CHEMISTRY

BOOKS - VK JAISWAL CHEMISTRY (HINGLISH)

p-BLOCK ELEMENTS

Level 1

1. Anhydrous aluminium chloride (Al_2Cl_6) is covalent compound and soluble in water giving:

A. Al^{3+} and Cl^- ions.

B. $\left[Cl(H_2O)_6\right]^{3+}$ and Cl^- ions

C. $\left[AlCl_2(H_2O)_4\right]$ and $\left[AlCl_4(H_2O)_2\right]^-$ ions

D. none of the above

Answer: C

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2. Al_4C_3 is a ionic carbide, named as:

A. Acetylide

B. Methanide

C. Allylide

D. Alloy

Answer: B

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3. On the addition of mineral acid to an aqueous solution of borax, the compound formed is:

A. Boron oxide

B. Orthoboric acid

C. Metaboric acid

D. Pyroboric acid

Answer: B

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4. $AlCl_3$ on hydrolysis gives

A. $Al_2O_3H_2O$

B. $Al(OH)_3$

C. Al_2O_3

D. $AlCl_36H_2O$

Answer: B

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5. Alumina is insoluble in water because:

A. It is a covalent compound

B. It has high lattice energy ad low heat of hydration

C. It has low lattice energy and high heat of hydration

D. Al^{3+} and O^{2-} ions are not excessively hydrated

Answer: B

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6. Which of the following is an electron deficient molecule?

A. LiH

B. B_2H_6

C. $LiBH_4$

D. $B_3N_3H_6$

Answer: B

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7. Anhydrous aluminium chloride fumes in moist air owing to the formation of:

A. Gaseous aluminium chloride

B. chlorine

C. chlorine dioxide

D. hydrogen chloride

Answer: D

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8. Colour of the bead in borax bead test mainly due to the formation of

A. metal oxides

B. boron oxide

C. metal metaborates

D. elemental boron

Answer: C

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9. The possible oxidation stata Tl are:

A. $+1 \text{ and } +2$

B. $+2 \text{ and } +3$

C. $+1 \text{ and } -1$

D. $+1 \text{ and } +3$

Answer: D

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10. Which of the following sublimes on heating ?

A. Al_2O_3

B. $Al(OH)_3$

C. $(AlH_3)_\pi$

D. $(AlCl_3)_\pi$

Answer: D

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11. The gaseous product(s) expected at room temperature by reaction of sodium borohydride and boron trifluoride under anhydrous conditions is/are:

A. H_2

B. B_2H_6 and H_2

C. B_2H_6

D. BH_2F and H_2

Answer: C

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12. Silicate having one monovalent corner oxygen atom in each tetrahedron unit is

A. sheet silicate

B. cyclic silicate

C. single chain silicate

D. double chain silicate

Answer: A

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13. PbI_4 does not exist because:

A. iodine is not a reactive

B. $Pb(IV)$ is oxidizing and I^- is storng reducing agent

C. Pb(IV) is less table than Pb(II)

D. Pb^{4+} is not easily formed

Answer: B

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14. The silicate anion in the mineral kinoite is a chain of three SiO_4 tetrahedra, that share corners with adjacent tetrahedra. The charge pof silicate anion is

A. -4

B. -8

C. -6

D. -2

Answer: B

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15. The gaseous product of the reaction betweenn S ad conc. H_2SO_4 is:

A. H_2

B. SO_2

C. SnH_4

D. SO_3

Answer: B

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16. The dehydration of malonic acid $CH_2(COOH)_2$ with P_4O_{10} and heat give

A. carbon monoxide

B. carbon suboxide

C. carbon dioxide

D. all three

Answer: B

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17. Which of the following structural features of graphite best accounts for its use as a lubricant?

A. Delocalized electrons

B. Strong covalent bonds between carbons atoms

C. van der waals' forces between layers

D. limited three covalency of carbon

Answer: C

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18. Which of the following is sparingly soluble in cold water and fairly soluble in hot water?

A. $Pb(NO_3)_2$

B. $PbCl_2$

C. $PbSO_4$

D. $PbCrO_4$

Answer: B

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19. The structural of silicon(IV) oxide belongs to the type:

A. ionic lattice

B. macromolecular with a layer structure

C. molecular lattice, with van der Waals' forces among the molecules

D. macromolecular, with a non-layer structure

Answer: D

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20. Silicon dissolves in excess of HF due to formation of

A. SiF_4

B. SiH_4

C. H_2SiF_6

D. H_2SiF_4

Answer: C

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21. Which of the following halides does not hydrolyse at room temperature?

A. $PbCl_4$

B. $SiCl_4$

C. CCl_4

D. $SnCl_4$

Answer: C

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22. $SiCl_4$ on hydrolysis gives:

A. silica

B. silicic acid

C. silicone

D. silicate

Answer: B

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23. Which substance is having molecular solid:

A. graphite

B. C_{60}

C. gold

D. $Ca_3(PO_4)_2$

Answer: B

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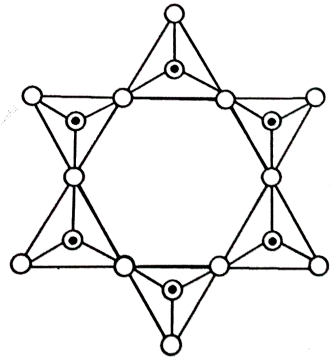
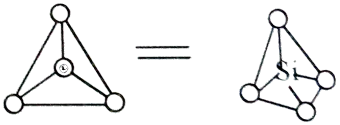
24. Identify the cyclic silicate ion given in the figure below



where



• = Si

O = O

A. $Si_2O_7^{4-}$

B. $Si_2O_3^{2-}$

C. SiO_3^{2-}

D. SiO_4^{4-}

Answer: C

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25. Which of the following is an organo silicon polymer?

A. Silica

B. Silicone

C. Silicon carbide

D. Silicic acid

Answer: B

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26. $SnCl^2$ acts as a reducing agent because

A. $SnCl_2$ can accept electrons readily

B. Sn^{2+} is more stable than Sn^{4+}

C. Sn^{4+} is more stable than Sn^{2+}

D. Sn^{2+} can be easily converted to metallic tin

Answer: C

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27. The correct order of decreasing ionic nature of lead dihalides is:

A. $PbF_2 > PbCl_2 > PbBr > PbI_2$

B. $PbF_2 > PBBr_2 > PbCl_2 > PbI_2$

C. $PbF_2 < PbCl_2 > PbBr_2 < PbI_2$

D. $PbI_2 < PbBr_2 < PbCl_2 < PbF_2$

Answer: A

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28. Carborundum is a

A. molecular solid

B. covalent solid

C. ionic solid

D. amrphous solid

Answer: B

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29. The plague OR tin pest or tin disease refers to .

A. conversion of stannous to stannic

B. conversion to white tin to grey tin

C. emmision of sound while bending a tin rod

D. atmospheric oxidation of tin

Answer: B

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30. Butter of tin is

A. $SnCl_2 \cdot 5H_2O$

B. $SnCl_2$

C. $SnCl_4$

D. $SnCl_4 \cdot 5H_2O$

Answer: D

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31. $H_2C_2O_4 \xrightarrow{\triangle} \text{gas}(A) + \text{gas}(B) + \text{liquid}(C)$. Gas(A) burns with a blue flame and is oxidised to gas(B).

$\text{Gas}(A) + Cl_2 \rightarrow D \rightarrow \xrightarrow{NH_3, \triangle} E$

A,B,C and E are

A. $CO_2, Co, H_2O, HCONH_2$

B. $CO, CO_2, CoCl_2, HCONH_2$

C. $CO, CO_2, H_2O, NH_2CONH_2$

D. $CO, CO_2, H_{20O}, COCl_2$

Answer: C

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32. $Si_2O_7^{6-}$ anion is obtained when:

A. no oxygen of a SiO_4 tetrahedron is shared with another SiO_4 tetrahedron

B. one oxygen of a SiO_4 tetrahedron is shared with another SiO_4 tetrahedron

C. two oxytgen of a SiO_4 tetrahedron are shared with another SiO_4 tetrahedron

D. three or all four oxygen of oxygen of a tetrahedron are shared with other SiO_4 tetrahedron

Answer: B

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33. Trisilyamine $(SiH_3)_3$ N is

A. trigonal pyramidal and acidic

B. trigonal pyramidal and basic

C. trigonal pyramidal and neutral

D. trigonal planar and weakly basic

Answer: D

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34. The mixed anhydride of nitrogen is:

A. $N_2O_2(2NO)$

B. $N_2O_4(2NO_2)$

C. N_2O_5

D. N_2O_3

Answer: B

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35. Among NH_3, PH_{30}, AsH_3 and SbH_3 which one is a stronger reducing agent?

A. NH_3

B. PH_3

C. AsH_3

D. SbH_3

Answer: D

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36. When zinc reacts with very dilute HNO_3, the oxidation state of nitrogen changes from:

A. $+5$ to +1

B. $+5$ to -3

C. $+5$ to +4

D. $+5$ to +3

Answer: B

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37. The correct order of thermal stability of hydrides of group 15 is

A. $NH_3 > PH_3 > AsH_3$

B. $NH_3 < PH_3 < AsH_3$

C. $NH_3 > PH_3 < AsH_3$

D. $NH_3 < PH_3 > AsH_3$

Answer: A

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38. The products formed by complete hydrolysis of PCl_3 are:

A. H_3PO_3 and HCl

B. $POCl_3$ and HCl

C. H_3PO_4 and HCl

D. $H_4P_2O_7$ and HCl

Answer: A

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39. When a sample of NO_2 is placed in a container, this equilibrium is rapidly estabilished.

$2NO_2(g) \Leftrightarrow H_2O_4(g)$

Iff this equilibrium mixture is a darker colour at high temperatures annd at low pressure, which of these statements about the reaction is true?

A. The reaction is exothermic and NO_2 is darker in colour than N_2O_4

B. The reaction is exothermic and N_2O_4 is darker in colour than NO_2

C. The reaction is endothermic and NO_2 is darker in colour than N_2O_4

D. The reaction is endothermic and N_2O_4 is darker in colour than NO_2

Answer: A

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40. Thermal decompostion of ammonium dichromate produces gas and steam.

A. NH_3, Cr_2O_3 and H_2O

B. N_2, Cr_2O_3 and H_2O

C. NO, CrO_3 and H_2O

D. N_2O, CrO_3 and H_2O

Answer: B

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41. Which of the following halide undergoes in hydrolysis via S_{N^1} reaction?

A. BCl_3

B. NF_3

C. NCl_3

D. $AsCl_3$

Answer: B

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42. Which of the following compound does not give oxyacid of central atom on hydrolysis?

A. $SlCl_4$

B. NCl_3

C. PCl_3

D. PCl_5

Answer: B

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43. In which process does the nitrogen undergo oxidation?

A. $N_2 \rightarrow 2NH_3$

B. $N_2O_4 ot 2NO_2$

C. $NO_3^- \rightarrow N_2O_5$

D. $NO_2^- \rightarrow NO_3^-$

Answer: D

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44. For which element would XH_3 be a stable species:

A. C

B. Si

C. P

D. S

Answer: C

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45. $S - O$ bond length is maximum in:

A. $SOBr_2$

B. $SOCl_2$

C. SOF_2

D. $SO(CH_3)_2$

Answer: D

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46. In case of hydride of oxyge family, which of the following physical property change regularly on moving down the group

A. Melting point

B. Thermal stability

C. Boiling point

D. Critical temperature

Answer: B

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47. When $KHSO_4$ is added into a concentrated solution of H_2SO_4 the acidity of the solution.

A. Increases

B. decreases

C. remains constant

D. can't be predicted

Answer: B

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48. Hydrolysis of one mole of peroxodisulphuric acid produces

A. two moles of sulphuric acid

B. two moles of peroxomono-sulphuric acid

C. one mole of sulphuric acid, one mole of peroxomono-sulphuric acid

D. one mole of sulphuric acid, one mole of peroxomono-sulphuric acid and one mole of hydrogen peroxide

Answer: C

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49. In trimer form of sulphurc trioxide, each sulphur atom s bonded with:

A. four oxygen atoms

B. three oxygenn atoms

C. two oxygen atoms

D. two sulphur atoms

Answer: A

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50. Sodium thiosulphate is formed when:

A. SO_2 is boiied into Na_2S

B. Na_2SO_3 is boiled withh elemental sulphur

C. $H_2H_2O_3$ is neutralised by NaOH

D. Na_2SO_4 is reduced by zinc dust

Answer: B::C

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51. $K_4\left[Fe(CN)_6\right]$ reacts with ozone is give:

A. Fe_2O_3

B. $Fe(OH)_2$

C. $K_3\left[Fe(CN)_6\right]$

D. KNO_3

Answer: C

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52. The dipole moment of H_2O_2 is more than that of H_2O but H_2O_2 is not a good solvent because :

A. It has a very high dielectric constant so that ionic compounds cannot be dissolved in it

B. it does not act as an oxidising agent

C. it acts as a reducing agennt

D. it dissociates easily ad acts as an oxidising agent in chemical reactions

Answer: D

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53. The correct increasing order of acidity is:

A. $CO_2 > H_2O_2 > H_2O$

B. $H_2O < H_2O_2 < CO_2$

C. $H_2O < H_2O_2 > CO_2$

D. $H_2O_2 > CO_2 > H_2O$

Answer: B

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54. In which cases, the order of acidic strength is not correct ?

A. $HI > HBr > HCl$

B. $HIO_4 > HBrO_4 > HClO_4$

C. $HClO_4 > HClO_3 > HClO_2$

D. $HF_2 > H_2O > NH_3$

Answer: B

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55. Concentrated HNO_3 reacts with iodine to give:

A. HOI

B. HI

C. $HOIO_2$

D. $HOlO_3$

Answer: C

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56. Thermally most stable compound is:

A. $HOClO_3$

B. $HOClO_2$

C. $HOCl$

D. $HOClO$

Answer: A

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57. Which of the following halogen oxide is used for estimation of carbon monoxide in automobile exhaust gases?

A. Cl_2O_7

B. I_2O_5

C. ClO_2

D. BrO_3

Answer: B

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58. The intergalogen which does not exist is:

A. IF_5

B. ClF_3

C. $BrCl$

D. ICl_4

Answer: D

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59. Which of the following halogen disproportionates in water?

A. F_2

B. Cl_2

C. I_2

D. all three

Answer: B

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60. Which of the following is correct statement?

A. F_2 has higher dissociation energy than Cl_2

B. F has higher electron affinity than Cl

C. HF is stronger acid than HCl

D. Boiling point increases down the group in halogens

Answer: D

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61. Only iodine forms hepta-fluroide IF_7, but chlorine and bromine give penta-flurorides. The reason for this is:

A. low electron affinity of iodine

B. unusual pentagonal bypyramidal structure of IF_7

C. that the larger iodine atom ca accommodate more number of smaller fluroine atom around it

D. lwo chemical ractivity of IF_7

Answer: C

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62. Acid used for making permanent markings on the glass surface is.

A. HNO_3

B. HF

C. HIO_3

D. H_2SO_4

Answer: D

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63. The unfavourable electrochemical reaction among the following is:

A. $Zn + H_2SO_4 \rightarrow ZnSO_4 + H_2$

B. $KKI + Cl_2 \rightarrow KCl + I_2$

C. $KCl + I_2 \rightarrow KI + ICl$

D. $Al + 3HCl \rightarrow AlCl_3 + \frac{3}{2}H_2$

Answer: C

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64. Which anion can undergo both oxidation and reduction?

