



CHEMISTRY

BOOKS - MODERN PUBLICATION

GROUP 15 ELEMENTS

Exercise

1. Hydrolysis of PI_3 yields:

A. Mono basic acid and a salt

B. Monobasic acid and dibasic acid

C. Dibasic acid and tribasic acid

D. Monobasic acid and tribasic acid

Answer: B



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2. Calcium phosphide is used in smoke screens

because it:

A. Burns to form soot

B. Gives PH_3 which forms smoke

C. Immediately catches fire in air

D. Is a gas which brings tears in eyes

Answer: B



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3. The oxidation state of nitrogen in NH_4NO_3

is:

A. -3, +5

B.

C.

D.

Answer: A



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4. The N-H bond in NH_3 is:

A. Covalent

B. Ionic

C. Dative

D. Hydrogen

Answer: A



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5. Oxidation of ammonia by CuO yields:

A. N_2

B. N_2O_2

C. NO

D. NO_2

Answer: A



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6. Which of the following statements is not true ?

A. NO_2 can be prepared by heating



B. NO_2 is red-brown gas

C. NO_2 is paramagnetic

D. NO_2 readily dimerises to N_2O_4

Answer: C



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7. Which reaction can be used to prepare phosphoric acid ?



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8. Metal among the following is:

A. *As*

B. *Sb*

C. *P*

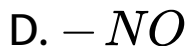
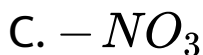
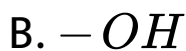
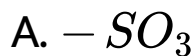
D. *Bi*

Answer: D



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9. PCl_5 reacts with compounds containing
——— group.



Answer: B



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10. Ammonia water is a good cleaning agent because it:

A. Is weakly basic

B. emulsifies

C. leaves no residue when wiped out

D. all are true

Answer: D



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11. Which is correct statement ?

A. Nitric oxide is isoelectronic with CO_2 .

B. Nitric Oxide is diamagnetic.

C. Nitric oxide is an endothermic compound.

D. Nitric oxide gas is used as general anaesthetic.

Answer: C



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12. The number of sigma bonds present in NCl_3 is:

A. 1

B. 2

C. 3

D. None

Answer: D



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13. Which is used to remove N_2 from air:

A. P

B. Mg

C. $CaCl_2$

D. *Conc.* H_2SO_4

Answer: B



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14. In PCl_5 phosphorous undergoes:

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

Answer: C



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15. Pure N_2 can be obtained by:.

A. Heating barium azide

B. NH_3 and CuO

C. Both (a) and (b)

D. None of these

Answer: C



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16. Liquor ammonia is:

A. Ammonium hydroxide

B. Liquefied ammonia gas

C. Concentrated solution of NH_3 in water.

D. A solution of NH_3 in alcohol

Answer: C



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17. Which element reacts with chlorine to give pentachloride ?

A. *P*

B. *As*

C. *Sb*

D. All

Answer: D



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18. NCl_3 on hydrolysis yields:

A. N_2 and $NOCl$

B. NO and HCl

C. NH_3 and $HOCl$

D. N_2O and NH_3

Answer: C



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19. Which element does not form stable diatomic molecules ?

A. Iodine

B. Phosphorus

C. Nitrogen

D. Oxygen

Answer: B



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20. Which reagent can separate nitric oxide from nitrous oxide ?

- A. Sodium nitroprusside solution
- B. $FeSO_4$ solution
- C. Nessler's reagent
- D. Ammonical silver nitrate solution

Answer: B



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21. Each of the following is true about white and red phosphorus except that they :

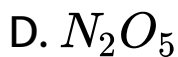
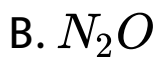
- A. are both soluble in CS_2
- B. Can be oxidised by heating in air
- C. Consist of same kind of atoms
- D. Can be converted into one another

Answer: A



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22. The gas which is supporter of combustion is:

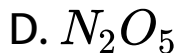
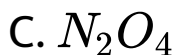
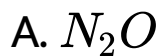


Answer: B



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23. The oxide which is solid at room temperature is:



Answer: D



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24. Bones glow in the dark. This is due to:

A. the presence of red phosphorus

B. Conversion of white P into red P

C. Slow combustion of white P in contact
with air

D. Conversation of red P into white P

Answer: C



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25. When ammonia is dissolved in water:

A. It loses a proton

B. It loses an electron

C. It gain a proton from water molecule

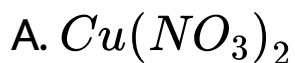
D. It gains an electron from water molecule

Answer: C



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26. A compound which leaves behind no residue on heating is :



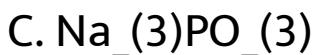
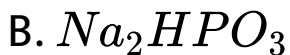
D. None of these

Answer: C



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27. Which one of the following formulae does not represent a salt derived from phosphorus acid, H_3PO_3 ?



