertion & Reason are true but the reason is not the correct explanation of the assertion , then mark (2)

C. If Assertion is true statement but Reason is false , then mark (3)

D. If both Assertion and Reason are false statements , then mark (4)

Answer: C

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7. A : Al forms $[AlF_6]^{3-}$

R : It is octahedral complex .

A. If both Assertion & Reason are true and the reason is the correct explanation of the assertion , then mark (1)

B. If both Assertion & Reason are true but the reason is not the correct explanation of the assertion , then mark (2)

C. If Assertion is true statement but Reason is false , then mark (3)

D. If both Assertion and Reason are false statements , then mark (4)

Answer: B

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8. A : Anhydride of carbonic acid is CO_2 .

R : Carbonic acid is dibasic .

A. If both Assertion & Reason are true and the reason is the correct explanation of the assertion , then mark (1)

B. If both Assertion & Reason are true but the reason is not the correct explanation of the assertion , then mark (2)

C. If Assertion is true statement but Reason is false , then mark (3)

D. If both Assertion and Reason are false statements , then mark (4)

Answer: B

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9. A : CaC_2 is interstitial carbide

R : Calcium ions are present in the Interstices .

A. If both Assertion & Reason are true and the reason is the correct explanation of the assertion , then mark (1)

B. If both Assertion & Reason are true but the reason is not the correct explanation of the assertion , then mark (2)

C. If Assertion is true statement but Reason is false , then mark (3)

D. If both Assertion and Reason are false statements , then mark (4)

Answer: D

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10. A : Fullerene is the purest allotrope of carbon .

R : They have smooth structure without dangling bonds .

A. If both Assertion & Reason are true and the reason is the correct explanation of the assertion , then mark (1)

B. If both Assertion & Reason are true but the reason is not the correct explanation of the assertion , then mark (2)

C. If Assertion is true statement but Reason is false , then mark (3)

D. If both Assertion and Reason are false statements , then mark (4)

Answer: A

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11. A : $GeCl_4$ is easily hydrolysed by water .

R : Central atom can accommodate lone pair of e^- from oxygen atom of water molecules in $GeCl_4$

- A. If both Assertion & Reason are true and the reason is the correct explanation of the assertion , then mark (1)
- B. If both Assertion & Reason are true but the reason is not the correct explanation of the assertion , then mark (2)
- C. If Assertion is true statement but Reason is false , then mark (3)
- D. If both Assertion and Reason are false statements , then mark (4)

Answer: A

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12. A : Carbon has maximum tendency of catenation among group 14

.

R : C- C bond strength is very strong .

- A. If both Assertion & Reason are true and the reason is the correct explanation of the assertion , then mark (1)
- B. If both Assertion & Reason are true but the reason is not the correct explanation of the assertion , then mark (2)
- C. If Assertion is true statement but Reason is false , then mark (3)
- D. If both Assertion and Reason are false statements , then mark (4)

Answer: A

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13. A : Oxides of carbon in higher oxidation state is more acidic than in lower oxidation state .

R : Both CO_2 and CO can exist .

- A. If both Assertion & Reason are true and the reason is the correct explanation of the assertion , then mark (1)
- B. If both Assertion & Reason are true but the reason is not the correct explanation of the assertion , then mark (2)
- C. If Assertion is true statement but Reason is false , then mark (3)
- D. If both Assertion and Reason are false statements , then mark (4)

Answer: B

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14. A : Heavier elements of 14th group do not form $p\pi - p\pi$ bonds .

R : Atomic orbital of heavier elements are too large and do not have effective overlapping .

- A. If both Assertion & Reason are true and the reason is the correct explanation of the assertion , then mark (1)
- B. If both Assertion & Reason are true but the reason is not the correct explanation of the assertion , then mark (2)
- C. If Assertion is true statement but Reason is false , then mark (3)
- D. If both Assertion and Reason are false statements , then mark (4)

Answer: A



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15. A : Carbon shows anomalous behaviour in group Gp- 14 .

R : Carbon has maximum covalency of 4 .

- A. If both Assertion & Reason are true and the reason is the correct explanation of the assertion , then mark (1)
- B. If both Assertion & Reason are true but the reason is not the correct explanation of the assertion , then mark (2)
- C. If Assertion is true statement but Reason is false , then mark (3)
- D. If both Assertion and Reason are false statements , then mark (4)

Answer: B

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16. A : H_2O is the only hydride of chalcogen family which is liquid .

R : Acidic nature of hydrides of chalcogen family increases down the group .