A. $Cr_2O_7^{2-}$

B. NO_3^-

C. OCl^-

D. S^{2-}

Answer: C

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65. In the series HCl, HBr and HI, the boiling point increases in the order $HCl < HBr < HI$. Thiis is due to:

A. HI is the strongest acid among the series

B. HI is the strongest reducing agent among the series

C. higherr van der waals' forces of attraction in HI

D. intermolecular H-bonding in HI

Answer: C

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66. Which factor is most responsible for the increase in boiling points of noble gases from He to Xe?

A. Decrease in I.E.

B. Monoatomic nature

C. Decrease in polarisability

D. Increase in polarisability

Answer: D

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67. The compound that cannot be formed by xenon is:

A. XeO_3

B. XeF_4

C. $XeCl_4$

D. XeO_2F_2

Answer: C

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68. Noble gases can be separated by:

A. passing them through suitable solution

B. electrolysis of their fluorides

C. adsorption and desorption on charcoal

D. adsorption annd desorption on activated hydrogen

Answer: C

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69. Which of the following xenon compound has the same number of lone pairs as in I_3^- ? (near central atom)

A. XeO_4

B. XeF_4

C. XeF_2

D. XeO_3

Answer: C

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70. Incorrectly matched characteristic is:

A. S_8: Covalent lattice

B. P_4: Tetrahedron

C. S_4^{2-} : Zig-Zig

D. SiO_2: Covalent lattice

Answer: A

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71. Which is wrong statement?

A. The decreasing order of thermal stability is

$$CsOH > RbOH > KOH > NaOH$$

B. The decreasing order of bond angle is $BF_3 > PF_3 > ClF_3$

C. The decreasing order of bond dissociation energy is

$$Cl_2 > Br_2 > F_2 > I_2$$

D. The decreasing order of melting point is

$$NH_3 > (CH_3)_2NH > CH_3NH_2 > (CH_3)_3N$$

Answer: D

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72. Which of the following has been arranged in orderr of decreasing bond dissociation energy:

A. $P-O>Cl-O>S-O$

B. $P-O>S-O>Cl-O$

C. $S-O>Cl-O>P-O$

D. $Cl-O>S-O>P-O$

Answer: D

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Level 2

1. $BX_3+NH_3 \xrightarrow{B.T.} BX_3 \cdot NH_3$+Heat of adduct formation (ΔH)

The numberical value of ΔH is found to be maximum for:

A. BF_3

B. BCl_3

C. BBr_3

D. BI_3

Answer: D

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2. Which is the following properties describes the diagonal relationship boron and silicon?

A. BCl_3 is not hydrolysed while $SiCl_4$ can be hydrolysed

B. Both form oxides B_2O_3 is amphoteric and SiO_2 is acidic

C. Both metals dissolve in cold and dilute nitric acid

D. Silicide and boride salts are hydrolysed by water

Answer: D

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3. Anhydrous $AlCl_3$ is covalent however, when it is dissolved in water hydrated ionic species are formed. This transformation is owing to:

A. the trivalent state of Al

B. the large hydration energy of Al^{3-}

C. the low hydration enegy of Al^{3+}

D. the polar nature of water

Answer: B

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4. Borax in its crystal posses:

A. 3 tetrahedral unit

B. 2 tetrahedral and 2 planar triangular units

C. 3 tetrahedral and 2 planar triangular units

D. all tetrahedral units

Answer: B

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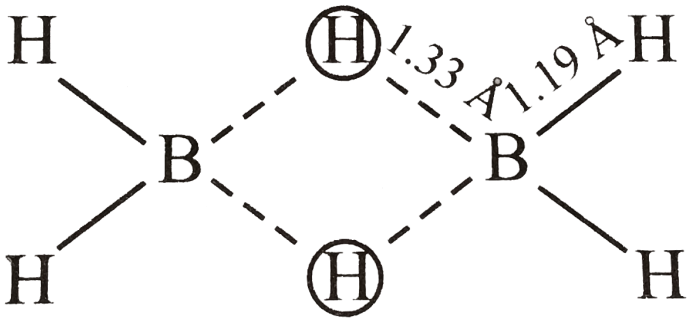
5. The molecular shapes of diborane is shown below :



Consider the following statements for diborane :

(i) Boron is approximately sp^3 hybridised.

(ii) $B-H-B$ angle is 180°

(iii) There are two terminal $B-H$ bonds for each boron atom.

(iv) There are only 12 bonding electrons available of These statements :

A. 1,3 and 4 are correct

B. 1,2 nd 3 are correct

C. 2,3 and 4 are correct

D. 1,2 and 4 are correct

Answer: A

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6. Alumiium vessels should not be washed with materials containing washing soda because:

A. washing soda reacts with aluminium to form soluble aluminate

B. washing soda is expensive

C. washing soda is easily decomposed

D. washing soda reacts with aluminium to form insoluble aluminium oxide

Answer: A

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7. Which of the following statements about anhydrous aluminium chloride is correct?

A. It can exist as $AlCl_3$ molecule in vapour

B. it is a strong Lewis base

C. It sublimes at $180^\circ C$ under vacuum

D. it is not easily hydrolysed

Answer: A::C

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8.

$$Na_2B_4O_7.10H_2O \xrightarrow{\text{Heat}} X + NaBO_2 + H_2O, X + Cr_2O_3 \xrightarrow{\text{Heat}} \underset{(\text{Green coloured})}{Y}$$

X and Y are :

A. Na_3BO_{30} and $Cr(BO_2)_3$

B. $Na_2B_4O_7$ and $Cr(BO_2)_3$

C. B_2O_3 and $Cr(BO_2)_3$

D. B_2O_3 and $CrBO_3$

Answer: C

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9. Borax is converted into amorphous Boron by following steps

$$\text{Borax} \xrightarrow{X} H_3BO_3 \xrightarrow{\triangle} B_2O_3 \xrightarrow[\triangle]{Y} B$$

X and Y are respectively

A. HCl, Mg

B. HCl, C

C. C, Al

D. HCl, Al

Answer: D

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10. The dissolution of $Al(OH)_3$ by a solution of $NaOH$ results in the formation of

A. $\left[Al(H_2O)_4(OH)_2\right]^+$

B. $\left[Al(H_2O)_3(OH)_3\right]$

C. $\left[Al(H_2O)_2(OH)_4\right]^-$

D. $\left[Al(H_2O)_6(OH)_3\right]$

Answer: C

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11. Choose the correct sequence for the geometry of the given molecules Borazon, Borazole,$B_3O_6^{3-}$, trimer of FCN.

['P' stands for planer and 'NP' standes for non-planer]

A. NP,NP,NP,P,P

B. P,P,NP,NP,P

C. NP,NP,NP,P,NP

D. NP,P,P,NP,P

Answer: D

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12. What is not true about borax ?

A. It is a useful primary standard for titrating against acids

B. one mole of borax contains 4B-O-B bonds

C. Aqueous solution of borax can be used as buffer

D. it is made up of two triangular BO_3 units and two tetrahedral BO_4 units

Answer: B

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13. How can the following reaction be made to proceed in forward direction ?

$B(OH)_3 + NaOH \Leftrightarrow Na\left[B(OH)_4\right].$

A. Addition of cis 1,2 diol

B. addition of borax

C. addition of trans 1,2 diol

D. addition of Na_2HPO_4

Answer: A

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14. Which of the following catio can not give bead test?

A. Cr^{3+}

B. Co^{2+}

C. Ag^{+}

D. Mn^{2+}

Answer: C

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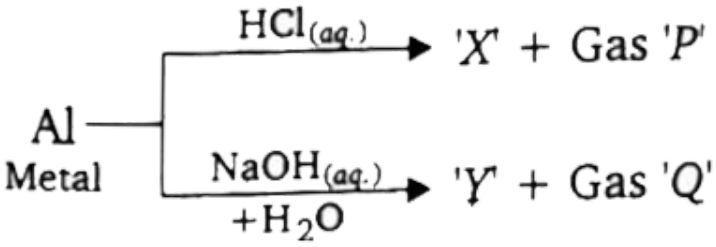
15.



The incorrect statement regarding above reactions is:

A. Al shows amphoteric character

B. Gas 'P' and 'Q' are different

C. Both X and Y are water soluble

D. Gas Q is inflammable

Answer: B

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16. The incorrect statement regarding 'X' in given reaction is:

$$BF_3 + LiAlH_4 \rightarrow \overset{\text{Ether}}{\longrightarrow} (X) + LiF + AlF_3$$

A. Twelve electrons are involved in bonding

B. Four, two centre-two electron bonds

C. Two, three centre-two electron bonds

D. X does not react with NH_3

Answer: D

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17. The incorrect stability order of +3 and +1 states of 13th group elements (boron family) is:

A. $Ga^{3+} < In^{3+} < Tl^{3+}$

B. $Tl^{+} > Tl^{3+}$

C. $Ga^{+} < In^{+} < Tl^{+}$

D. $Ga^{3+} > Ga^{+}$

Answer: A

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18. Consider the following route of reaction:

$$R_2SiCl_2 + \text{water} \rightarrow (A) \xrightarrow{\text{Polymerisation}} (B)$$

Compound(B) in above reaction is:

A. Dimer silicone

B. Linear silicone

C. Cross linked silicon

D. Polymerisation of (A) does not occur

Answer: B

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19. The most basic oxide of elements group 14 of the periodic table is:

A. SiO_2

B. GeO_2

C. SnO_2

D. PbO

Answer: D

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20. $(Si_2O_5)_n^{2n-}$ anion is obtained when:

A. no oxygen of a SiO_4^{4-} tetrahedron is shared with another SiO_4^{4-} tetrahedron

B. one oxygen of a SiO_4^{4-} tetrahedron is shared with another SiO_4^{4-} tetrahedron

C. two oxygen of a SiO_4^{4-} tetrahedron are shared with another SiO_4^{4-} tetrahedron

D. Three oxygen of a SiO_4^{4-} tetrahedron are shared with another SiO_4^{4-} tetrahedron

Answer: D

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21. Amphilbole silicate structure has 'x' number of corner shared per tetrahedron. The value of x is :

A. 2

B. $2\frac{1}{2}$

C. 3

D. 4

Answer: B

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22. The silicate ion in the mineral kinoite is a chain of three SiO_4^{4-} tetrahedral that share corners with adjacent tetrahedral. The mineral also contains Ca^{2+} ions, Cu^{2+} ions and water molecules in $1:1:1$ ratio. The mineral is represented as

A. $CaCuSi_3O_{10} \cdot H_2O$

B. $CaCuSi_3O_{10} \cdot 2H_2O$

C. $Ca_2Cu_2Si_3O_{10} \cdot 2H_2O$

D. none of these

Answer: C

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23. Choose the correct order of C-C bond length in the given compounds:

A. Acetylene $<$ ethylene $<$ graphite $<$ benzene $<$ ethane

B. acetylene $<$ ethylene $<$ benzene $<$ graphite $<$ ethane

C. acetylene $<$ graphite $<$ ethylene $<$ benzene $<$ ethane

D. acetylene $<$ benzene $<$ graphite $<$ entylene $<$ ethane

Answer: B

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24. Silicate having one monovalent corner oxygen atom in each tetrahedron unit is

A. sheet silicate

B. cyclic silicate

C. single chain silicate

D. double chain silicate

Answer: A

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25. In which of the following silicates, only two corners per tetrahedron are shared ?

I. Pyrosilicate

II. Cyclic silicate

III Double chain silicate

IV Single chain silicate

V 3D Silicate

A. (i),(ii) and (iv)

B. (iv) and (vi) only

C. (i) and (vi) only

D. (ii) and (iv) only

Answer: D

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26. The correct code for stability, of oxidation states for given cations is:

(i) $Pb^{2+} > Pb^{4+}, Tl^{+} < Tl^{3+}$

(ii) $Bi^{3+} < Sb^{3+}, Sn^{3+} < Sn^{4+}$

(iii) $Pb^{3+} > Pb^{4+}, Bi^{3+} > Bi^{3+}$

(iv) $Tl^{3+} < \ln^{3+}, Sn^{2+} > Sn^{4+}$

(v) $Sn^{2+} < Pb^{2+}, Sn^{4+} > Pb^{4+}$

(vi) $Sn^{2+} < Pb^{2+}, Sn^{4+} < Pb^{4+}$

A. (v) and (vi)

B. (i), (iii) and (vi)

C. (iii) and (v)

D. (ii) and (iv)

Answer: C

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27. Nitrogen gas is liberated by thermal decomposition of:

A. NH_4NO_2

B. NaN_3

C. $(NH_4)_2Cr_2O_7$

D. all

Answer: D

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28. Two oxides of Nitrogen, NO and NO_2 reacts together at 253 K and form a compound Nitrogen X.X reacts with water to yield another compound of Nitrogen Y. The shape of the anion of Y molecule is

A. triangular planar

B. triangular pyramidal

C. tetrahedron

D. square planar

Answer: A

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29. Consider the following sequence of reaction:

$$Na + NH_3(g) \rightarrow [X] \xrightarrow{N_2O} [Y] \xrightarrow{Heat} \underset{\text{Gas pure}}{[Z]}$$

Identify [Z] gas:

A. N_2

B. NH_3

C. O_2

D. H_2

Answer: A

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30. Which of the following oxyacid contains both P-H and P-P bond simultaneously?

A. $H_4P_2O_5$

B. $H_4O_2O_7$

C. $H_4O_2O_6$

D. none

Answer: D

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31. Among the following statement which one is true?

A. NH_3 is less soluble than PH_3 in water

B. NH_3 is stronger base and stronger reducing agent than PH_3

C. NH_3 has higher boiling point than PH_3 and has lower melting point than PH_3

D. PH_3 is stronger reducing agent than NH_3 and it has lower critical temperature than NH_3

Answer: D

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32. Which of the following statements regarding N_2O_4 is/are correct?

A. It is a planar molecule

B. It is used as non-aqueous solvent

C. It involves N-N bond which is larger than that N-N bond in hydrazine

D. Ammonium nitrate in N_2O_4 acts as a base

Answer: C

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33. Which of the following on heating produces NO_2 ?

A. $NaNO_3$

B. $AgNO_3$

C. NH_4NO_3

D. NH_4NO_2

Answer: B

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34. Which of the following equation is incorrectly written?

A. $P_4 + 20HNO_3 \rightarrow 4H_3PO_4 + 20NO_2 + 4H_2O$

B. $I_2 + 10HNO_3 \rightarrow 2HIO_4 + 10NO_2 + 4H_2O$

C. $S + 6HNO_3 \rightarrow H_2SO_4 + 6NO_2 + 2H_2O$

D. none of the above

Answer: B

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35. The cyclotrimetaphosphoric acid is:

A. $(HPO_3)_5$ and contains 9σ-bonds

B. $H_3P_3O_6$ and contains $12\sigma -$ bonds

C. $(HPO_3)_3$ and contains 15σ-bonds

D. $H_3P_3O_9$ and contains 18σ-bonds

Answer: C

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36. $A + H_2O \rightarrow B + HCl$

$B + H_2O \rightarrow C + HCl$

Compound (A), (B) and (C) will be respectively:

A. $PCl_5, POCl_3, H_3PO_3$

B. $PCl_5, POCl_3, H_3PO_4$

C. $SOCl_2, POCl_3, H_3PO_3$

D. $PCl_3, POCl_3, H_3PO_4$

Answer: B

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37. It is recommended that ammonia bottles be opened after cooling in ice for sometime. This is because

A. brings tears in the eyes

B. is a corrosive liquid

C. is a mild explosive

D. generates high vapour pressure

Answer: D

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38. Which of the following statements are correct about the reaction between the copper metal and dilute HNO_3?