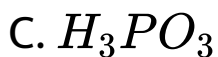
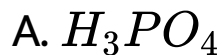
D. None of these

Answer: C



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28. The strongest oxidising agent is:

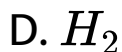


Answer: B



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29. The colourless gas liberated by passing excess of chlorine through NH_3 gas is:



Answer: B



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30. Good conductor of electricity is:

A. Yellow P

B. Red P

C. Violet P

D. Black P

Answer: D



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31. Ammonia is soluble in water because it is:

A. A polar molecule

B. Bronsted base

C. Both (a) and (b)

D. None of these

Answer: C



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32. In the compound of type ECl_3 where E=B, P As, or Bi, the angle Cl-E-Cl for different E are in order:

A. $p\pi-d\pi$

B. $d\pi-d\pi$

C. $p\pi-p\pi$

D. no multiple bonding

Answer: A



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33. Anhydride of nitric acid is _____ and anhydride of phosphoric acid is _____.

A. NO

B. N_2O_3

C. N_2O_4

D. N_2O_5

Answer: D



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34. Fuming nitric acid is:

A. NO

B. NO_2

C. N_2O_3

D. N_2O_5

Answer: A



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35. Why SO_2 gas cannot be collected over water?

A. NH_3

B. N_2

C. SO_2

D. HCl

Answer: B



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36. The nitrate which when heated gives off a gas or a mixture of gases which cannot relight a glowing splinter is:

- A. Sodium nitrate
- B. Ammonium nitrate
- C. Lead nitrate
- D. Potassium nitrate

Answer: B



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37. Lead nitrate on heating gives lead oxide, nitrogen dioxide and oxygen. The reaction is known as:

A. Combustion

B. Combination

C. Displacement

D. Decomposition

Answer: D



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38. Phosphorus is manufactured by heating___ in a furnace.

A. Bone-ash, sodium chloride and coke

B. None-ash, silica and lime

C. None-ash, coke and limestone

D. Bone-ash, coke and limestone

Answer: B



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39. A process for making ammonia at high temperature and pressure in the presence of a catalyst is known as:

- A. Destructive distillation
- B. Fractional crystallization
- C. Gasification
- D. Synthesis

Answer: D



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40. Yellow phosphorus is kept in:

- A. Water

B. Ether

C. Alcohol

D. Kerosene

Answer: A



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41. Diammonium phosphate (DSP) is used in:

A. Cement industry

B. Glass industry

C. Agriculture

D. Metallurgy

Answer: C



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42. NH_3 can be collected by the displacement

of:

A. Mercury

B. Water

C. Brine

D. *Conc. H₂SO₄*

Answer: A



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43. Light blue colour of nitrous acid is due to dissolved:

A. O_2

B. N_2

C. N_2O

D. N_2O_3

Answer: D



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44. The dipole moment of NF_3 is less than NH_3 because:

A. F is more reactive than H

B. NH_3 forms of the bond polarity is less

C. The resultant of the bond polarity is less

D. The resultant of the individual polarities

is opposed by the polarity of lone pair

Answer: D

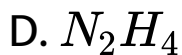


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45. Which hydride does not exist ?

A. SbH_3

B. AsH_3



Answer: C



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46. Skin turns yellow in contact with conc.

HNO_3 , because:

A. Proteins are converted into

xanthoproteins

B. Water is removed by the acid

C. Skin gets burnt

D. Nitrocellulose is formed

Answer: A



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47. Ammonia molecule is:

A. 109^{028} '

B. 104^{031} '

C. 120°

D. $106^{\circ}51'$

Answer: D



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48. Nitrates of all metals are:

A. Unstable

B. Coloured

C. Insoluble in water

D. Soluble in water

Answer: D



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49. Man dies, when nitrous oxide is inhaled in large quantities because it:

A. Is poisonous

B. Causes laughing hysteria

C. Decomposes haemoglobin

D. React with organic tissues

Answer: B



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50. Mg on heating to redness in an atmosphere of N_2 and then on treating with H_2O gives:

A. NH_3

B. H_2

C. N_2

D. O_2

Answer: A



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51. Which halide does not hydrolyse ?