- A. If both Assertion & Reason are true and the reason is the correct explanation of the assertion , then mark (1)
- B. If both Assertion & Reason are true but the reason is not the correct explanation of the assertion , then mark (2)
- C. If Assertion is true statement but Reason is false , then mark (3)
- D. If both Assertion and Reason are false statements , then mark (4)

Answer: B

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17. A : PF_5 and IF_5 have similar shapes .

R : All the bond lengths are equal PF_5

- A. If both Assertion & Reason are true and the reason is the correct explanation of the assertion , then mark (1)
- B. If both Assertion & Reason are true but the reason is not the correct explanation of the assertion , then mark (2)
- C. If Assertion is true statement but Reason is false , then mark (3)
- D. If both Assertion and Reason are false statements , then mark (4)

Answer: D

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18. A : Atomic size of F is smaller than that of Cl .

R : F- F bond is stronger than Cl-Cl bond .

- A. If both Assertion & Reason are true and the reason is the correct explanation of the assertion , then mark (1)
- B. If both Assertion & Reason are true but the reason is not the correct explanation of the assertion , then mark (2)
- C. If Assertion is true statement but Reason is false , then mark (3)
- D. If both Assertion and Reason are false statements , then mark (4)

Answer: C

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19. Assertion (A) : P_4 is more reactive than N_2

Reason (R) : $P - P$ bonds are relatively weaker than $N \equiv N$

- A. If both Assertion & Reason are true and the reason is the correct explanation of the assertion , then mark (1)
- B. If both Assertion & Reason are true but the reason is not the correct explanation of the assertion , then mark (2)
- C. If Assertion is true statement but Reason is false , then mark (3)
- D. If both Assertion and Reason are false statements , then mark (4)

Answer: A

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20. A : Noble gases have highest ionization energies in their respective periods .

R : The outer most sub-shell of noble gases in which electron enters is completely filled .

A. If both Assertion & Reason are true and the reason is the correct explanation of the assertion , then mark (1)

B. If both Assertion & Reason are true but the reason is not the correct explanation of the assertion , then mark (2)

C. If Assertion is true statement but Reason is false , then mark (3)

D. If both Assertion and Reason are false statements , then mark (4)

Answer: A



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21. A : The bond angle of NH_3 is greater than BiH_3 .

R : 'Bi' is metal while N is non - metal .

A. If both Assertion & Reason are true and the reason is the correct explanation of the assertion , then mark (1)

B. If both Assertion & Reason are true but the reason is not the correct explanation of the assertion , then mark (2)

C. If Assertion is true statement but Reason is false , then mark (3)

D. If both Assertion and Reason are false statements , then mark (4)

Answer: B



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22. A: XeF_6 on the reaction with RbF gives $Rb[XeF_7]$

R: XeF_6 is non - reactive .

A. If both Assertion & Reason are true and the reason is the correct explanation of the assertion , then mark (1)

B. If both Assertion & Reason are true but the reason is not the correct explanation of the assertion , then mark (2)

C. If Assertion is true statement but Reason is false , then mark (3)

D. If both Assertion and Reason are false statements , then mark (4)

Answer: C



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23. A : Tailing of Hg caused by ozone is due to formation of HgO .

R : In the presence of O_3 , Hg does not loses its meniscus .

A. If both Assertion & Reason are true and the reason is the correct explanation of the assertion , then mark (1)

B. If both Assertion & Reason are true but the reason is not the correct explanation of the assertion , then mark (2)

C. If Assertion is true statement but Reason is false , then mark (3)

D. If both Assertion and Reason are false statements , then mark (4)

Answer: D



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24. A : The valency and oxidation number of sulphur in S_8 respectively are 2 and 0 .

R : S_8 Rhombic is the most stable allotropic form of sulphur .

A. If both Assertion & Reason are true and the reason is the correct explanation of the assertion , then mark (1)

B. If both Assertion & Reason are true but the reason is not the correct explanation of the assertion , then mark (2)

C. If Assertion is true statement but Reason is false , then mark (3)

D. If both Assertion and Reason are false statements , then mark (4)

Answer: B

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25. A : Dissolution of concentrated H_2SO_4 in water is highly exothermic process .

R : Sulphuric acid is always diluted by adding acid to water slowly .

A. If both Assertion & Reason are true and the reason is the correct explanation of the assertion , then mark (1)

B. If both Assertion & Reason are true but the reason is not the correct explanation of the assertion , then mark (2)

C. If Assertion is true statement but Reason is false , then mark (3)

D. If both Assertion and Reason are false statements , then mark (4)

Answer: B

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26. A: N_2 is more stable than O_2 .