A. I,II,III

B. I,III

C. III,IV

D. All the above

Answer: A

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39. In which of the following acids, P-P bonds is present?

A. Tetra poly phosphoric acid $(H_6P_4O_{13})$

B. Pyrophosphoric acid $(H_4P_2O_7)$

C. Hypophosphoric acid $(H_4P_2O_6)$

D. Polymetaphosphoric acid $(HPO_3)_\pi$

Answer: C

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40. $NH_3 + O_2 \xrightarrow[\Delta]{Pt} A + H_2O$

$A + O_2 \rightarrow B,$

$B + O_2 + H_2O \rightarrow C$

A, B and C are:

A. N_2O, NO_2 and HNO_3

B. NO, NO_2 and HNO_3

C. NO_2, NO and HNO_3

D. N_2O, NO and HNO_3

Answer: B

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41. The formation of PH_4^+ is diffficult compaired to NH_4^+ because:

A. lone pair of phosphorus is optically inert

B. lone pair of phosphorus resides in almost pure p-orbital

C. lone pair of phosphorus resides at sp^3 orbital

D. lone pair of phosphorus resides in almost pure s-orbitals

Answer: D

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42. Nitrozen (i) oxide is produced by

A. thermal decomposition of sodium nitrite at low temperature

B. thermal decomposition of ammonium nitrite

C. disproportionation of N_2O_4

D. interaction of hydroxyl amine and nitrous acid

Answer: D

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43. Amongst the following compounds

(I) $H_5P_3O_{10}$

(II) $H_6P_4O_{13}$

(III) $H_5P_5O_{15}$

(IV) $H_7P_5O_{16}$

non-cyclic phosphates are:

A. I,III

B. I,II,III

C. I,II,IV

D. I,II,III,IV

Answer: C

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44. Match List-I with List-II and select the correct answer using the codes given below the lists:

List-I (Compounds)	List-II (used in)
(A) $BaSO_4 + ZnS$	(1) Explosive
(B) NI_3	(2) Oxidiser in rocket propellants
(C) N_2O_4	(3) Space capsule
(D) KO_2	(4) Pigment

A. A-3,B-1,C-4,D-2

B. A-4,B-1,C-2,D-3

C. A-3,B-4,C-1,D-2

D. A-4,B-3,C-2,D-1

Answer: B

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45. Which is the correct sequence in the following properties. For the correct order mark (T) and for the incorrect order mark (F):

(a)Acidity order $: SiF_4 < SiCl_4 < SiBr_4 < SiI$ (b)Melting point : N

(c)Boiling point $: NH_3 > SbH_3 > AsH_3 > PH_3$ (d)Dipole moment o

A. FTFT

B. TFTF

C. FFTT

D. FFTF

Answer: A

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46. An orange solid (X) on heating, gives a colourless gas (Y) and a only green residue (Z). Gas (Y) on treatment with Mg, produces a white solid substance.....

A. Mg_2N_2

B. MgO

C. Mg_2O_3

D. $MgCl_2$

Answer: A

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47. Calcium imide on hydrolysis will give gas (B) which on oxidation by beaching powder gives gas (C) gas (C) on reaction with magnesium give compound (D). (D) on hydrolysis gives gas (B). (B), (C) and (D) are

A. NH_3, N_2, Mg_3N_2

B. N_2, NH_3, $MgNH$

C. N_2, N_2O_5, $Mg(NO_3)_2$

D. NH_3, NO_2, $Mg(NO_2)_2$

Answer: A

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48. Among the following compounds, which on heating do not produce N_2 ?

A. $(NH_4)_2Cr_2O_7$

B. $NH_4Cl + NaNO_2$

C. $NH_4Cl + CaO$

D. $Ba(N_3)_2$

Answer: C

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49. In which of the following compounds hydrolysis tkes plcae through S_{N^1} and S_{N^2} mechanism respectively?

A. NF_3, NCl_3

B. P_4O_{10}, $SiCl_4$

C. SF_4, TeF_6

D. $SiCl_6$, SiF_4

Answer: A

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50. Incorrect statement about PH_3 is:

A. it is produced by hydrolysis of Ca_3P_2

B. It gives black ppt. (Cu_3P_2) with $CuSO_4$ solution

C. Spontaneously burnns in presence of P_2H_4

D. it does not react with B_2H_6

Answer: D

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51. Which of the following compound does not give oxyacid of central atom on hydrolysis?

A. BF_3

B. NCl_3

C. SF_4

D. PCl_5

Answer: B

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52. The incorrect statement regarding 15th group hyrides (EH_3). $[E = N, P, As, Sb, Bi]$

A. $NH_3 > PH_3 > AsH_3 > SbH_3 > BiH_3$:Thermal stability

B. $N-H>P-H>As-H>Sb-H>Bi-H, E-H$ bond dissociation enthalpy

C. $NH_3>PH_3>AsH_3>SbH_3>BiH_3$: Reducing character

D. $NH_3>PH_3>AsH_3>SbH_3>BiH_3$: Basicity

Answer: C

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53. Calculate x+y+z for H_3PO_3 acid, where x is number of lone pairs, y is number of σ-bonds and z is number of π-bonds

A. 5

B. 14

C. 13

D. 12

Answer: C

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54. A non-metal M forms MCl_3, M_2O_5 and Mg_3M_2 but does not form MI_5, then incorrect statement regarding non-metal M is

A. M can form mutiple bond

B. M is of second period element

C. Atomicity of non-metal is 4

D. The range of oxidation number for M is -3 to +5

Answer: C

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55. The incorrect order is:

A. Thermal stabilityy: $HF > HCl > HBr$

B. Lewis basic character $PF_3 < PCl_3 < PBr_3$

C. %p-character: $NO_2^+ > NO_3^- > NH_3^+$

D. Bond angle: $NH_3 > PH_3 > AsH_3$

Answer: C

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56. The correct order of S-S bond length in following oxyanions is:

$S_2O_4^{2-}$

(II) $S_2O_5^{2-}$

(III) $S_2O_6^{2-}$

A. $I > II > III$

B. $I > III > II$

C. $III > II > I$

D. $III > I > II$

Answer: A

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57. In which of the following reaction product does not contian 'peroxoy' linakge?

A. $2OF \xrightarrow{\text{Dimerisation}}$

B. $H_4P_2O_8 \xrightarrow{+H_2O}$

C. $2Na \xrightarrow[\Delta]{\text{excess } O_2}$

D. none of these

Answer: A

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58. Consider the following statements in respect of oxides of sulphur:

(1) in gas phase SO_2 molecule is V_shape.

(2) In gas phase SO_3 molecule is planar.

(3) $\gamma - SO_3$ is cyclic trimer.

Which of the above statements are correct?

A. 1 and 2 only

B. 2 and 3 only

C. 1 and 3 only

D. 1,2 and 3

Answer: D

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59. Gas that can not be collected over water is:

A. N_2

B. O_2

C. SO_2

D. PH_3

Answer: C

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60. In thiosulphuric acid:

A. each sulphur atom is in identical oxidation state

B. there is a s=S linkage present

C. one S atom is in +2 and other sulphur atom is in +4 oxidation state

D. there is only one replaceable hydrogen atom

Answer: B

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61. One gas bleaches the colour of flowers by reduction, while the other by oxidation, the two gases respectively are:

A. CO and Cl_2

B. H_2S and Br_2

C. NH_3 and SO_3

D. SO_2 and Cl_2

Answer: D

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62. Which of the following halides cannot be hydrolysed at room temperature?

(I) TeF_6

(II) SF_6

(III) NCl_3

(IV) NF_3

Choose the correct code:

A. III and IV

B. I, II and III

C. I, II and IV

D. II and IV

Answer: D

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63. By which of the following methods, H_2O_2 can't be synthesised?

A. Lewis addition of ice cold H_2SO_4 on BaO_2

B. Addition of ice cold H_2SO_4 on PbO_2

C. Aerial oxidation of 2-ethyl anthraquinol

D. Electrolysis of $(NH_4)_2SO_4$ at a high current density

Answer: B

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64. Give the correct order of initials T or F for following statements. Use T if statements is true and F if if false.

(I) Number of $S-S$ bond in $H_2S_nO_6$ are $(n+1)$

(II) When F_2 reacts with water gives HF, O_2 and O_3

(III) $LiNO_3$ and $BaCl_2$ compounds are used in the fire works

(IV) Be and Mg hydrides are ionic and polymeric

A. FTTF

B. FTTT

C. TFTT

D. TTFF

Answer: A

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65. Which of the following parent acid(s) does/do not have corresponding hypo-oxyacid?

A. H_2SO_2

B. HNO_2

C. H_3PO_3

D. $HClO_3$

Answer: D

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66. Which pair of elements cann from multiple bond with itselff and oxygen?

A. F,N

B. N,Cl

C. N,Br

D. N,C

Answer: D

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67. Consider the following reactions:

(i) $PCl_3 + 3H_2O \rightarrow H_3PO_3 + 3HCl$

(ii) $SF_4 + 3H_2O \rightarrow H_3SO_3 + 4HF$

(iii) $BCl_3 + 3H_2O \rightarrow H_3BO_3 + 3HCl$

(iv) $XeF_6 + 3H_2O \rightarrow XeO_3 + 6HF$

Then according to given information the incorrect statement is:

A. During the (i) reaction the hybridisation of 15th group element does not change

B. During the (ii) reaction the hybridisation of 16th group element does not change

C. During the (iii) reaction the hybridisation of 13th group element does not change

D. During the (iv) reaction the hybridisation of 18th group element does not change

Answer: D

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68. Consider the oxy acids $HClO_n$ series here value of n is 1 to 4. then incorrect statement regarding these oxyacids Is:

A. Acidic character of oxy acids increases with increasing value of n.

B. Oxidising power of oxy acids increases with decreasing value of n

C. thermal stability of oxy acids decreases with increasing value of n.

D. Cl-O' bond order decreases with decreasing value of n

Answer: C

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69. The correct statement regarding ClO_n^- molecular ion is:

A. On decreasing value of 'n', $Cl - O$ bond order increases

B. On increasing value of 'n', Cl-O bond length increases

C. On increasing value of n, oxidation number of central atom increases

D. On increasing value of n, hybrid orbitals on central atom increases

Answer: C

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70. In, $Cl_2O_6(l) + HF \rightarrow P + Q$

If H^- of acid HF attraches with Q, then correct option of hybridization of Cl-atom and $\angle OClO$ in the P and Q ions:

A. $P: sp^2, \ > 120^\circ$

B. $Q: sp^3: 109^\circ 28'$

C. $P: sp^3, \ < 109^\circ 28'$

D. $Q: sp^3, \ > 109^\circ 28'$

Answer: B

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71. Bromine is commercially prepared from sea water by displacement reaction

$Cl_2 + 2Br^-(aq) \rightarrow 2Cl^-(aq) + Br_2$

Br_2 gas thus formed is dissolved into solution of Na_2CO_3 and then pure Br_2 is obtained by treatment of the solution with:

A. $Ca(OH)_2$

B. $NaOH$

C. H_2SO_4

D. HI

Answer: C

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72. Which of the following properties of halogens increase with increasing atomic number?

(I) Ionization energy

(II) Ionic radius

(III) Bond energy of the X_2 molecule

(IV) Enthalpy of vaporisation

A. I,II,III

B. I,III

C. II,IV

D. IV

Answer: C

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73. Predict the correct product when Cl_2 passed through $H - \overset{18}{O} - \overset{18}{O} - H$ solution.

A. $H^+ + Cl^- + O_2$ (both oxygen having 18)

B. HOCl and $HClO_2$ (all oxygen having 18)

C. $HClO_4$ and HCl (all oxygen having 18)

D. Cl_2O and H_2O (all oxygen having 18)

Answer: A

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74. $Cl_2(g) + Ba(OH)_2 \rightarrow X(aq.) + BaCl_2 + H_2O$

$X + H_2SO_4 \rightarrow Y + BaSO_4$

$Y \underset{\Delta > 365K}{\overset{\Delta}{Z}} + H_2O + O_2$

Y and Z are respectively:

A. $HClO_4, ClO_2$

B. $HClO_3, ClO_2$

C. $HClO_3, ClO_6$

D. $HClO_4, Cl_2O_7$

Answer: B

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75. Auto-oxidation of bleaching powder gives:

A. only calcium chlorate

B. only calcium chloride

C. only calcium hypochlorite

D. both (a) and (b)

Answer: D

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76. Which is incorrectly matched?

A. $I_4O_9 \Leftrightarrow I^{3+} + 3IO_3^-$

B. $I_2O_4 \Leftrightarrow IO^+ + IO_3^-$

C. $CsBr_3 \Leftrightarrow Cs^+ + Br_3^-$

D. none of these

Answer: D

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77. The three elements X,Y and Z with electronic configuration shown below al form hydrides:

Element	Electronic configuration
X	$1s^2 2s^2 2p^2$
Y	$1s^2 2s^2 2p^6 3s^1$
Z	$1s^2 2s^2 2p^6 3s^2 3p^6 3d^{10} 4s^2 4p^5$

Which set of properties match correctly with properties of the hydrides of these elements:

A. Hydride of X- Colourless gas insoluble in H_2O, Hydride of Y-Silver/grey solid reacts with H_2O to form an alkali

Hydride of Z-Colourless gas forms a strong acid in H_2O

B. Hydride of X-Colourless liquid, no reaction with H_2O, Hydride of Y-Silver/grey solid forms H_2 and H_2O, Hydride of Z-Ionic solid with formula ZH

C. Hydride of X-Non-polar compound reacts with Cl_2 in light, Hydride of Y-Silver/grey ionic solid with formula YH_2,Hydride of Z-Forms when water is added to phosphorus and elemental Z.

D. Hydride of X-Colourless gas which burns with air, Hydride of Y-Silver/grey solid which reacts violently with acids, Hydride of Z-Colourless, corrosive liquid at STP

Answer: A

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78. The incorrect order is:

A. $HF < HCl < HBr < HI$: Acidic strength

B. $HF > HCl > HBr > HI$: Thermal stability

C. $HF > HCl > HBr > HI$: Boiling point

D. $HF > HCl > HBr > HI$: bond dissociation enthalpy

Answer: C

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79. The correct statement regarding perxenate ion $\left(XeO_6^{4-}\right)$ is:

A. it is polar species

B. it is a planar species

C. Xe-O' bond order is 1.33

D. Molecular ion has only one type of bond angle

Answer: C

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80. XeF_2 and XeF_6 are separately hydrolysed then:

A. both give out O_2

B. XeF_6 gives O_2 and does not

C. XeF_2 along gives O_2

D. Neither of them gives HF

Answer: C

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81. $Mf + XeF_4 \rightarrow M^+A^-\left(M^+ - \right.$ alkali metal cation) The state of hybridisation of the central atom in A and sphere of the species are:

A. sp^3d, TBP

B. sp^3d^3, distorted octahedral

C. sp^3d^3, pentagonal planar

D. No compound formed at all

Answer: C

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82. Xenon tetrafluoride, XeF_4 is:

A. tetrahedral annd acts as a fluoride donor with SbF_5

B. square planar and acts as a fluoride donor with PF_5

C. square planar and acts as fluoride donor with NaF

D. see-saw shape and acts as a fluoride donor with AsF_5

Answer: B

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83. XeF_6 dissolves in anhydrous HF to give a good conducting solution which contains:

A. H^+ and XeF_7^- ion

B. HF_2^- and XeF_5^+ ions

C. $HXeF_6^+$ and F^- ions

D. none of these

Answer: B

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84. Which of the following is not true about helium ?

