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India's Number 1 Education App

CHEMISTRY

BOOKS - MTG GUIDE

THE p-BLOCK ELEMENTS (GROUP 15 TO 18)

Illustration

1. Account for the following: HF is not stored in glass bottles but is kept in wax-coated bottles.

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2. F_2 is more reactive than ClF_2, but ClF_3 is more reactive than Cl_2.

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3. Account for the following: Fluorine forms only one oxoacid HOF.

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4. Unlike xenon, no distinct chemical compound of helium is known. Give reason.

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5. Xenon does not form such fluorides as XeF_3 and XeF_5. Explain.

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Neet Cafe Topicwise Practice Questions

1. What are the products obtained when ammonia is reacted with excess chlorine?

A. Na_2 and NCl_3

B. N_2 and HCl

C. N_2 and NH_4Cl

D. NCl_5 and HCl

Answer: D

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2. H_3PO_2 is the molecular formula of an acid of phosphorus. Its name and basicity respectively are

A. phosphorous acid and two

B. hypophosphorous acid and two

C. hypophosphorous acid and one

D. hypophosphoric acid and two.

Answer: C

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3. In which of the following reactions HNO3 will not act as an oxidising agent?

A. $HNO_3 + H_2SO_4 \rightarrow$

B. $HNO_3 + FeSO_4 + H_2SO_4 \rightarrow$

C. $KI + HNO_3 \rightarrow$

D. $Au + HNO_3 \rightarrow$

Answer: A

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4. Which of the following catalysts is commonly employed in the manufacture of ammonia by the Haber's process?

A. Finely divided platinum together with a nickel promoter

B. Finely divided nickel together with a platinum promoter

C. Finely divided iron together with a molybdenum promoter

D. Finely divided palladium together with a zinc promoter

Answer: C

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5. If HNO_3 changes into N_2O, the oxidation number is changed by

A. 2

B. 6

C. 0

D. 4

Answer: D

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6. Which of the following is not correct ?

A. Ammonia is used as refrigerant.

B. A mixture of $Ca(CN)_2$ and C is known as nitrolim

C. A mixture of $Ca(H_2PO_4)_2$ and $CaSO_4 2H_2O$ is known as superphosphate of lime

D. Hydrolysis of NCl_3 gives NH_3 and HOCI

Answer: B

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7. Which of the following is obtained when N_2 reacts with calcium carbide?

A. Calcium cyanate

B. Calcium acetate

C. Calcium cyanamide

D. Calcium carbonate

Answer: C

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8. $(NH_4)2Cr_2O_7$ on heating liberates a gas. The same gas will be obtained by

A. heating NH_4NO_3

B. heating NH_4NO_2

C. treating $H_2O_2 with NaNO_2$

D. treating Mg_3N_2 with H_2O

Answer: B

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9. There is very little difference in acid strength in the series H_3PO_3 and H_3PO_2 because

A. phosphorus in these acids exists in different oxidation states

B. number of unprotonated oxygen responsible for increase of acidity due to inductive effect remains the same

C. phosphorus is not a highly electronegative element

D. phosphorus oxides are less basic.

Answer: B

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10. How many P - O bonds and how many lone pairs respectively are present in P_4O_6 molecule?

A. 12,4

B. 8,8

C. 12,16

D. 12,12

Answer: C

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11. Calomel (Hg_2Cl_2) on reaction with NH_4OH gives

A. $HgNH_2Cl$

B. $NH_2 - Hg - Hg - Cl$

C. Hg_2O

D. HgO

Answer: A

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12. Slow acting nitrogenous fertilizer among the following is

A. NH_2CONH_2

B. NH_4NO_3

C. $CaCN_2$

D. KNO_3

Answer: C

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13. In nitroprusside ion, the iron and NO exist as Fe^{2+} and NO^+ t rather then Fe^{3+} and NO. These forms can be differentiated by

A. estimating the concentration of iron

B. measuring the solid state magnetic moment

C. thermally decomposing the compound

D. measuring the concentration of CN^- .

Answer: B

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14. Which acid has P - P linkage?

A. Hypophosphoric acid

B. Pyrophosphoric acid

C. Metaphosphoric acid

D. Orthophosphoric acid

Answer: A

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15. Which blue liquid is obtained on reaction of equimolar amount of NO and NO_2 gases at $-30^\circ C$?

A. N_2O

B. N_2O_3

C. N_2O_4

D. N_2O_5

Answer: B

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16. Nitrous oxide (N_2) is

A. soluble in cold water

B. acidic in nature

C. odourless

D. soluble in hot water.

Answer: A

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17. Which of the following phosphorus is most reactive?