A. $SbCl_3$

B. $AsCl_3$

C. PCl_3

D. NF_3

Answer: D



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52. Bones glow in the dark, because:

A. They contain a shining material.

B. They contain red phosphorus.

C. White phosphorus changes into red phosphorus.

D. White phosphorus undergoes slow combustion with air.

Answer: D



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53. Bottle of PCl_5 is kept stoppered because it:

A. Explodes

B. Gets oxidised

C. Is volatilized

D. Reacts with moisture

Answer: D



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54. In modern process phosphorus is manufactured by:

A. Heating a mixer is phosphorite mineral with sand and coke in electric furnace

B. Heating calcium phosphate with coke

C. Heating bone ash with coke

D. Heating the phosphate mineral with
sand

Answer: A



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55. The basicity of orthophosphoric acid is:

A. 2

B. 3

C. 4

D. 5

Answer: B



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56. Cane sugar reacts with concentrated

HNO_3 to give:

A. CO_2 and H_2O

B. Oxalic acid

C. Carbonic acid

D. CO and H_2O

Answer: B



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57. Complex fertilizer is that supplies to the soil:

A. S , K and N

B. N , K and P

C. S , K and P

D. S and N

Answer: B



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58. Liquid ammonia bottles be opened after cooling them in ice for sometime. It is because liquid NH_3 :

- A. Bringing tears to the eyes
- B. Has a high vapour pressure
- C. Is a corrosive liquid
- D. Is a mild explosive

Answer: B



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59. The lightning bolts in atmosphere cause the formation of:

A. NO

B. O_3

C. CO_2

D. H_2O_2

Answer: A



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60. The most reactive allotropic form of phosphorus is:

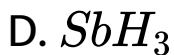
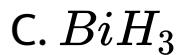
- A. Red phosphorus
- B. Yellow phosphorus
- C. Black phosphorus
- D. Violent phosphorus

Answer: B



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61. Which hydride possesses the maximum complex forming nature ?

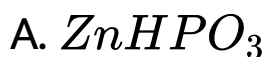


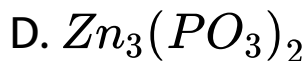
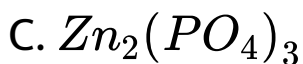
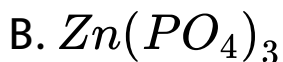
Answer: A



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62. The formula of zinc phosphite is:





Answer: A



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63. NH_3 molecule can enter into complex formation through:

A. Ionic bond

B. covalent bond

C. Co-ordinate covalent bond

D. Electron deficient bond

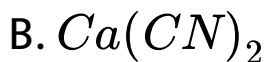
Answer: C



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64. Calcium carbide when heated with nitrogen forms:

A. Ca_3N_2



Answer: C



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65. Which property of white phosphorus is common to red P ?

A. It is soluble in Carbon disulphide

B. It shows chemiluminescence

C. It reacts with caustic soda solution to
give phosphine

D. It burns when heated with air.

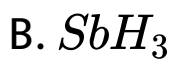
Answer: D



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66. Which hydride is most stable ?

A. AsH_3

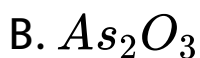
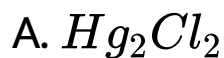


Answer: D



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67. Which is a poison ?



C. $NaHCO_3$

D. $NaCl$

Answer: B



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68. NH_4Cl is used to clean metal surfaces

because:

A. It dissociates into NH_3 and HCl on

heating

B. NH_3 forms soluble complex the metal.

C. NH_4Cl forms a volatile chloride

D. None of the above

Answer: A



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69. In smoke screens calcium phosphide is used, because it:

A. Catches fire easily

B. burns and gives soot

C. Forms phosphine which gives smoke

D. None of these

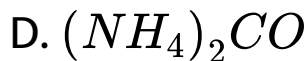
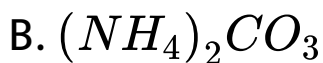
Answer: C



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70. Ammonia on heating with carbon dioxide under pressure gives:

A. NH_4HCO_3

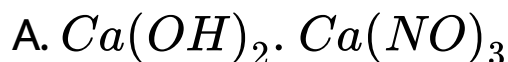


Answer: C



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71. Dilute HNO_3 reacts with limestone to yield:



B. $CaO \cdot Ca(NO_3)_2$

C. $2CaO \cdot Ca(NO_3)_2$

D. None of these

Answer: D



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72. CaN pellets are coated with calcium silicate because:

A. CaN is explosive

B. CaN is hygroscopic

C. CaN is water-soluble)

D. None

Answer: B

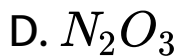
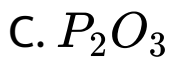


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73. Basic oxide is:

A. Bi_2O_3

B. As_2O_3



Answer: A



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74. Fluorapatite is a mineral of:



D. As

Answer: C



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75. Which of the following is correct, with the reference to Protonic acids:

A. PH_3 is more basic than NH_3 .

B. PH_3 is less basic than NH_3 is basic.

C. PH_3 is as basic as NH_3 .

D.