A. it has the lowest boiling point

B. it has the highest first ionization energy

C. it can diffuse through rubber and plastic material

D. it can form clathrate compounds

Answer: D

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85. SbF_5 reacts with XeF_4 to form an adduct. The shapes of cation and anion in the adduct are respectively:

A. square planar, trigonal bipyramidal

B. T-shaped, octahedral

C. square pyramidal, octahedral

D. square planar, octahedral

Answer: B

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86. Consider the followingg transformations:

(I) $XeF_6 + NaF \rightarrow Na^+[XeF_7]^-$

(II) $2PCl_5(s) \rightarrow [PCl_4]^+[PCl_6]^-$

(III) $\left[Al(H_2O)_6\right]^{3+} + H_2O \rightarrow \left[Al(H_2O)_5OH\right]^{2+} + H_3O^+$

Possible transformations are:

A. I,II,III

B. I,III

C. I,II

D. II,III

Answer: A

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87. Which of the following is an uncommon hydrolysis product of XeF_2 and XeF_4?

A. Xe

B. XeO_3

C. HF

D. O_2

Answer: B

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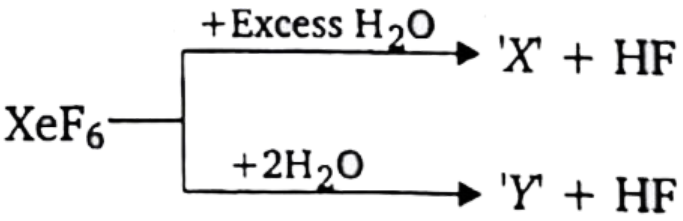
88. Incorrect statement regarding following reaction is:



A. X' is explosive

B. Y' is an oxyacid of xenon

C. Both are example of non-redox reaction

D. XeF_6 can underg partial hydrolysis

Answer: B

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89. Which of the following noble gases does not form clatherates?

A. Kr

B. Ne

C. Xe

D. Ar

Answer: B

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90. Correct order of bond angle in given species is:

A. $SiO_4^{4-} > PCl_3 > NCl_3 > SbH_3 > H_2Te$

B. $SiO_4^{4-} > NCl_3 > PCl_3 > SbH_3 > H_2Te$

C. $SiO_4^{4-} > H_2Te > SbH_3 > PCl_3 > NCl_3$

D. $NCl_3 > PCl_3 > SiO_4^{4-} > SbH_3 > H_2Te$

Answer: B

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91. The incorrect order is:

A. $N > P > As$: strength of π-bond with oxygen atom

B. $SiF_4 > SiCl_4 > SiBr_4 > SiI_4$: Thermal stability

C. $H_2S > H_2Se > H_2Te$: Arrhenious acid character

D. $CaBr_2 > MgBr_2 > BeBr_2$ Melting point

Answer: C

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92. Among the following, cyclic species are:

(I) $H_5P_3O_{10}$

(II) $\left[B_3O_3(OH)_5\right]^{2-}$

(III) $H_5P_5O_{15}$

(IV) $P_3N_3Cl_6$

A. I,III

B. I,III,IV

C. II,III,IV

D. I,II,III,IV

Answer: C

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93. The substance that has the lowest boililng point is:

A. HCl

B. H_2S

C. PH_3

D. SiH_4

Answer: D

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94. Which of the following molecule can show Lewis acidity?

(I) CO_2

(II) Br_2

(III) $SnCl_2$

(IV) HF

A. III,IV

B. I,II,III

C. I,III,IV

D. II,III,IV

Answer: B

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95. Molecule having non-pola as well as polar bonds but the molecule as a whole is polar:

A. $(SCN)_2$

B. Cl_2O_8

C. B_2Cl_4

D. I_2Cl_6

Answer: A::B

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96. Which of the following order is incorrect?

A. Lewis basic character: $NH_3 > PH_3 > AsH_3 > SbH_3$

B. Bond dissociation energy $HF > HCl > HBr > HI$

C. Thermal stability: $H_2O > H_2S > H_2Se > H_2Te$

D. Bond angle: $CH_4 > SiH_4 > GeH_4 > SnH_4$

Answer: D

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97. Which of the following does not under Lewis acid-basic reaction?

A. $CO_2 + H_2O$

B. $AlCl_3 + Cl^-$

C. $SF_6 + BF_3$

D. $B(OH)_3 + H_2O$

Answer: C

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Level 3 Passage Type

1. Each oxy-acid contains at least one X-OH unit (X is non-metal). The H-atom of X-OH unit is ionisable and the number of -OH groups directly attach to non-metal decides the basicity of oxy-acid.

Q. Which of the following oxy-acid does not have its peroxy form having two central atoms?

A. H_2SO_4

B. HNO_3

C. H_3PO_4

D. none

Answer: B

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2. Each oxy-acid contains at least one X-OH unit (X is non-metal). The H-atom of X-OH unit is ionisable and the number of -OH groups directly attach to non-metal decides the basicity of oxy-acid.

Q. Which of the following oxy-acid does not have its peroxy form having two central atoms?

A. $H_2N_2O_2$

B. $H_4P_2O_6$

C. $H_2S_2O_6$

D. H_3PO_3

Answer: A

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3. Each oxy-acid contains at least one X-OH unit (X is non-metal). The H-atom of X-OH unit is ionisable and the number of -OH groups directly attach to non-metal decides the basicity of oxy-acid.

Q. Which of the following oxy-acid does not have its peroxy form having two central atoms?

A. $S_3O_6^{2-}$

B. $Si_2O_7^{6-}$

C. $S_2O_5^{2-}$

D. none

Answer: C

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4. Formation of a bridge bond is best explained by molecular orbital theory. According to which a bridge bond is formed by filling electrons into molecular orbital which spread over three nuclei hence such bonds are speciified as three centered bond.

Q. In which of the following dimer emtpy atomic orbit of central atom of monomer does not involve in hybridization:

A. Ga_2H_6

B. Al_2Br_6

C. Be_2H_4

D. Cl_2O_6

Answer: D

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5. Formation of a bridge bond is best explained by molecular orbital theory. According to which a bridge bond is formed by filling electrons into molecular orbital which spread over three nuclei hence such bonds are speciified as three centered bond.

Q. In which of the following compound hybridization of bridging atom is differennt from hybridisation of central atom:

A. $Al_2(NH_2)_6$

B. I_2Cl_6

C. Solid $BeCl_2$

D. $Al_2(OH)_6$

Answer: B

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6. Formation of a bridge bond is best explained by molecular orbital theory. According to which a bridge bond is formed by filling electrons into molecular orbital which spread over three nuclei hence such bonds are speciified as three centered bond.

Q. Which of the following compound is having number of atoms in same plane?

A. Al_2Me_6

B. B_2H_6

C. Be_2H_4

D. C_3H_4

Answer: A

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7. (i) $P + C(\text{carbon}) + Cl_2 \rightarrow Q + COuaarr$

(ii) $Q + H_2O \rightarrow R + HCl$

(iii) $BN + H_2O \rightarrow R + NH_3 \uparrow$

(iv) $Q + LiAlH_4 \rightarrow S + LiCl + AlCl_3$

(v) $S + H_2 \rightarrow R + H_2 \uparrow$

(vi) $S + NaH \rightarrow T$

(P,Q,R,S annd T do not represent their chemical symbols)

Q. Compound Q has:

(I) zero dipole moment.

(II) a planar trigonal structure

(III) an electron deficient compound

(IV) a lewis base

Chose the correct code:

A. I,IV

B. I,II,IV

C. I,II,III

D. I,II,III,IV

Answer: C

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8. (i) $P + C(\text{carbon}) + Cl_2 \rightarrow Q + COuaarr$

(ii) $Q + H_2O \rightarrow R + HCl$

(iii) $BN + H_2O \rightarrow R + NH_3 \uparrow$

(iv) $Q + LiAlH_4 \rightarrow S + LiCl + AlCl_3$

(v) $S + H_2 \rightarrow R + H_2 \uparrow$

(vi) $S + NaH \rightarrow T$

(P,Q,R,S annd T do not represent their chemical symbols)

Q. Compound T is used as a/an:

A. oxidising agent

B. complexing agent

C. bleaching agent

D. reducing agent

Answer: D

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9. (i) $P + C(\text{carbon}) + Cl_2 \rightarrow Q + COuaarr$

(ii) $Q + H_2O \rightarrow R + HCl$

(iii) $BN + H_2O \rightarrow R + NH_3 \uparrow$

(iv) $Q + LiAlH_4 \rightarrow S + LiCl + AlCl_3$

(v) $S + H_2 \rightarrow R + H_2 \uparrow$

(vi) $S + NaH \rightarrow T$

(P,Q,R,S annd T do not represent their chemical symbols)

Q. Compound S is:

(I) an odd e^- compound

(II) $\left(2c - 3e^-\right)$ compound

(III) a electron deficient compound

(IV) a sp^2 hybridized compound

Choose the correct code:

A. III

B. I,III

C. II,III,IV

D. I,II,IV

Answer: A

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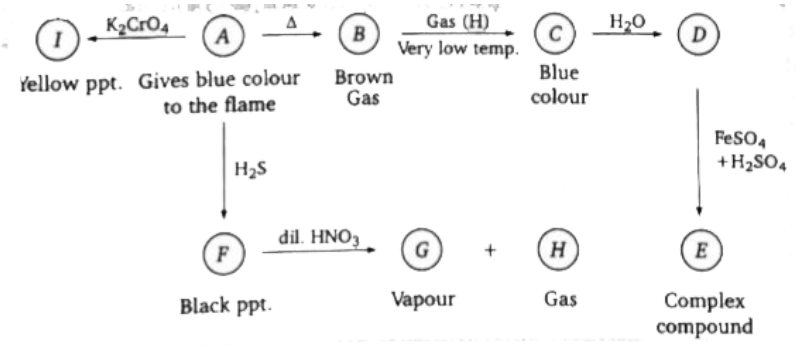

10.

Q. Compound $(D) + I^- + H^- \rightarrow$ Gas

Evolved gas is similar to:

A. Gas-B

B. Gas-G

C. Gas-H

D. None

Answer: C

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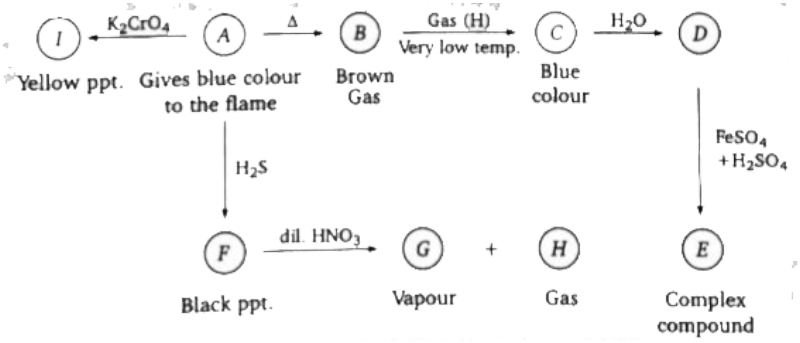

11.

Q. Yellow ppt. of compound (I) is insoluble in:

A. NaOH

B. CH_3COOH

C. dil. HNO_3

D. none

Answer: B

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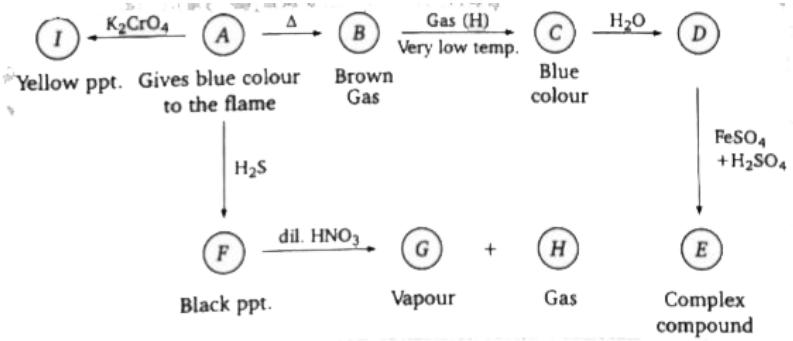

12.

Q. type of hybridization of central atomo of gas (B) is:

A. sp

B. sp^2

C. sp^3

D. no hybridization

Answer: B

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13. The following flow diagram represent the industrial preparation of nitric acid from ammonia:

$$NH_3 + \underset{(\text{excess air})}{O_2} \overset{(X)}{\underset{900^\circ C}{N}} O \xrightarrow[air]{(Y)} (Z) \xrightarrow{\text{water}} HNO_3 + NO$$

Q. Which line of entry describes the undefined reagents, products and reaction conditions?

A. X-Pt, Y-cool$(-25^\circ C)$, Z-NO_2

B. X-Ni, Y-cool $(-25^\circ C)$, Z-N_2O

C. X-Fe, Y-cool $(-11^\circ C)$, Z-NO_2

D. X-Pd, Y-high pressure, Z-N_2O_3

Answer: A

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14. The following flow diagram represent the industrial preparation of nitric acid from ammonia:

$$NH_3 + \underset{(\text{excess air})}{O_2} \overset{(X)}{\underset{900^\circ C}{N}} O \xrightarrow[air]{(Y)} (Z) \xrightarrow{\text{water}} HNO_3 + NO$$

Q. When (Z) is dissolved in H_2O then formation of HNO_3 takes place through various reactions. select the reaction not observed in this step:

A. $NO_2 + H_2O \rightarrow HNO_3 + HNO_2$

B. $HNO_2 \rightarrow H_2O + NO + NO_2$

C. $NO_2 + H_2O \rightarrow HNO_3 + NO$

D. none of these

Answer: D

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15. Species having X-O-H linkage (X=non-metal with positive oxidation state) are called oxy acids and parent acid of a non-metal may exist in two form (a)-ic form of parent oxy acid (b)-us form parent oxy acid.

Q. Number of P-O bond(s) having bond order=2, in $P_2O_6^{4-}$ ions is:

A. 0

B. 2

C. 3

D. 6

Answer: A

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16. Species having X-O-H linkage (X=non-metal with positive oxidation state) are called oxy acids and parent acid of a non-metal may exist in two form (a)-ic form of parent oxy acid (b)-us form parent oxy acid.

Q. Which of the following parent oxy acid does not have its pyro-oxy acid?

A. H_2SO_3

B. HNO_3

C. H_3PO_3

D. H_4SiO_4

Answer: B

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17. Species having X-O-H linkage (X=non-metal with positive oxidation state) are called oxy acids and parent acid of a non-metal may exist in two form (a)-ic form of parent oxy acid (b)-us form parent oxy acid.