A. Scarlet phosphorus

B. Red phosphorus

C. Violet phosphorus

D. White phosphorus

Answer: D

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18. The correct order of electronegativities of N, O, F and P is

A. $F > NgrP > O$

B. $F > O > P > N$

C. $F > O > N > P$

D. $N > O > F > P$

Answer: C

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19. In reaction

$HNO_3 + P_4O_{10} \rightarrow 4HPO_3 + X,$ the product X is

A. N_2O_5

B. H_2O

C. NO_2

D. N_2O_5

Answer: A

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20. Pure nitrogen can be prepared from

A. NH_4OH

B. Ca_3NO_2

C. NH_4NO_2

D. BaO

Answer: C

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21. Which has highest concentration of N?

A. Urea

B. Calcium ammoniumnitrate

C. Ammonium sulphate

D. Nitrolim

Answer: A

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22. The angular shape of ozone molecule $\left(\upsilon_3 \right)$ consists of

A. 1σ and 1π bond

B. 2σ and $1\pi bond$

C. 1σ and $2\pi bonds$

D. 2α and $2\pi bonds$

Answer: B

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23. There is no S-S bond in

A. $S_2O_4^{2-}$

B. $S_2O_5^{2-}$

C. $S_2O_3^{2-}$

D. $S_2O_7^{2-}$

Answer: D

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24. High concentration of ozone can be highly explosive because

A. Δ G for its conversion into oxygen has a large negative value

B. Δ H for its conversion into oxygen has a positive value

C. Δ S for its conversion into oxygen is negative

D. none of these

Answer: A

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25. Which of the following represents the correct order of decreasing number of S=O bonds?

A. $H_2SO_3 > H_2S_2O_8 > H_2SO_4$

B. $H_2S_2O_8 > H_2SO_4 > H_2SO_3$

C. $H_2S_2O_8 > H_2SO_3 > H_2SO_4$

D. $H_2SO_4 > H_2SO_3 > H_2S_2O_8$

Answer: B

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26. Mark the incorrect statement.

A. The chemical reactions of H_2SO_4 are as a result of its ability to act as an oxidising agent.

B. Dilution of oleum with water gives $H2_SO_4$

C. The key step in the manufacture of H_2SO_4, is the catalytic reduction of SO_2.

D. H_2SO_4 because of its low volatility can be used to manufacture more volatile acids from their corresponding salts.

Answer: C

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27. The incorrect trend regarding group 16 hydrides (H_2M) is

A. down the group, the H-M-H bond angle increases

B. the acidic character of hydrides increases down the group

C. except water, all hydrides possess reducing properties

D. thermal stability of hydrides decreases down the group.

Answer: A

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28. X is used as a germicide, disinfectant and for sterilising water. X also acts an oxidising agent in the manufacture of $KMnO_4$ X is

A. O_2

B. O_3

C. Cl_2

D. ClO_2

Answer: B

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29. Electron affinity of sulphur is

A. more than O and Se

B. more than O but less than Se

C. less than O but more than Se

D. equal to O and Se

Answer: A

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30. The oxidation state of sulphur in the anions SO_3^{2-}, $S_2O_4^{2-}$ and $S_2O_6^{2-}$ follows the order

A. $S_2O_6^{2-} < S_2O_4^{2} < SO_3^{2-}$

B. $S_2O_6^{2-} < SO_3^{2-} < S_2O_6^{2-}$

C. $SO_3^{2-} < S_2O_4^{2-} < S_2O_6^{2-}$

D. $S_2O_4^{2-} < S_2O_6^{2-} < SO_3^{2-}$

Answer: B

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31. Iron sulphide is heated in air to form A, an oxide of sulphur. A is dissolved in water to give an acid. The basicity of this acid is....

A. 2

B. 3

C. 1

D. zero

Answer: A

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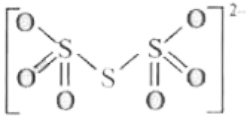
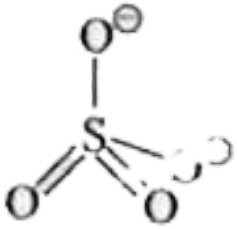
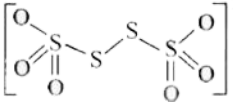
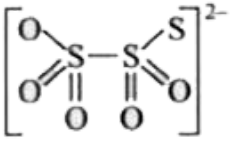
32. The structure of the tetrahionate ion is

A. 

B. 

C. 

D. 

Answer: C

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33. Which of the following species is basic and reducing?

A. SO_3^{2-}

B. SO_4^{2-}

C. $S_2O_4^{2-}$

D. HSO_4^-

Answer: A

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34. A substance on treatment with dilute H_2SO_4 liberates a colourless gas which produces (i) turbidity with baryta water and (ii) turns acidified dichromate solution green.

These reactions indicate the presence of

A. CO_3^{2-}

B. S^{2-}

C. SO_3^{2-}

D. NO_2^-

Answer: C

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35. Which has maximum pH in aqueous solutiion ?