Answer: B



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76. The single electron in 2p-orbitals of nitrogen atom proves:

A. Hund's rule

B. Pauli's rule

C. Aufbau principle

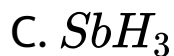
D. None of the above

Answer: A



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77. Vortex rings in air are formed by:

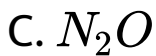
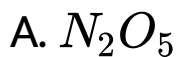


Answer: A



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78. NaOH can absorb:



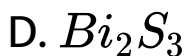
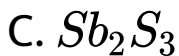
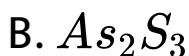
D. All of these

Answer: A



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79. Which sulphide is insoluble in yellow ammonium sulphide ?



Answer: D



80. Which statement is not correct ?

- A. White and red phosphorus react with chloride at room temperature.
- B. White phosphorus is metastable, while red phosphorus is stable.
- C. White phosphorus is lighter than red phosphorus.

D. White phosphorus is highly poisonous,
while red phosphorus is not.

Answer: A



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81. Name the catalyst used in the manufacture
of nitric acid by Ostwald process.



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82. Anhydride of nitric acid is_____and anhydride of phosphoric acid is_____.



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83. which gas collected over water?

A. NH_3

B. N_2

C. SO_2

D. HCl

Answer: KNO_3 and H_2SO_4



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84. HNH bond angle in NH_3 is _____.



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85. HMH bond angles in MH_3 molecules of group 15 ___ down the group.



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86. In general, two types of oxy-acids formed by elements of nitrogen family are ___ and ____.



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87. Nitrogen cannot form NCl_5 due to _____.



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88. Bismuth cannot form stable $BiCl_5$, due to ____.



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89. Pentoxides of all the elements of nitrogen family are ____ acidic than their trioxides.



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90. In the synthesis of NH_3 by Haber's process, catalyst is ____ and promoter is _____.



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91. Write the chemical formula of Glauber's salt.



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92. What happens when

H_3PO_3 is heated?



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93. What is the oxidation number of nitrogen in nitrous oxide.



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94. What happens when ammonium chloride is heated with quick lime?



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95. What is the shape of NH_3 molecule and it is due to what type of hybridisation ?



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96. Name the element that are included in the nitrogen family.



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97. What is the shape of ammonia molecule ?



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98. Which catalyst is used in the manufacture of ammonia by Haber's process ?



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99. Name two elements of group 15 of periodic table.



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100. What substance is used for dyeing ammonia gas ?



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101. What is anhydride of nitric acid?



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102. What is the bond angle in the molecules of ammonia ?



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103. Write the formula of nitric anhydride.



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104. What is the bond angle in NH_4^+ ion ?



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105. Why does NH_3 form hydrogen bond but PH_3 does not ?



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106. Give the disproportionation reaction of H_3PO_3 .



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107. Among CCl_4 , BF_3 , NH_3 and CO_2 ,
Which one has net dipole moment and why ?



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108. Why does $R_3P=O$ exist but $R_3N=O$ does not (R = alkyl group)?

Give reason for the following:

$(CH_3)_3P=O$ exists but $(CH_3)_2N=O$ does not



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109. Fill in the blanks : Red phosphorus is
reactive than white phosphorus as red

phosphorus is and consists of Of P_4
units



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110. Why is BiH_3 , the strongest reducing agent among all hydrides of group-15 elements?



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111. Why does NO_2 dimerises.



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112. PCl_5 is known but PI_5 is not known. Why ?



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113. Which is a strong reducing agent ?



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114. What is hydrogen bond ? How does it influence the properties of compounds ? Explain with two examples.



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115. Why is N_2 , less reactive at room temperature?



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116. What is the covalency of 'N' in N_2O_5 ?



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



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118. What is the basicity of H_3PO_4 ?



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119. Why does nitrogen exist as a diatomic molecule and is a gas at room temperature ?



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120. Explain why NH_3 , is basic, while BiH_3 , is only feebly basic?



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121. Why Bi does not form pentahalide ?



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122. H_3PO_3 is



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123. How are interhalogen compounds formed
? Give general formula.



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124. Draw the structure of ovum.



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125. The N-H bond in NH_3 is:



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126. An ionic compound is :



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127. Strongest reducing agent is:



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128. Why Bi does not form pentahalide ?



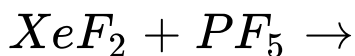
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129. Draw the molecular structure of oleum.



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130. Complete the following chemical equations :



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131. Phosphorus shows greater tendency for catenation than nitrogen. Give examples.



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132. Why PH_3 , has lower boiling point than NH_3 ?



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133. Give an example of sol.



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134. Write the structural formula of EDTA and also give its one use.





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