Q. X-O-X bond (where X=central atom) is not present in species.

A. Cl_2O_7

B. $H_2N_2O_7$

C. N_2O_5

D. $H_2S_2O_7$

Answer: B

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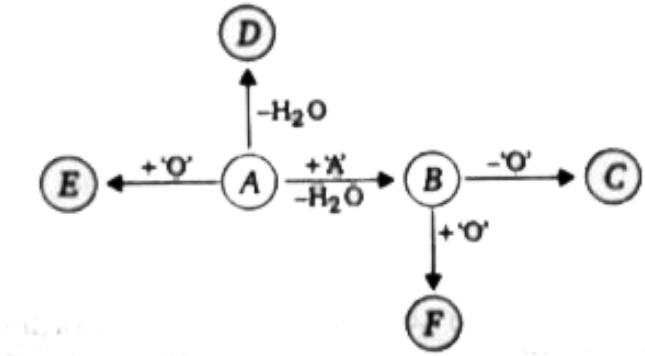
18. Consider the following sequence of reactions, if A is sulphuric acid, then give the answer of following questions



Q. Which of the following oxy acid does not have peroxy (-O-O-) linkage?

A. F

B. C

C. E

D. None of these

Answer: B

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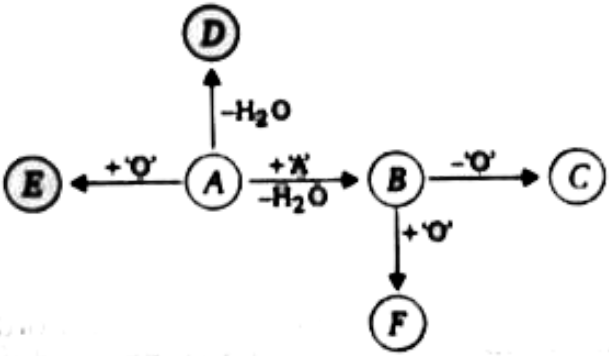
19. Consider the following sequence of reactions, if A is sulphuric acid, then give the answer of following questions



Q. In which of the following compound S-atom is sp^2 hybridised:

A. C

B. E

C. D

D. B

Answer: C

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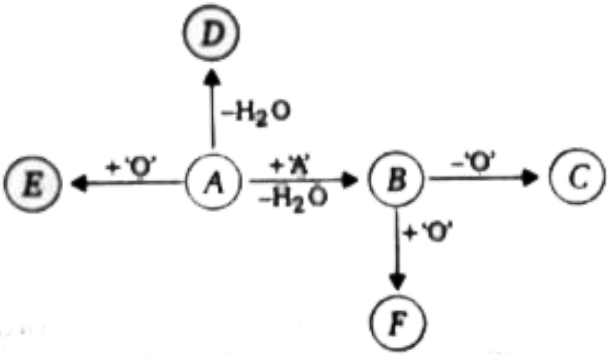
20. Consider the following sequence of reactions, if A is sulphuric acid, then give the answer of following questions



Q. Which of the following oxy acid is having S-O-S linakge?

A. B

B. C

C. F

D. None of these

Answer: A

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One Or More Answers Is Are Correct

1. Consider the following reactions,

$$A_x + yB_2 \xrightarrow[\text{supply of air}]{\text{limited}} \text{Compound } 'P' \xrightarrow[\text{excess air}]{+zB_2} \text{Compound 'Q'}$$

If atomic number of elements A and B are 15 and 8 respectively, then according to the given information the correct statement(s) is/are:

A. (B-A-B) bond angle in compound 'Q'gt(B-A-B) bond angle in compound 'P'

B. (A-B) bond length in compound 'Q' $<$ (A-B) bond length in compound 'P'

C. Value of $x + y + z$ is 9

D. Compound 'P' is P_2O_5 and compound 'Q' is P_4O_{10}

Answer: A::B::C

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2. Which of the following is (are) V-shaped?

A. S_3^{2-}

B. I_3^-

C. N_3^-

D. I_3^+

Answer: A::D

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3. $'X' + 6H_2O \rightarrow 'Y' + 6HF$

$X + H_2O \rightarrow 'Z' + 2HF$

If 'X' is xenon hexafluoride than correct statement is:

A. Compound 'Y' and 'Z' and same number of lone pair(s) at central atom

B. Both compound 'Y and 'Z' have same number of lone pair(s) at central atom

C. Z' is a partially hydrolysed product of compound 'X'

D. X' act as fluoride donor when it reacts with alkali metal fluoride.

Answer: A::B::C

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4. Which of the following oxy anion(s) contain(s) P-O bond order equal to 1.5?

A. $H_2P_2O_6^{2-}$

B. $H_2PO_3^-$

C. $H_2PO_4^-$

D. $H_2PO_2^-$

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

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5. Which of the following order is correct?

A. $N_2 > F_2 > O_2$: Ionisation energy

B. $H_2Te > H_2Se > H_2S > H_2O$: reducing naturue

C. $H_2O > H_2Te > H_2Se > H_2S$: Boiling point

D. $HClO_4 > HClO_3 > HClO_2 > HClO$: oxidising nature

Answer: B::C

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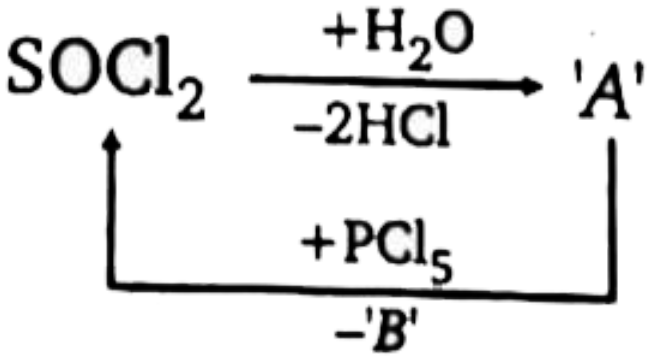
6. Consider the following sequence of reaction



the according to given information the correct statement(s) is/are:

A. Compound 'A' and pπ-$p\pi$ bond

B. central atom of compound B is sp^3-hybridized

C. Compound 'B' has plane of symmetry

D. compound 'A' is polarr and B is non-polar

Answer: B::C

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7. Correct statement(s) about hydrolysis of $H_5P_3O_{10}$ is/are:

A. $H_4P_2O_6$ can be formed by its partial hydrolysis

B. Hydrolysis is proceeded by SN_{AE} mechanism

C. Complete hydrolysis produces H_3PO_4

D. $H_5P_3O_{10}$ is obtained by hydrolysis of $H_3P_3O_9$

Answer: B::C::D

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8. The species which react with silica/glass in presence of moisture:

A. HF

B. XeF_2

C. XeF_4

D. XeF_6

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

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9. In which of the following compound(s) terminal $\left(2C - 2e^-\right)$ bond and bridge bonds are lying in same plane:

A. I_2Cl_6

B. Fe_2Cl_4

C. Solid $BeCl_2$

D. Ga_2H_6

Answer: A::B

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10. The correct statement(s) regarding diborane (B_2H_6) is/are:

A. Maximum six hydrogenn atoms can lie in a plane

B. Maximum six atoms cann lie in a plane

C. Bridging $H_b - B$ bond is stronger than terminal B-H_t bond

D. Terminal $H_t - B - H_t$ bond angle is greater than bridging $H_b - B - H_b$ bond angle

Answer: B::D

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11. In which of the compounds oxygen does not exhibit oxidation state (-2)?

A. CsO_2

B. K_2O_2

C. OF_2

D. Cl_2O

Answer: A::B::C

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12. Aqueous solution of boric acid is treated with Salicylic acid. Which of the following statements is/are incorrect for the product formed in the above reaction

A. no product will be formed because both are acid

B. product is 4-coordinated complex and optically resolvable

C. product is 4-coordinated complex and optically non-resolvable

D. there are two ring only which are five membered

Answer: A::C::D

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13. Borazine is called 'inorganic benzene' in view of its ring structure with alternate BH and NH groups. Which of the following statements is correct about borazine?

A. Each B and N atom is sp^2 hybridised

B. Borazine satisfied the $(4n+2)$ Huckel's rule

C. Like organic benzene, borazine does not give addition product with HCl

D. Borazine contains dative $p\pi - p\pi$ bond

Answer: A::B::D

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14. Identify the correct statement abouut orthoboric acid:

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

B. Orthoboric acid (H_3BO_3) is a weak monobasic lewis acid

C. On heating ortho-boric acid form meta-boric acid and on further heating to red hot, forms boric oxide anhydride

D. it is obtained by reaction borax withh dilute HCl using phenolphthalein as an indicator

Answer: A::B::C

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15. Which of the following methods can be used for the preparation of anhydrous aluminium chloride

A. heating $AlCl_3 \cdot 6H_2O$

B. Heating a mixture of alumina and coke in a currennt of dry chlorine

C. Passing dry HCl gas over heated aluminium powder

D. Passing dry chlorine over heated aluminium

Answer: B::C::D

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16. Identify the correct statement regarding structure of diborane

A. There are two bridging hydrogen atoms

B. Each boron atom forms four bonds

C. The hydrogen atoms are not in the same plane

D. each boron atom is in sp^3 hybridized state

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

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17. The major product obtained in the reaction of oxalic acid with conc, H_2SO_4 upon heating are

A. CO

B. SO_2

C. CO_2

D. SO_3

Answer: A::C

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18. Which of the following is/are correct for group 14 elements?

A. The stability of dihalids are in the order

$CX_2 + SiX_2 < GeX_2 < SnX_2 < PbX_2$

B. The ability of formm $p\pi - p\pi$ multiple bonds among themselves increases down the group

C. The tendency for catenation decreases down the group

D. they all form oxides with the formula MO_2

Answer: A::C::D

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19. Select the correct statement about silicates ?

A. Cyclic silicate having three Si atoms contains six Si-O-Si linkages.

B. $2\frac{1}{2}$ over oxygen atoms of per tetrahedron unit are shared in double chain silicate

C. $(Si_2O_5)_n^{2n-}$ is formula of double chain silicate

D. SiO_4^{4-} units polymerize to form silicate because Si atom has less tendency to formm π-bond with oxygen

Answer: B::D

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20. SiO_2 reacts with:

A. Na_2CO_3

B. CO_2

C. HF

D. HCl

Answer: A::C

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21. Which of the following statement(s) is/are true?

A. The lattice structure of diamond ad graphite are different

B. Graphite is an impure form of carbon while diamond is a pure form

C. Graphite is harder than diamond

D. graphite is thermally more stable than diamond

Answer: A::D

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22. On strong heating $Pb(NO_3)_2$ gives:

A. PbO

B. NO_2

C. O_2

D. NO

Answer: A::B::C

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23. PbO_2 is:

A. acidic

B. basic

C. reducing agent

D. oxidising agent

Answer: A::B::D

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24. Which of the following is true for allotropes of phosphorus?

A. Yellow phosphorus is soluble in CS_2 while red phosphorus is not

B. P-P-P bond angle is 60° in red phoshprus

C. On heating in air, white phophorus changes to red

D. White phosphorus slowly changes to red phosphorus at ordinar temperature

Answer: A::D

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25. Which of the following statements are true about P_4O_6 and P_4O_{10}?

A. Both these oxides have a closed cage like structure

B. Each oxide requires 6 water molecules for complete hydrolysis to form their respective oxoacids

C. both these oxides contain 12 equivalent P-O bonds

D. P_4O_6 and P_4O_{10} both contains $p\pi - p\pi$ bonds

Answer: A::B::C

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26. Which of the following, when dissolved in water, will liberated ammonia?

A. $NaNO_3$

B. $NaNO_2$

C. $NaNH_3$

D. Na_3N

Answer: C::D

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27. PH_3 can be obtained by:

A. heating hypophosphorus acid

B. heating orthophosphorus aciid

C. reacting white phoshporus with hot conc. NaOH

D. hydrolysis of calcium phophide

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

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28. Which of the following are used as fertilizers?

A. $Ca_3(PO_4)_2$

B. $Ca(H_2PO_4)_2$

C. $CaNCN$

D. CaC_2

Answer: B::C

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29. Which of the following statement(s) regarding nitrogenn sesquioxide (N_2O_3) is/are correct?

A. Nitrogen sesquioxide is stble only in the liquid state. It dissociates in the vapour state

B. Nitrogen sesquioxide is a neutral oxide

C. Nitrogen sesquioxide contains a weak N-N bond

D. Nitrogenn sesquioxide exists in two different forms

Answer: C::D

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30. Photochemical decomposition off HNO_3 produces:

A. N_2

B. N_2O

C. NO_2

D. O_2

Answer: C::D

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31. Identify th correct statement(s):

A. P_4O_{10} is used as a drying agent

B. P_4O_{10} contains $p\pi - d\pi$ back bonding

C. In P_4O_{10} each P atom is bonded to three oxygen atoms

D. P_4O_{10} hydrolyse in water forming phosphorus acid

Answer: A::B

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32. Which of the followinng will formed whhen HNO_2 disproportionates in aqueous medium?

A. NH_3

B. N_2

C. NO

D. HNO_3

Answer: C::D

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33. Which of the followinngg species is/are formed when conc. HNO_3 is added to conc. Sulphuric acid?

A. NO_3^-

B. NO_2^+

C. NO^+

D. HSO_4^-

Answer: B::D

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34. The correct order of reducing power off MH_3 is:

A. $NH_3 < PH_3 < SbH_3 < BiH_3$

B. $PH_3 < AsH_3 < BiH_3 < SbH_3$

C. $BiH_3 < SbH_3 < PH_3 < NH_3$

D. $PH_3 < AsH_3 < SbH_3 < BiH_3$

Answer: A::D

Watch Video Solution

35. Which of the following do not have tendency to act as ligands during complex formation?

A. BiH_3

B. PH_3

C. AsH_3

D. SbH_3

Answer: A::C::D

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36. Metal() M in the following equation is/are $M + N_2 \xrightarrow{\Delta}$ Metal nitride

A. Na

B. Li

C. Cs

D. Mg

Answer: B::D

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37. Which of the following compound(s) is/are explosive(s)?

A. NF_3

B. NCl_3

C. NBr_3

D. NI_3

Answer: B::C::D

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38. The compounds obtained by heatinng of orthophosphoric acid are:

A. metaphosphoric acid

B. pyrophosphoric acid

C. P_4O_6

D. P_4O_{10}

Answer: A::B::D

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39. At high temperature, nitrogenn directly combines with

A. Zn

B. Mg

C. Al

D. Fe

Answer: B::C

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40. Phosphine is obtained by the reaction when

A. White phophorus is heated with NaOH

B. Ca_3P_2 reacts with water

C. red phosphorus is heated with NaOH

D. phosphorus is heated in currennt of hydrogen

Answer: A::B

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41. Predict product(s) in the following reaction, $P + OH^- \rightarrow$ product(s)

A. PH_3

B. PO_4^{3-}

C. $H_2PO_2^-$

D. PO_2^-

Answer: A::C

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

A. NO_2 is a paramagnetic substance

B. NO2 solid is brown in colour

C. NO_2 dimerizes to N_2O_4

D. NO_2 is a mixed anhydride

Answer: A::C::D

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43. Which is true about N_2O_5?

A. It is anhydride of HNO_3

B. in solid state it exists as $NO_2^+ NO_3^-$

C. it is structurally similar to P_2O_5

D. it can be prepared by heating HNO_3 over P_2O_5

Answer: A::B::D

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44. White phosphorus can be separeted from red phosphorus by :

A. sublimation

B. dissolving in CS_2

C. distillation

D. none of these

Answer: B

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45. Orthophosphoric acid $\xrightarrow[220^\circ C]{\text{gentle heat}} X$

what is/are correct about X?