A. NaClO

B. $NaClO_2$

C. $NaClO_3$

D. $NaClO_4$

Answer: A

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36. It is known that Cl_2 reacts with water to form HCl and HOCI. So when ICI is hydrolysed then

A. only HCl is formed

B. only HI is formed

C. HOCI and HI are formed

D. HOI and HÇI are formed.

Answer: D

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37. When BrF_5 reacts with NaOH

A. $NaFO_3$ and NaBr are formed

B. $NaBrO_3$ and NaF are formed

C. NaF and NaBr are formed

D. NaBrF is formed along with F_2

Answer: B

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38. Iodine pentoxide on heating with dry HCl gives

$I.\ Icl_3 \qquad II.\ Cl_2 \qquad III.\ ICl_5 \qquad IV.\ ICl$

A. I, II

B. I, III

C. I,II,III,IV

D. I,II,III

Answer: A

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39. Arrange the acids $(I)H_2SO_4$, $(II)H_3PO_3$, and (III) $HCIO_3$ in the decreasing order of acidity.

A. $I > III > II$

B. $I > II > III$

C. $III > I > II$

D. $II > III > I$

Answer: C

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40. Chlorine is liberated when we heat

A. $Pb(NO_3) + MnO_2$

B. $K_2Cr_2O_7 + MnO_2$

C. $KMnO_4 + NaCl$

D. $K_2Cr_2O_7 + HCl$

Answer: D

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41. The solubility of I_2 increases in water in the presence of

A. $KMnO_4$

B. KI

C. CS_2

D. H_2SO_4

Answer: B

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42. Which of the following halogen is solid at room temperature?

A. Iodine

B. Bromine

C. Fluorine

D. Chlorine

Answer: A

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43. The acid formed, when iodine reacts with concentrated nitric acid, is

A. iodic acid

B. nitrous acid

C. hydroiodic acid

D. per-iodic acid.

Answer: A

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44. Which of the following substances is used, in laboratory, for fast drying of neutral gases?

A. Phosphorus pentoxide

B. Anhydrous calcium chloride

C. Active charcoal

D. Sodium phosphate

Answer: B

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45. Aquaregia is a mixture of HNO_3 and HCl in the ratio of

A. $1:3$

B. $2:3$

C. $3:2$

D. $3:1$

Answer: A

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46. Among noble gases (from He to Xe) only xenon reacts with fluorine to form stable xenon fluorides because xenon

A. has the largest size

B. has the lowest ionisation enthalpy

C. has the highest heat of vapourisation

D. is the most readily available noble gas.

Answer: B

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47. Which one of the following elements is most reactive?

A. He

B. Ne

C. Xe

D. Kr

Answer: C

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48. In the given reaction for the preparation of XeF_4, what is the ratio of Xe and F_2 used ?

$$Xe_{(g)} + 2F_{2(F)} \xrightarrow{873K, 7\text{bar}} XeF_{4(x)}$$

A. $1:2$

B. $1:5$

C. $1:10$

D. $1:20$

Answer: C

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49. Which of the following suggests the correct hybridisation and structure of $XeOF_4$?

A. sp^3d, trigonal bipyramidal

B. sp^3d, square pyramidal

C. sp^3d^2, octahedral

D. sp^3d^2 square pyramidal

Answer: D

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50. Which of the following is not correct?

A. XeO_3 has four σ and four π bonds

B. The hybridisation of Xe in XeF_4 is sp^3d^2

C. Among the noble gases the occurrence (percent by weight) of argon is highest in air.

D. Liquid helium is used in cryogenic liquids

Answer: A

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51. Among the following molecules

(i) XeO_3 $(ii)XeOF_4$ $(iii)XeF_6$

Those having same number of lone pairs on Xe are

A. (i) and (ii) only

B. (i) and (iii) only

C. (ii) and (ii) only

D. (i), (ii) and (iii)

Answer: D

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52. Which of the following statements is incorrect ?

A. XeF_2 is powerful reducing agent .

B. XeF_2 is obtained by the direct reaction between F_2 and Xe at high pressure.

C. XeF_2 undergoues alkalin hydrolysis to give O_2 and Xe.

D. XeF_2 contains two bond pairs and three lone pairs.

Answer: A

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53. Which of one of the following reactions of xenon compunds in no feasible ?

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

B.

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

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

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

Answer: A

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54. Least chemical activity is shown by

A. NH_3

B. CH_4

C. Ar

D. H_2SO_4

Answer: C

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55. The structure of XeF_6 is

A. distorted octahedral

B. pyramidal

C. tetrahedral

D. none of these

Answer: A

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56. Which of the following is the correct sequence of the noble gases in their group in the periodic table ?