R : Bond order of N_2 is more than that of O_2 .

A. If both Assertion & Reason are true and the reason is the correct explanation of the assertion , then mark (1)

B. If both Assertion & Reason are true but the reason is not the correct explanation of the assertion , then mark (2)

C. If Assertion is true statement but Reason is false , then mark (3)

D. If both Assertion and Reason are false statements , then mark (4)

Answer: A



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27. A : PH_5 is not possible .

[R] : -5 oxidation state of phosphorus is not possible .

A. If both Assertion & Reason are true and the reason is the correct explanation of the assertion , then mark (1)

B. If both Assertion & Reason are true but the reason is not the correct explanation of the assertion , then mark (2)

C. If Assertion is true statement but Reason is false , then mark (3)

D. If both Assertion and Reason are false statements , then mark (4)

Answer: A



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28. A: NH_3 is more polar than NF_3 .

R : NF_3 cannot be hydrolysed .

A. If both Assertion & Reason are true and the reason is the correct explanation of the assertion , then mark (1)

B. If both Assertion & Reason are true but the reason is not the correct explanation of the assertion , then mark (2)

C. If Assertion is true statement but Reason is false , then mark (3)

D. If both Assertion and Reason are false statements , then mark (4)

Answer: B



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29. A: O_3 is better oxidizing agent than H_2O_2 .

R : O_3 converts Ag to Ag_2O .

A. If both Assertion & Reason are true and the reason is the correct explanation of the assertion , then mark (1)

B. If both Assertion & Reason are true but the reason is not the correct explanation of the assertion , then mark (2)

C. If Assertion is true statement but Reason is false , then mark (3)

D. If both Assertion and Reason are false statements , then mark (4)

Answer: B



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30. A: $Na_2S_2O_3$ on reaction with I_2 gives $Na_2S_4O_6$.

R : This reaction involves colour and electronic change both .

A. If both Assertion & Reason are true and the reason is the correct explanation of the assertion , then mark (1)

B. If both Assertion & Reason are true but the reason is not the correct explanation of the assertion , then mark (2)

C. If Assertion is true statement but Reason is false , then mark (3)

D. If both Assertion and Reason are false statements , then mark (4)

Answer: B



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31. A : Cl_2 on reaction with NaOH (cold and dilute) gives $NaClO_3$.

R : Cl_2 get oxidized only in this reaction .

A. If both Assertion & Reason are true and the reason is the correct explanation of the assertion , then mark (1)

B. If both Assertion & Reason are true but the reason is not the correct explanation of the assertion , then mark (2)

C. If Assertion is true statement but Reason is false , then mark (3)

D. If both Assertion and Reason are false statements , then mark (4)

Answer: D



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32. A: $2F^- + Cl_2 \rightarrow 2Cl^- + F_2$ is a reaction having $\Delta G^0 = -ve$

R: Cl_2 is better oxidizing agent than F_2 .

A. If both Assertion & Reason are true and the reason is the correct explanation of the assertion, then mark (1)

B. If both Assertion & Reason are true but the reason is not the correct explanation of the assertion, then mark (2)

C. If Assertion is true statement but Reason is false, then mark (3)

D. If both Assertion and Reason are false statements, then mark (4)

Answer: D

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33. A: H_3PO_4 is less acidic than H_3PO_3 .

R : Oxidation state of phosphorus in $H_3PO_4 < H_3PO_3$.

A. If both Assertion & Reason are true and the reason is the correct explanation of the assertion , then mark (1)

B. If both Assertion & Reason are true but the reason is not the correct explanation of the assertion , then mark (2)

C. If Assertion is true statement but Reason is false , then mark (3)

D. If both Assertion and Reason are false statements , then mark (4)

Answer: C



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34. A : CN^- is pseudohalide .

R : $(CN)_2$ is pseudohalogen .

A. If both Assertion & Reason are true and the reason is the correct explanation of the assertion , then mark (1)

B. If both Assertion & Reason are true but the reason is not the correct explanation of the assertion , then mark (2)

C. If Assertion is true statement but Reason is false , then mark (3)

D. If both Assertion and Reason are false statements , then mark (4)

Answer: B



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35. A : Xe is the only element of group 18 which forms compounds .

R : Xe does not form clathrates

A. If both Assertion & Reason are true and the reason is the correct explanation of the assertion , then mark (1)

B. If both Assertion & Reason are true but the reason is not the correct explanation of the assertion , then mark (2)

C. If Assertion is true statement but Reason is false , then mark (3)

D. If both Assertion and Reason are false statements , then mark (4)

Answer: D



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