A. It is a tetrabasic acid

B. It contains one P-O-P bond

C. it is a dibasic acid

D. On hydrolysis it produces metaphosphoric aciid

Answer: A::B

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46. Which of the following act as an oxidizing as well as a reducing agent?

A. HNO_2

B. H_2O_2

C. H_2S

D. SO_2

Answer: A::B::D

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47. Which of the following statements are correct about SF_4?

A. It is prepared by reacting sulphur directly with flurine

B. sulphur tetrafluoride hydrolysed by water to give SO_2 and HF

C. SF_4 has a square planar shape with S having two lone pair of electrons

D. S-atom has a expanded octet

Answer: A::D

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48. Nitrating mixture is obtained by mixing conc. HNO_3 and conc H_2SO_4. Role of H_2SO_4 in nitration is

A. to force HNO_3 to behave as a base

B. to supress the dissociation of HNO_3

C. to produce NO_2^+ ions

D. to remove the colour NO_2 produced during nitration

Answer: A::C

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49. Drops of nitric acid reacts with P_2O_{10} to gives:

A. NO

B. NO_2

C. N_2O_5

D. HPO_3

Answer: C::D

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

A. Rhombic sulphur is stable at room temperature

B. Monochlinic sulphur is stable at room temperature

C. Both rhombic and monochlinic sulphur has the molecular formula S_8

D. Both rhombic and monochlinic sulphur are soluble in CS_2

Answer: A::C::D

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51. Which of the followingg statements are true about sodium thiosulphate, $Na_2S_2O_3$?

A. It isused in the estimation of iodine

B. it can give a black precipitate with $AgNO_3$

C. it is used to remove the unexposed AgBr from photograhpic films

D. it contains ionic, covalet and coordinate covalent bonds

Answer: A::B::C

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52. Peroxy acids of sulphur are:

A. $H_2S_2O_8$

B. H_2SO_5

C. $H_2S_2O_7$

D. $H_2S_2O_3$

Answer: A::B

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53. Sulphur dioxide can be used as:

A. bleaching agennt

B. antichlor

C. disinfectant

D. none of these

Answer: A::B::C

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54. Which statements are correct for ozone?

A. it is obtained by silent electric discharge on oxygen

B. it can be obtained by the action of ultraviolet rays on oxygen (modified)

C. it is regarded as an allotrope of oxygen

D. ozone molecules is paramagnetic like oxygen molecule

Answer: A::B::C

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55. Concentrated sulphuric acid is:

A. efforescent

B. hygroscopic

C. oxidising agent

D. sulphonating agent

Answer: B::C::D

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56. The reaction of sodium thiosulphate with I_2 gives:

A. sodium sulphite

B. sodium sulphate

C. sodium iodide

D. sodium tetrathiomate

Answer: C::D

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57. identify the correct statement(s):

A. Ozone is a powerful oxidising agent as compared to O_2

B. Ozone racts with KOHH and gives ann orange coloured solid KO_3

C. There is a decrese in volume when ozone decomposed to form O_2

D. The decomposition of O_3 to O_2 is exothermic

Answer: A::B::D

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58. Oxygen is not evolved when:

A. potassium chlorate is heated with MnO_2 catalyst

B. sodium peroxide racts with water

C. ammonium nitrate is heated

D. zinc oxide is treated with NaOH

Answer: C::D

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59. Identify the correct statements:

A. Fluroine is a super halogen

B. iodine shows lewis basic nature

C. AgF is insoluble in water

D. SCN^- is a pseudohalide

Answer: A::D

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60. Which of the following properties of the elements chlorine, bromine and iodine increase with increasing atomic number?

A. Ionization enerrgy

B. Ionic radius

C. Bond energy of the molecule X_2

D. Enthalpy of vaporization

Answer: B::D

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

A. Chlorine dioxide (ClO_2) is powerful oxidising agent but bleaching action is lower than Cl_2

B. ClO_2 in alkaline solution undergoes disproportionation

C. ClO_2 is diamagnetic in nature

D. ClO_2 is a yellow gas but deep red liquid

Answer: B::D

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62. Which of the following statement is true about NO_2 and ClO_2?

A. Both are paramagnetic

B. Both have a bent structure

C. On cooling, both undergoes dimerisation

D. In both oxides, the central atom has an oxidation state +4.

Answer: A::B::D

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63. $Cl_2O_6 + NaOH \rightarrow ?$

A. $NaClO_4$

B. $NaOCl$

C. $NaClO_2$

D. $NaClO_3$

Answer: A::D

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64. Predict product(s) in the following reaction,

$Cl_2 + OH^- \xrightarrow{hot} ?$

A. Cl^-

B. ClO_2

C. OCl^-

D. ClO_3^-

Answer: A::D

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65. In the isolation of fluorine a number of difficulties were encountered.

Which statements are correct:

A. Fluorine reacts with moist glass vessels

B. Fluorine gas great affinity for hydrogen

C. Electrolysis of aqueous HF gives ozonized oxygen

D. the potential required for the discharge of the fluoride ions lowest

Answer: A::B::C

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66. Iodine is formed when potasium iodide reacts with:

A. $ZnSO_4$

B. $CuSO_4$

C. Cl_2

D. Br_2

Answer: B::C::D

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67. Available Cl_2 is liberated from bleaching powder when it :-

A. is heated

B. reacts with acid

C. reacts with H_2O

D. recs with CO_2

Answer: B::C::D

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68. Which reactions are used for the preparation of the halogen acid?

A. $2KBr + \underset{(conc.)}{H_2SO_4} \rightarrow K_2SO_4 + 2HBr$

B. $CaF_2 + \underset{(conc.)}{H_2SO_4} \rightarrow CaSO_4 + 2HF$

C. $NaCl + \underset{(conc.)}{H_2SO_4} \rightarrow NaHSO_4 + HCl$

D. $2KI + \underset{(conc.)}{H_2SO_4} \rightarrow K_2SO_4 + 2HI$

Answer: B::C

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69. Which of the following statement(s) is/are correct for halogens

A. halogen which is liquid at room temperature is bromine

B. the most electronegativity element is fluorine

C. the most reactive halogen is fluorine

D. the strongest oxidising agent is iodine

Answer: A::B::C

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70. What are products in the following equation, $S + OH^- \rightarrow$?

A. H_2S

B. S^{2-}

C. $S_2O_3^{2-}$

D. SO_3^{2-}

Answer: B::C

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71. Correct statements about the hydrogen halides include that:

A. they are all coloured

B. the thermal stability decreases with increasing atomic number of halogen

C. they all form soluble silver salts

D. they all donate protons to water

Answer: B::D

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72. Which of the following statement(s) is/are not correct?

A. The covalency of N in HNO_3 is +5

B. HNO_3 in the gaseous state has a trigonal planar structure

C. The oxidation state of N in HNO_3 is +4

D. Gold dissolves in HNO_3 to form gold nitrate

Answer: A::C::D

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73. Which of the substances react with water?

A. Chlorine

B. Phosphorus trichloride

C. Silicon tetrachloride

D. Tetrachloro methane

Answer: A::B::C

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74. Which of the following substances are soluble in NaOH solution?

A. $Sn(OH)_2$

B. $Al(OH)_3$

C. $Bi(OH)_3$

D. $Pb(OH)_2$

Answer: A::B::D

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75. Which of the following molecules have a dative bonding $(p\pi - d\pi)$?

A. P_4O_{10}

B. $(SiH_3)_3N$

C. P_4O_6

D. N_2O_5

Answer: A::B

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76. Which of the following will give N_2 when heated?

A. NaN_3

B. NH_4NO_2

C. NH_4NO_3

D. $(NH_4)_2Cr_2O_7$

Answer: A::B::D

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77. Which of the following will give NO_2 when heated?

A. $LiNO_3$

B. $NaNO_3$

C. $Al(NO_3)_2$

D. $AgNO_3$

Answer: A::C::D

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78. identify the correct statements:

A. Calcium cyanamide on treatment with steam under pressure gives NH_3 and $CaCO_3$

B. PCl_5 is kept in well stopped bottle because it reacts readily with moisture

C. Ammonium nitrite on heating gives ammonia and nitrous acid

D. Cane sugar reacts with conc. HNO_3 to form oxalic acid

Answer: A::B::D

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79. Select the correct statement(s):

A. When Al is added to potassium hydroxide solution, hyddrogenn gas is evolved

B. H_2SiF_6 is formed when silica reaccts with hydrogen fluoride followed by hydrolysis

C. Phosphine gas is formed when red phosphorus is heated with NaOH

D. $(NH_4)_2SO_4 \cdot FeSO_4 \cdot 6H_2O$ is called alums

Answer: A::B

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80. Which of the following gases on dissolution in water make the solution acidic?

A. CO

B. CO_2

C. SO_3

D. PH_3

Answer: B::C

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81. Which of the following oxides is/are neutral?

A. N_2O

B. CO

C. Al_2O_3

D. NO

Answer: A::B::D

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82. Which of the following statement(s) is/are incorrect about borazine (inorganic benzene)?

A. It contains $p\pi - p\pi$ bond

B. it does not give addition product with HCl like organic benzene

C. each boron and nitrogen atom is sp^2-hybridised

D. Its disubstituted derivatives gives equal no. of ortho, meta and para devivatives like disubstituted organic benzene

Answer: B::D

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83. What is true about NO and ClO_2?

A. Both molecules have fractional bond order

B. Both oxides are neutral in nature

C. Both have odd e^- bond in their structures

D. both are paramagnetic in nature

Answer: A::C::D

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84. Select the correct statement(s) regarding structure of $Al_2(CH_3)_6$:

A. All carbon atoms of $-CH_3$ groups do not lie in the same plane

B. One vacant orbital of each Al-atom is involved in sp^3-hybridisation

C. There are only 8 sp^3-hybridised atoms are present

D. There are total 48 bonding electrons are available

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

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85. Which of the following statement(s) is/are correct about SF_4 molecule?

A. it has a square planar shape with S-atom having two lone pairs

B. It is hydrolysed by water to give H_2SO_3 and HF as final products

C. During hydrolysis, S-atom in transition state is sp^3d^2 hybridised

D. All S-F bond lengths are equal

Answer: B::C

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86. Which of the given compound(s) can act as Lewis acid in both monomer and dimer form?

A. BH_3

B. $BeCl_2$

C. BeH_3

D. $AlCl_3$

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

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87. Which of the following parent acid(s) does/do not have corresponding hypo-oxyacid?

A. HNO_3

B. H_3PO_4

C. H_2SO_4

D. $HClO_3$

Answer: A::D

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88. Oxy anion(s) containing (6,2) pair of equivalent X-O linkaes (where X-central atom) is/are:

A. $S_2O_8^{2-}$

B. $P_2O_6^{4-}$

C. $P_2O_7^{4-}$

D. $P_2O_8^{4-}$

Answer: A::C::D

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89. Which of the following reactions of xenon compounds in not feasible?

A. $XeF_2 + HF \rightarrow H[XeF_3]$

B. $XeF_6 + RbF \rightarrow [XeF_5][RbF_2]$

C. $XeF_4 + PF_5 \rightarrow [XeF_3][PF_6]$

D. $3XeF_4 + 6H_2O \rightarrow 2Xe + XeO_3 + 12HF + 1.5O_2$

Answer: A::B

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90. Select the incorrect statement(s):

A. NH_3 has a highest dipole moment among CO, NH_3 and NF_3

B. HF has a highest boiling point among CH_4, NH_3 and HF

C. Cl_2 has a lowest boiling point among Cl_2, Br_2 and I_2

D. $HClO_3$ is weakest acid among HIO_3, $HBrO_3$ and $HClO_3$

Answer: D

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91. The possible product (s) formed in the following reaction is/are:

$IF_5 + H_2O \rightarrow ?$

A. HIO_3

B. HIO

C. HIO_4

D. HF

Answer: A::D

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92. Which of the following species does/do not exist?

A. OF_4

B. NH_2^-

C. NCl_5

D. ICl_3^+

Answer: A::C::D

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93. Consider the following table:

Compound	Enthalpy of formation ($kJ\ mol^{-1}$)	Bond angle (H—C.A.—H)	Boiling point (°C)
H_2O	x_1	y_1	z_1
H_2S	x_2	y_2	z_2
H_2Se	x_3	y_3	z_3
H_2Te	x_4	y_4	z_4

Accoridng to given information of correct order is/are:

A. $x_1 > x_2 > x_3 > x_4$

B. $y_1 > y_2 > y_3 > y_4$

C. $x_1 > z_4 > z_3 > z_2$

D. $x_1 > x_4 > x_3 > x_2$

Answer: A::B::C

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94. $2P \xrightarrow{-H_2O} Q \xrightarrow{-[O]} R$

If P is parent phosphoric acid then according to given information the correct statement is/are:

A. Q is pyro form and R is hypo form of givenn present oxy acid P

B. Number of H-atoms present in each given oxy acid is equal to its besicity

C. In P, Q, R oxy acids, oxidation state of central atom remains same.

D. All given oxy acids have $p\pi - d\pi$ bond(s) in their structure

Answer: A::B::D

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95. The correct statement(s) regarding PCl_5 is/are:

A. In solid phase, hybridisation of P-atom in cation is sp^3

B. In vapour phase, al P-Cl bond lengths are equal

C. In vapour and solid phase, central atom has no lone pair

D. In solid phase, anion has only one type of bond angle

Answer: A::C

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96. Correct order(s) is/are:

A. Thermal stability: $H_2O > H_2S > H_2Se > H_2Te$

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

C. Melting point: $NH_3 > SbH_3 > AsH_3 > PH_3$

D. $X - C - X$ bond angle: $COCl_2 > COF_2$

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

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97. Which of the following reaction(s) do/does not givean oxo-acid?

A. Two moles of nitric acid $\xrightarrow{-H_2O}$

B. One mole of sulphrus acid $\xrightarrow{-H_2O}$

C. Two mole of Chloric acid $\xrightarrow{-H_2O}$

D. Two moles of sulphuric acid $\xrightarrow{-H_2O}$

Answer: A::B::C

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Match The Column

1.

	Column-II (Property)
(A) $NH_3 > PH_3 > AsH_3 > SbH_3$	(P) Melting point
(B) $H_2O > H_2S > H_2Se > H_2Te$	(Q) Lewis acid character
(C) $AlCl_3 > AlBr_3 > AlI_3$	(R) Thermal stability
(D) $I_2 > IBr > ICl > IF$	(S) Lewis basic character

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2.

Column-I	Column-II
(A) Does not neutralise dil. HNO_3	(P) SiO_2
(B) Reaction with HF acid	(Q) PbO_2
(C) Solid at room temperature	(R) CO
(D) May acts as reducing agent	(S) SnO
	(T) NO

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3.

Column-I (Hydrolysed Products)	Column-II (Compounds that undergo hydrolysis)
(A) H_2 gas is evolved	(P) CaH_2
(B) Proton donor oxyacid is formed	(Q) $POCl_3$
(C) Halogen acid is formed	(R) NCl_3
(D) Back bonding is present in formed oxyacid	(S) B_2H_6
	(T) R_2SiCl_2

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4.

Column-I	Column-II
(A) $POCl_3$	(P) Oxyacid formed during hydrolysis undergoes Tautomeric change
(B) SOF_2	(Q) Oxidation state of central atom does not change during hydrolysis
(C) $XeOF_4$	(R) Complete as well as partial hydrolysis is possible
(D) $H_2S_2O_8$	(S) Hydrolysed product reacts with glass
	(T) Hybridization of central atom in the final product remains same as in the substrate on hydrolysis

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5.