A. Ar, He, Kr, Be, Rn 'Xe

B. He, Ar, Ne, Kr, Xe, Rn

C. He, Ne, Kr,Ar, Xe, Rn

D. He,Ne, Ar, Kr, Xe, Rn

Answer: D

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57. Compund with the geometry square pyramidal and sp^3d^2 hybridisation is

A. $XeOF_2$

B. $XeOF_4$

C. XeO_4

D. XeO_2F_2

Answer: B

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58. Which of the following statements is not true about noble gases ?

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Check Your Neet Vitals

1. Among the following statements which one is incorrect?

A. Nitrogen has the ability to form propre bonds with itself.

B. Bismuth forms metallic bonds in elemental state

C. Catenation tendency is higher in nitrogen when compared with other elements of the same group

D. Nitrogen has higher first ionization enthalpy when compared with other elements of the same group.

Answer: D

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2. Which of the following statements is wrong about the oxides of nitrogen?

A. N_2O_5 is an anhydride of HNO_3

B. NO si an acidic oxide.

C. N_2O_3 is an anhydride of HNO_2

D. NO is not anhydride of an acid.

Answer: D

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3. The correct statement regarding (i) HClO, (ii) $HClO_2$

,

(iii) $HClO_3$ and (iv) $HClO_4$, is/are

A. the number of Cl = O bonds in (ii) and (iii) together is two

B. the number of lone pairs of electrons on Cl in (ii) and (iii) together is three

C. the hybridisation of Cl in (iv) is sp^2

D. amongst (i) to (iv) , the strongest acid is (i)

Answer: B

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4. In anology of $O_2^+[PtF_6]^-$ a compound $N_2^+[PtF_6]^-$ will not be formed because

A. the ionisation enthalpy of N_2 gas is higher than that of O_2 gas

B. the ionisation enthalpy of N_2 gas is lower than that of O_2 gas

C. the ionisation enthalpy of N_2 gas is higher than that of N atom

D. none of these

Answer: A

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5. Which statement is correct about the oxyacids of phosphorus ?

A. Basicity of both H_3PO_4 and H_3PO_3 is 3.

B. Acidity of both H_3PO_4 and H_3PO_3 is 3.

C. Acidity of H_3PO_4 and H_3PO_3 is 3 and 2 respectively.

D. Basicity of H_3PO_4 and H_3PO_3 is 3 and 2 respectively.

Answer: B

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6. Copper metal on treatment with dilute HNO_3 produces a gas (X) . (X) when combines with (Y) , an iron containing brown complex (Z) is obtained. Complex (Z) is.

A. $\left[Fe(H_2O)_5NO\right]^+$

B. $\left[Fe(H_2O)_5NO\right]^{2+}$

C. $\left[Fe(H_2O)_5NO_2\right]^+$

D. $\left[Fe(H_2O)_5NO_2\right]^{2+}$

Answer: B

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7. Chlorine cannot displace

A. iodine from NaI

B. bromine from NaBr

C. fluorine from NaF

D. none of these

Answer: B

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8. The following species will not exhibit disproportionation reaction.

A. ClO^-

B. ClO_2^-

C. ClO_3^-

D. ClO_4^-

Answer: D

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9. An oxide of a non-metal has the followig properties :

(i) It acts both as a proton donor as well as proton acceptor.

(ii) It reacts readily with basic and acidic oxides.

(iii) It oxidises Fe at its boiling point.

The oxide is

A. P_2O_5

B. SiO_2

C. H_2O

D. CO_2

Answer: A

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10. Which one is not an acid ?

A. NaH_2PO_2

B. NaH_2PO_3

C. NaH_2PO_4

D. none of these

Answer: D

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11. Which of the following statements is incorrect ?

A. ONCl and ONO^- are isoelectronic

B. O_3 molecule is bent.

C. Ozone is violet-black in solid state.

D. Ozone is diamagnetic gas

Answer: A

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12. Which of the following statements is correct ?

A. Helium has the lowest melting piont and boiling point.

B. Helium can diffuse through rubber, PVC and even glass.

C. Ar, Kr and Xe from clathrate compounds.

D. All the above statements are correct.

Answer: B

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13. In XeF_6, oxidation state and of hybridisation of Xe, and shape of the molecule are respectively

A. $+6 sp^3 d^3$, distorted octahedral

B. $+4$, sp^3, d^2 squar planar

C. $+6$, sp^3, pyramidal

D. $+6$, $sp^3 d^2$, square pyramidal

Answer: D

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14. Which one of the following statement is incorrect ?

A. pK_a value of HI (strongest halogen acid) is most positive.

B. High H-F bond strength makes H-F a weak acid in dilute aqueous solution.

C. Helium and neon do not form clathrates.

D. K_a values of HX is in order $HF < HCl > HBr > HI$

Answer: A

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