Column-I (Complete hydrolysis)	Column-II (Characteristics of any hydrolysed product/hydrolysis)
(A) $HNCl_3 \xrightarrow{H_2O}$	(P) Dibasic acid
(B) $NO_2^- \xrightarrow{H_2O}$	(Q) Can act as flexidentate ligand
(C) $H_2S_2O_8 \xrightarrow{H_2O}$	(R) Can act as both oxidising and reducing agent
(D) $SF_4 \xrightarrow{H_2O}$	(S) Can act as monodentate ligand
	(T) Non-redox hydrolysis

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Column-I	Column-II
(A) Disproportionation in alkaline medium/heating	(P) Cl_2
(B) Oxidizing agent	(Q) NO_2
(C) Reacts with water/hydrolysis	(R) XeF_6
(D) Basic gas evolves on heating	(S) NaH_2PO_3
	(T) $(NH_4)_2S$

6.

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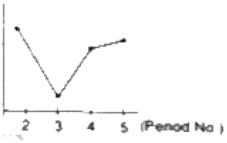
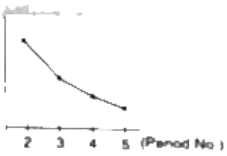
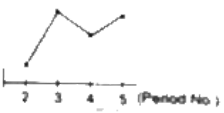
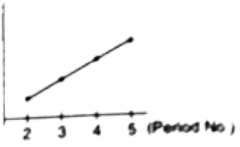
Match the Column-I with the graph of Column-II which is most close to the answer

Column-I	Column-II
(A) Bond energies of the hydra acids of the halogens fluorine, chlorine, bromine, iodine	(P) 
(B) Boiling points of the hydrides of the 16 group elements oxygen, sulphur, selenium, tellurium	(Q) 
(C) The stability of monochlorides of group 13 elements boron, aluminium, gallium, indium	(R) 
(D) Melting points of the dioxides of the group 14 elements carbon, silicon, germanium, tin	(S) 

7.

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Column-I contains four statements following reason and Column-II consists of four options P, Q, R, S.

Answer the following :

P → If both statement and reason are true and reason is correct explanation of statement.

Q → If both statement and reason are true and reason is not correct explanation of statement.

R → If statement is correct and reason is incorrect.

S → If both statement and reason are incorrect.

	Column-I			Column-II
(A)	**Statements**	:	PbI_4 is a stable compound	P
	Reason	:	Iodide stabilizes higher oxidation state.	
(B)	**Statements**	:	White phosphorus is more reactive than red phosphorus.	Q
	Reason	:	Red phosphorus consists of P_4 tetrahedral units linked to one another to form linear chains.	
(C)	**Statement**	:	Caro's acid has sulphur atom in sp^3 hybridized state.	R
	Reason	:	Caro's acid contains one peroxy O_2^{2-} linkage.	
(D)	**Statement**	:	Bleaching action of chlorine is permanent while that of SO_2 is temporary.	S
	Reason	:	Chlorine bleaches by reduction and SO_2 by oxidation.	

8.

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Column-I	Column-II
(A) Negative charge on the anion is equal to the number of terminal oxygen atoms	(P) $Si_4O_{13}^{10-}$
(B) Three shared corners and ten unshared corners	(Q) SiO_4^{4-}
(C) Silicon atom(s) is/are present at the center of geometry and every oxygen atom is present at each corner of the geometry	(R) $Si_4O_{12}^{8-}$
(D) Non-planar geometry	(S) $Si_2O_7^{6-}$

9.

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10.

List-I (Mixtures)	List-II (Solution used for separation)
(A) N_2 and CO	(P) Water
(B) N_2 and O_2	(Q) H_2SO_4 acid
(C) N_2 and NH_3	(R) Ammonical CuCl
(D) PH_3 and NH_3	(S) Pyrogallol

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11.

Column-I (Metal with HNO_3)	Column-II (Main product)
(A) Mg + very dil. HNO_3	(P) NO
(B) Zn + dil. HNO_3	(Q) H_2
(C) Sn + dil. HNO_3	(R) N_2O
(D) Pb + dil. HNO_3	(S) NH_4NO_3

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12. Match the following columns

Column-I	Column-II
(A) Moissan method	(P) Purification of bauxite
(B) Ostwald process	(Q) Manufacture of Cl_2
(C) Deacon process	(R) Manufacture of HNO_3
(D) Baeyer process	(S) Isolation of F_2

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13. Match the following columns

Column-I (Oxy acid)	Column-II (Acid anhydride)
(A) HOCl	(P) N_2O_5
(B) HNO_3	(Q) Cl_2O_7
(C) H_3PO_4	(R) Cl_2O
(D) $HClO_4$	(S) NO_2
	(T) P_4O_{10}

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14.

Column-I	Column-II
(A) Maximum solubility in water	(P) F_2
(B) Corrosive liquid	(Q) Cl_2
(C) Maximum interatomic distance	(R) Br_2
(D) Maximum enthalpy of dissociation	(S) I_2

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15. Match the following columns

Column-I	Column-II
(A) Borax $\xrightarrow{\Delta}$	(P) BN
(B) $B_2H_6 + H_2O \longrightarrow$	(Q) B_2H_6
(C) $B_2H_6 + NH_3$(excess) $\xrightarrow{\Delta}$	(R) H_3BO_3
(D) $BCl_3 + LiAlH_4 \longrightarrow$	(S) $NaBO_2 + B_2O_3$

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16.

Column-I (Catalyst involved in process)	Column-II (Process)
(A) Platinum	(P) Decomposition of bleaching powder
(B) V_2O_5	(Q) Manufacturing of HNO_3
(C) Iron	(R) Manufacturing of H_2SO_4
(D) Cobalt chloride	(S) Manufacturing of NH_3
	(T) Hydrogenation

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17.

Column-I	Column-II
(A) Hypo phosphoric acid	(P) All hydrogen are ionizable in water
(B) Pyro phosphoric acid	(Q) Lewis acid
(C) Boric acid	(R) Monobasic in water
(D) Hypo phosphorus acid	(S) sp^3 hybridized central atom

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18. Match the following columns

Column-I	Column-II
(A) CO_2	(P) Acidic oxide
(B) SO_2	(Q) Colourless
(C) NO_2	(R) Paramagnetic
(D) N_2O	(S) Coloured

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19.

Column-I	Column-II
(A) $Na_2B_4O_7 \cdot 10H_2O$	(P) Basic solution
(B) Na_2CO_3	(Q) Acidic solution
(C) $K_2SO_4 \cdot Al_2(SO_4)_3 \cdot 24H_2O$	(R) can react with NaOH
(D) NH_4Cl	(S) Swells up on heating

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20.

Column-I	Column-II
(A) SiO_2	(P) React with HF
(B) CN^-	(Q) Pseudo halide
(C) I^-	(R) Gives compound with Cu^{2+} via redox Rxn
(D) SnO_2	(S) Can dissolves in alkali

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21.

Column-I	Column-II
(A) Sheet silicate	(P) $(SiO_3)_n^{2n-}$
(B) Pyroxene chain	(Q) $(Si_4O_{11})_n^{6n-}$
(C) Pyro silicate	(R) 3-corner oxygen atom are shared
(D) Amphibole chain	(S) Non-planar

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22.

Column-I	Column-II
(A) Br_2	(P) Liquid at room temperature
(B) O_2	(Q) Used in estimation of CO
(C) ClO_2	(R) Paramagnetic
(D) I_2O_5	(S) Powerful bleaching agent

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23.

Column-I	Column-II
(A) $NH_3 > PH_3 > AsH_3 > SbH_3$	(P) Reducing property
(B) $KF > KCl > KBr > KI$	(Q) Heat of fusion (M.P.)
(C) $H_2O > H_2S > H_2Se > H_2Te$	(R) Thermal stability
(D) $CH_4 < SiH_4 < GeH_4 < SnH_4$	(S) Lewis basic character

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24.

Column-I (Catalyst involved in process)	Column-II (Process)
(A) SF_4	(P) Can act as Lewis acid as well as Lewis base
(B) AsH_3	(Q) Central atom belongs to 16th or 17th group
(C) ClO_4^-	(R) Non-axial set of *d*-orbitals do not use in bonding
(D) $SbCl_4^-$	(S) Only one type bond angle
	(T) Oxidation state of central atom is +4 or greater than +4

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Assertion Reason Type Questions

1. Assertion: $Al(OH)_3$ is amphoteric in nature.

Reason: $Al(OH)_3$ is H^+ donar acid as well as OH^- donar base.

A. If both (A) and (R) are true and (R) is the correct explanation of (A)

B. if both (A) and (R) are true but (R) is not correct explanation of (A)

C. If (A) is true but (R) is false

D. If (A) is false but (R) is false

Answer: C

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2. Assertion: BF_3 is weaker lewisi acid than BCl_3.

Reason: BF_3 is less electron deficient thann BCl_3.

A. If both (A) and (R) are true and (R) is the correct explanation of (A)

B. if both (A) and (R) are true but (R) is not correct explanation of (A)

C. If (A) is true but (R) is false

D. If (A) is false but (R) is false

Answer: A

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3. Assertion: Compound having X-O-H linkage (X=non-metal) always acts as Arrhenius acid.

Reason: Bond polarrity of O-H bond is higher than that of X-O bond.

A. If both (A) and (R) are true and (R) is the correct explanation of (A)

B. if both (A) and (R) are true but (R) is not correct explanation of (A)

C. If (A) is true but (R) is false

D. If (A) is false but (R) is false

Answer: D

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4. Assertion: When two gaseous OF molecules are allowed to cool, then they undergo dimerisation through O-atom.

Reason: Dimerr form of OF molecule (i.e, O_2F_2) is having one peroxy linkage in its structure.

A. If both (A) and (R) are true and (R) is the correct explanation of (A)

B. if both (A) and (R) are true but (R) is not correct explanation of (A)

C. If (A) is true but (R) is false

D. If (A) is false but (R) is false

Answer: C

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5. Assertion: bond dissociation energy of N-F bond in NF_3 molecule in lower than that of in NCl_3 molecule.

Reason: Inter electronic repulsion exists between small size N and F atoms in N-F bond of NF_3 molecule.

A. If both (A) and (R) are true and (R) is the correct explanation of (A)

B. if both (A) and (R) are true but (R) is not correct explanation of (A)

C. If (A) is true but (R) is false

D. If (A) is false but (R) is false

Answer: D

View Text Solution

6. Assertion: $KAlF_4$ salt can not be formed by combining AlF_3 with KF.

Reason: AlF_3 being predominantly ionic compound never acts as lewis acid.

A. If both (A) and (R) are true and (R) is the correct explanation of (A)

B. if both (A) and (R) are true but (R) is not correct explanation of (A)

C. If (A) is true but (R) is false

D. If (A) is false and (R) is false

Answer: D

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7. Assertion: $NaBO_3 / OH^-$ can be used for oxidation of Cr^{3+} to Cr^{6+}

Reason: IN alkaline medium $NaBO_3$ produces H_2O_2

A. If both (A) and (R) are true and (R) is the correct explanation of (A)

B. if both (A) and (R) are true but (R) is not correct explanation of (A)

C. If (A) is true but (R) is false

D. If (A) is false but (R) is false

Answer: A

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8. Statement-I: Aluminium and zinc metal evolve H_2 gas from NaOH solution

Statement-II: Several non-metals such as P,S,Cl, etc. yield a hydride instead of H_2 gas from NaOH

A. If both (A) and (R) are true and (R) is the correct explanation of (A)

B. if both (A) and (R) are true but (R) is not correct explanation of (A)

C. If (A) is true but (R) is false

D. If (A) is false but (R) is false

Answer: B::C

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9. Assertion: There is a very little difference in acidic strengths of H_3PO_4, H_3PO_3 and H_3PO_2.

reason: Number of unprotonated oxygen (=O) responsible for increase of acidic strength due to inductive effective remains the same.

A. If both (A) and (R) are true and (R) is the correct explanation of (A)

B. if both (A) and (R) are true but (R) is not correct explanation of (A)

C. If (A) is true but (R) is false

D. If (A) is false but (R) is false

Answer: A

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10. Statement-I : $PCl_5 \text{and} PbCl_4$ are thermally unstable.

Statement-II : They produce same gas on thermal decomposition

A. If both (A) and (R) are true and (R) is the correct explanation of (A)

B. if both (A) and (R) are true but (R) is not correct explanation of (A)

C. If (A) is true but (R) is false

D. If (A) is false but (R) is false

Answer: B::C

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11. Concentrated H_2SO_4 cannot be used to prepare HBr from NaBr , because it ,

A. If both (A) and (R) are true and (R) is the correct explanation of (A)

B. if both (A) and (R) are true but (R) is not correct explanation of (A)

C. If (A) is true but (R) is false

D. If (A) is false but (R) is false

Answer: C

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12. Statement-1: Oxygen is more electronegative than sulphur, yet H_2S is acidic, while H_2O is neutral.

Statement-2: $H-S$ bond is weaker than $O-H$ bond.

A. If both (A) and (R) are true and (R) is the correct explanation of (A)

B. if both (A) and (R) are true but (R) is not correct explanation of (A)

C. If (A) is true but (R) is false

D. If (A) is false but (R) is false

Answer: A

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13. Asserrtion: Liquid IF_5conducts electricity.

Reason: Liquid IF_5 conducts as, $2IF_5 \Leftrightarrow IF_4^+ + IF_6^-$.

A. If both (A) and (R) are true and (R) is the correct explanation of (A)

B. if both (A) and (R) are true but (R) is not correct explanation of (A)

C. If (A) is true but (R) is false

D. If (A) is false but (R) is true

Answer: A

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14. Assertion: Red phophorus is less volatile then white phosphorus.

Reason: Red phosphorus has a discrete tetrahedral structure.

A. If both (A) and (R) are true and (R) is the correct explanation of (A)

B. if both (A) and (R) are true but (R) is not correct explanation of (A)

C. If (A) is true but (R) is false

D. If (A) is false but (R) is false

Answer: C

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15. Statement-1: $Al(OH)_3$ is amphoteric in nature.

Statement-2: It cannot be used as an antacid.

A. If both (A) and (R) are true and (R) is the correct explanation of (A)

B. if both (A) and (R) are true but (R) is not correct explanation of (A)

C. If (A) is true but (R) is false

D. If (A) is false but (R) is false

Answer: C

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16. Statement-1: Chlorine gas disproportionates in hot and conc. NaOH solution.

Statement-2: NaCl and NaOCl are formed in the above reaction.

A. If both (A) and (R) are true and (R) is the correct explanation of (A)

B. if both (A) and (R) are true but (R) is not correct explanation of (A)

C. If (A) is true but (R) is false

D. If (A) is false but (R) is false

Answer: C

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17. Statement-I : Silicons are very inert polymers

Statement-II: Both $Si-O \text{and} Si-C$ bond energies are very high

A. If both (A) and (R) are true and (R) is the correct explanation of (A)

B. if both (A) and (R) are true but (R) is not correct explanation of (A)

C. If (A) is true but (R) is false

D. If (A) is false but (R) is false

Answer: A

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18. Assertion: AgI does not dissolve in NH_3.

Reason: Due to ionic character of AgI.

A. If both (A) and (R) are true and (R) is the correct explanation of (A)

B. if both (A) and (R) are true but (R) is not correct explanation of (A)

C. If (A) is true but (R) is false

D. If (A) is false but (R) is false

Answer: C

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19. Assertion: Anhydrous $AlCl_3$ is covalent while hydrated $AlCl_3$ is ionic.

Reason: In water $AlCl_3$ is presennt as $Al^{3+}_{(aq.)}$ and $Cl^{-}_{(aq.)}$ ion.

A. If both (A) and (R) are true and (R) is the correct explanation of (A)

B. if both (A) and (R) are true but (R) is not correct explanation of (A)

C. If (A) is true but (R) is false

D. If (A) is false but (R) is false

Answer: B::C

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20. Assertion: Boron reacts with HNO_3

Reason: Boron reacts with all acids.

A. If both (A) and (R) are true and (R) is the correct explanation of (A)

B. if both (A) and (R) are true but (R) is not correct explanation of (A)

C. If (A) is true but (R) is false

D. If (A) is false but (R) is false

Answer: C

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21. Assertion: H_2SO_4 is a weaker acid than $HClO_4$.

Reason: SO_4^{2-} is more stable than ClO_4^- in solution.

A. If both (A) and (R) are true and (R) is the correct explanation of (A)

B. if both (A) and (R) are true but (R) is not correct explanation of (A)

C. If (A) is true but (R) is false

D. If (A) is false but (R) is false

Answer: C

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22. Asseration: HF forms two series of salts but HCl not.

Reason: F-atom is more electronegative than Cl-atom.

A. If both (A) and (R) are true and (R) is the correct explanation of (A)

B. if both (A) and (R) are true but (R) is not correct explanation of (A)

C. If (A) is true but (R) is false

D. If (A) is false but (R) is false

Answer: A

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23. Assertion: PCl_3 on hydrolysis gives $OH-\overset{\overset{O}{||}}{\underset{H}{\underset{|}{P}}}-OH$ and not $OH-\underset{OH}{\underset{|}{P}}-OH$ as major product.

Reason: H_3PO_3 exists in two tautomeric forms $:OH-\underset{OH}{\underset{|}{P}}-OH \Leftrightarrow HO-\overset{\overset{O}{||}}{\underset{OH}{\underset{|}{P}}}-OH$

A. If both (A) and (R) are true and (R) is the correct explanation of (A)

B. if both (A) and (R) are true but (R) is not correct explanation of (A)

C. If (A) is true but (R) is false

D. If (A) is false but (R) is false

Answer: A

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24. Assertion: BiI_3 withh triiodide $\left(I_3^-\right)$ ion never exists.

Reason: Intramoleclar redox reaction takes place between bismuth cation

and triiodide ion.

A. If both (A) and (R) are true and (R) is the correct explanation of (A)

B. if both (A) and (R) are true but (R) is not correct explanation of (A)

C. If (A) is true but (R) is false

D. If (A) is false but (R) is false

Answer: C

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25. Assertion: SnO is more reactive towards acid than SnO_2.

Reason: Both SnO and SnO_2 are amphoteric oxides.

A. If both (A) and (R) are true and (R) is the correct explanation of (A)

B. if both (A) and (R) are true but (R) is not correct explanation of (A)

C. If (A) is true but (R) is false

D. If (A) is false but (R) is false

Answer: C

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26. Assertion: Bond dissociation energy of F_2 molecule is less than that of Cl_2 molecule.

Reason: Due to inter-electronic repulsion between F atom, F-F bond length in F_2 molecule is higher than Cl-Cl bond lengthh in Cl_2molecule.

A. If both (A) and (R) are true and (R) is the correct explanation of (A)

B. if both (A) and (R) are true but (R) is not correct explanation of (A)

C. If (A) is true but (R) is false

D. If (A) is false but (R) is false

Answer: A

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27. Assertion: In H_3PO_3 basicity of the oxy acid is two.

Reason: One H-atom is non-ionizable in more stable tautomeric form of H_3PO_3.

A. If both (A) and (R) are true and (R) is the correct explanation of (A)

B. if both (A) and (R) are true but (R) is not correct explanation of (A)

C. If (A) is true but (R) is false

D. If (A) is false but (R) is false

Answer: A

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Subjective Problems

1. In phosphorus acid, If X is number of non-bonding electron pairs. Y is number of σ-bonds and Z is number of π-bonds. Then calculate value of "YxZ-X"`.

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2. Consider the following oxyanions:

$PO_4^{3-}, P_2O_6^{4-}, SO_4^{2-}, MnO_4^-, CrO_4^{2-}, S_2O_5^{2-}, S_2O_7^{2-}$

and find the value of R+Q-P

where P-number of oxy anions having three equivalent X-O bonds per central atom

Q=number of oxy anions having two equivalent X-O bonds per central atom.

R=Number of oxy anions having four equivalent X-O bonds per central atom.

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3. For oxyacid $HClO_x$, fi x=y=z (x,y and z are natural numbers), then calculate the value of |x+y+z|. Where x=number of 'O' atoms

y=total number of ions pairs at central atom

z=total number of pi(π) electrons in the oxyacid.

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4. Consider the following representation of oxy-acid, $H_{n_1}S_2O_{n_2}$, (where S is central sulphur atom annd n_1 and n_2 are natural numbers.) if there are two possible oxy-acid of sulphur A and B contains ratio of $n_2 : n_1$ are 2 and 4 respectively, then sum of oxidation state of 'S' atom in both oxy-acid will be:

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5. total number of molecule which hydrolysed at room temperature and hybridization of central atom is sp^3d in transition state:

$CCl_4, SiCl_4, NCl_3, PCl_3, AsCl_3, SF_6, P_4O_6, P_4O_{10}, SeF_6$

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6. The difference between total number of lone pairs and total number of σ-bonds in $\left[B_3O_3(OH)_6\right]^{3-}$ molecular ion is:

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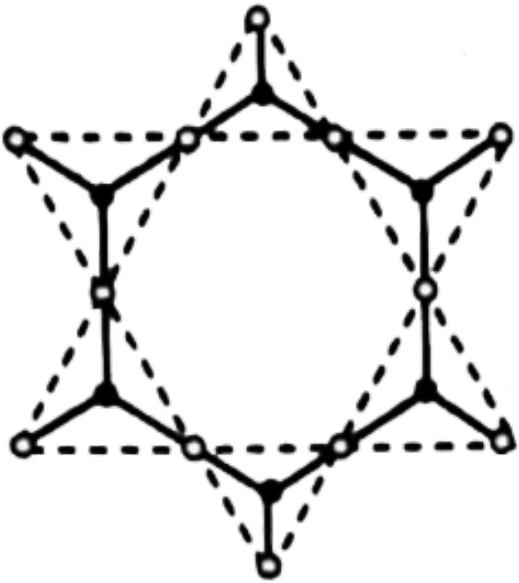
7. Calculate vlaue of $|x+y-z|$ for the followng sillicate $\left[Si_xO_{y+z}\right]^{z-}$ anion.



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8. The general formula of polythionate ion is $S_{n+2}O_6^{2-}$. If average oxidation state of 'S' atom is any polythionate ion is equal to bond order

of 'S-O' bond. Then calculate the value of 'n' for the corresponding polythionate ion.

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9. total number of Boron atoms in anionic part of borax which participate in back bonding.

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10. Choose total number of correct reaction.

(i) When $CuSO_4$ solution reacts with NH_3, complex is formed.

(ii) When $CuSO_4$ solution react withh PH_3, complex is formed.

(iii) $C_{12}H_{22}O_{11} \xrightarrow{\text{conc. } H_2SO_4} 2C + 11H_2O$

(iv) $\underset{(\text{excess})}{NH_3} + Cl_2 \xrightarrow{\Delta} NH_4Cl + N_2$

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11. Consider the following orders:

(1) $H_2SO_4 > H_2SO_3$: boiling point

(2) $H_2O > HF$: Extent of H-bond

(3) $H_2O < H_2O_2$: Strength off H-bond.

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12. How many monovalent oxygen atoms are preset in the mineral kinoite $\left(\overset{+2}{C}a_2\overset{+2}{C}u_2Si_3O_{10} \cdot 2H_2O\right)$?

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13. How many moles off given compound are decomposed in the following decomposition in the following decomposition reaction?

$NaOCl \xrightarrow{\Delta} NaClO_3 + NaCl$

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14. How many moles of NaOH are required to react with one mole of solid N_2O_5?

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15. How many moles of hypophophorous acid are involved in its thermal decomposition reaction when one mole of each product is formed.

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16. Consider the structure of Al_2Me_6 compound and find the value of $\frac{x-y}{z}$ where $x =$ maximum number of atoms that can lie in place having terminal $(Al-Me)$ bonds

$y =$ total number of $3c-2e^-$ bonds

$z =$ total number of atoms that are sp^3 hydrized.

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17. Sum of oxidation state of nitrogen atom in hyponitrous acid, nitric acid and nitrous acid.

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18. Find the value of x in the tremolite abestos:

$Ca_2Mg_x(Si_4O_{11})_2(OH)_2$

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19. Consider the following silicates

(a) $BaTi(Si_2O_9)$

(b) $ZnCa_2Si_2O_7$

Then calculate X+Y, where X and Y are total number of monovalent and divalent oxygen atoms in both silicates respectively.

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20. Atomicity of white or yellow phosphorus is 4 annd it is represented as P_4 molecule

Calculate the value of expresion $\frac{x \cdot y}{z}$ regarding this molecule.

Where x: total number of vertex angles in P_4 molecule.

y: Total number of lone pairs in P_4 molecule

z: total number of P-P bonds in P_4 molecule.

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21. Marshall's acid $\xrightarrow{H_2O} A + B$

$A \xrightarrow{H_2O} B + C$

If P and Q represent maximum number of atoms that can lie in a plane of compound A and C respectively. Then, find out value of (P-Q).

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22. Consider following four compounds:

(i) C_xO_y

(ii) C_xO_{y+1}

(iii) $C_{x+2}O_{y+1}$ and (iv) $C_{x+11}O_{y+8}$,

if "x=y=1", then calculate the vlaue of |p-q|, where p and q are total number of sp^2 and hybridized carbon atoms respectively in given four compounds.

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23. If following molecules undergo dimerisation then find the value of $\frac{YZ}{X}$:

(i) CiO_3

(ii) OF

(iii) GaH_3

(iv) $AlCl_3$

(v) ICl_3

(vi) BeH_2

(vi) NO_2

Where X=Number of molecules which are hypevalennt in dimeric form.

Y=Number of molecules which complete octet in dimer form

Z=Number of molecules which are hypovalent in dimeric form.

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24. Consider $Al_2(OH)_6$ compound and caculate the value of $(X+Y)+Z$ Wher X=total number of $\left(2c-2e^-\right)$ bond.

Y=total number of $\left(3c-2e^-\right)$ bond.

Z=total numbe of $\left(3c-4e^-\right)$ bond

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25. Consider the following covalent compounds in their solid state and find the value of expression $(X+Y+Z)$.

$N_2O_5, Cl_2O_6, PCl, I_2Cl_6, XeF_6, PBr_5$

Where X=total number of compounds in which central atom of cationic or anionic part is sp^3 hybridized.

Y=Total number of compounds having 90° bond angle either in cationic or anionic part.

Z=Total number of compounds having $109^{\circ}28'$ bond angle either in cationic or anionic part.

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26. Consider following compounds A to E :

(A) XeF_n $(B)XeF^{+}_{(n+1)}$ $(C)XeF^{-}_{(n+1)}$ $(D)XeF_{(n+2)}$

(E) $XeF^{2-}_{(n+4)}$,

If value of n is 4, then calculate value of $p \div q$ here, 'p' is total number of bond pair and 'q' is total number of lone pair on central atoms of compounds (A) to (E).

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27. When B_2H_6 is allowed to react with following lewis bases, then how man ygiven lewis bases form adduct through symmetrical cleavage of B_2H_6?

$NH_3, MeNH_2,$ Pyridine, $CO, T.H.F, PH_3, PF_3, Me_3N, Me_2NH$

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28. What is covalency of chlorine atom in second excited state ?

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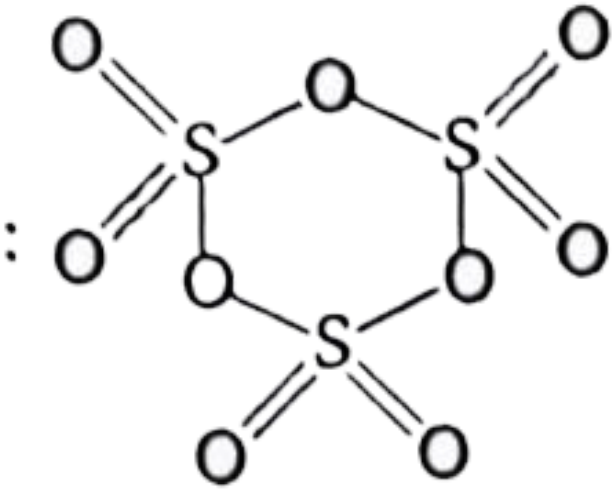
29. Consider the following molecule:



Calculate value of q+q, here p and q are total number of $d\pi - p\pi$ bonds and total number of sp^3-hybridised atoms respectively in given molecule.

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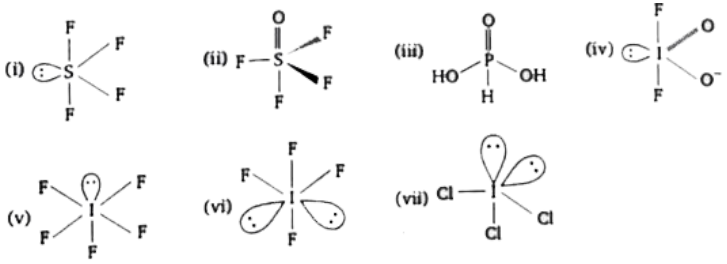
30. Consider the following structures and calculate value of $\left(P^2 - Q^2\right)$

Where P=total number of correct structure representation.

Q=Total number of incorrect structure representation.



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31. Calculate the value of " x+y-z" here x,y and z are total number of non-bonded electron pair (s),pie (π) bond(s) and sigma (σ) bonds in hydrogen phosphite ion respectively.

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32. Consider the following species:

(i) CH_3^+

(ii) $(C_3H_5)_3Al$

(iii) $HCHO$

(iv) CH_4

(v) $(C_2H_5)_3N$

(vi) $TiCl_4$

(vii) CO_2

(viii) $SiCl_4$

(ix) BF_3

the find out total number of species which can act as Lewis acid.

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33. Consider the following species: $CF_4, GeH_4, BCl_3, AlBr_3, H_2O, PH_3, PCl_5, CO_2, CH_4$ and calculate value of $(x-y)^2$:

Where, x: Total number of species which can act as only lewis acid.

y: total number of species which can act as lewis acid as well as lewis base.

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34. If X,Y and Z are total number of π-bond(s) in $H_2S_2O_6, H_2SO_3$ and $H_2S_2O_7$ respectively then calculate vlaue of expression $|X+Y-Z|$.

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35. Calculate value of "x+y" ffor "hypophoshporic acid", where x is total number of lone pair(s) and y is total number π-bond(s) in givenn oxo-acids.

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36. Atomicity of white or yellow phosphorus is 4 annd it is represented as P_4 molecule

Calculate the value of expresion $\frac{x \cdot y}{z}$ regarding this molecule.

Where x: total number of vertex angles in P_4 molecule.

y: Total number of lone pairs in P_4 molecule

z: total number of P-P bonds in P_4 molecule.

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