CHEMISTRY

BOOKS - EVERGREEN CHEMISTRY (ENGLISH)

STUDY OF COMPOUNDS - AMMONIA

Equation Worksheet

1. Ammonium chloride + alkali

$$NH_4Cl + Ca(OH)_2 \rightarrow {}_{\_}\ {}_{\_}\ + H_2O + {}_{\_}\ {}_{\_}\ [g]$$

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2. Ammonium chloride + alkali

$$NH_4Cl + NaOH \rightarrow {}_{\_}\ {}_{+}\ H_2O + {}_{\_}\ {}_{g}$$

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3. Ammounium sulphate + alkali

$(NH_4)_2SO_4 + NaOH \rightarrow$ _ _ _ $+ H_2O +$ _ $_g$

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4. Ammonium chloride + alkali

$NH_4Cl + Ca(OH)_2 \rightarrow$ _ _ _ $+ H_2O +$ _ _ _ $[g]$

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5. Sulphuric acid [conc.]

$NH_3 + H_2SO_4 \rightarrow$ _ _ _

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6. Phosphorus pentoxide

$NH_3 + P_2O_5 + H_2O \rightarrow$ _ _ _ _

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7. Calcium chloride

$NH_3 + CaCl_2 \rightarrow$ _ _ _ _

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8. Magnesium nitride

$Mg_3N_2 + H_2O \rightarrow$ _ _ _ _ + _ $_g$

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9. Calcium nitride

$Ca_3N_2 + H_2O \rightarrow$ _ _ + _ _ $[g]$

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10. Aluminium nitride

$AIN + H_2O \rightarrow$ _ _ + _ _ $[g]$

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11. Haber 's process

$N_2 + H_2 \Leftrightarrow$ _ _ _ $+ \Delta$

Temperature _____

Pressure _____

Catalyst _____

Favourable conditions :

_____[temperature (high/low)]

_____[pressure (high/low)]

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12. Burning of ammonia in oxygen

$NH_3 + O_2 \rightarrow$ _ _ _ + _ _ _ _

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13. Catalytic oxidation of amonia

$NH_3 + O_2 \xrightarrow[800^\circ C]{Pt}$ _ _ _ + _ _ _ + Δ

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14. Reaction with ammonia

$NH_3 + HCl \rightarrow$ _____

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15. Nitric acid

$NH_3 + HNO_3 \rightarrow$ _ _ _ _

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16. Sulphuric acid [conc.]

$NH_3 + H_2SO_4 \rightarrow$ _ _ _

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17. Water [Dissociation of aq . Soln]

$NH_3 + H_2O \rightarrow$ _ _ _

$[NH_4OH \Leftrightarrow NH_4^+ +$ _ _ _]

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18. Hydrochloric acid

$NH_4OH + HCl \rightarrow$

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19. Nitric acid

$NH_4OH + HNO_3 \rightarrow$

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20. Sulphurc acid

$NH_4OH + H_2SO_4 \rightarrow$

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21. Action of Sodium Hydroxide -On solutions of salts

1. Calcium nitrate & Magnesium chloride

2. Iron [II] sulphate

3. Iron [III] chloride

4. Copper [II] sulphate

5. Zinc sulphate

6. Lead nitrate

Complete and balanced the equations:

$FeSO_4 + NaOH \rightarrow \quad \_\_\_\_\_ + \_\_\_\_ \quad \downarrow$

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22. Complete and balanced the equations:

$FeCl_3 + NH_4OH \rightarrow \quad \_\_\_\_\_ + \_\_\_\_ \quad \downarrow$

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23. Complete the following reaction

$CuO + HCl \rightarrow$ _____ + _____

$NH_4OH + HCl \rightarrow$ _____ + _____

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24. Action of Ammonium Hydroxide- On solution of salts

Magnesium chloride Iron [III] chloride

Copper [II] sulphate

Zinc sulphate

Lead nitrate

Complete and balanced the equations:

$ZnSO_4 + NH_4OH \rightarrow$ _____ + _____ $\downarrow$

$\left[Zn(OH)_2 + (NH_4)_2SO_4 + NH_4OH \rightarrow [\text{in excess}] \text{ _____} + \text{_____} \right]$

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25. Complete and balanced the equations:

$CuSO_4 + NH_4OH \rightarrow \quad \_\_\_\_\_ + \_\_\_\_ \quad \downarrow$

$\left[Cu(OH)_2 + (NH_4)_2SO_4 + NH_4OH \rightarrow [\text{in excess}] \quad \_\_\_\_\_ + \_\_\_\_ \right]$

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26. Heated copper oxide

$CuO + NH_3 \rightarrow \_ \quad \_\_ \quad \_ + H_2O + \_ \quad \_\_ \; [g]$

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27. Heated lwad oxide

$PbO + NH_3 \rightarrow \_ \quad \_\_ \quad \_ \; H_2O + \_ \quad \_\_ \; [g]$

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28. Chlorine [ammonia in excess]

$NH_3 + Cl_2 \rightarrow_{\_} \ \_{\_} \ \_ \ + N_2[g]$

$NH_3 + HCl \rightarrow_{\_} \ \_{\_} \ \_$

$8NH_3 + Cl_2 \rightarrow_{\_} \ \_{\_} \ \_ \ +_{\_} \ \_{\_} \ \_ \ [g]$

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29. Chlorine [chlorine in excess]

$NH_3 + Cl_2 \rightarrow_{\_} \ \_{\_} \ \_{\_} \ \_+ \ \_{\_} \ \_{\_} \ \_$

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Questions

1. From the gases - ammonia , chlorine , hydrogen chloride , sulphur dioxide , select the gas that turns moist red litmus paper blue . Write the equation for the reaction - when the gas is passed over heated CuO.

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2. Name a gas whose solution in water is alkaline .

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3. How would you distinguish between $Zn^{2}+)$ and Pb^{2+} using ammonium hydroxide solution.

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4. Explain how Ammonia can be obtained by adding water to Magnesium nitride.

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5. How is ammonia collected . Why is ammonia not collected over water .

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6. The following questions are based on the preparation of ammonia gas in the laboratory :

Name the compound normally used as a drying agent during the process.

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7. From $NH_3, HCl, H_2S, SO_2 -$ Select : - i] The gas which when bubbled through $CuSO_4$ soln., a deep blue coloured soln is fromed . Ii] This gas burns in oxygen with a green flame .

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8. Write the equation for the reaction in the Haber s process that forms ammonia.

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9. State the purpose of liquefying the ammonia produced in the process .

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10. Write balanced chemical equation for the following: Chlorine reacts with excess of ammonia.

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11. Name the other ion formed when ammonia dissolves in water.

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12. Write equations for the following reactions :

A mixture of ammonium chloride and slaked lime is heated.

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13. Select from the list - Ammonia , Copper oxide ,Copper sulphate ,Hydrogen chloride,Hydrogen sulphide , Lead bromide :The

compound which is not a metal hydroxide but its aqueous solution is alkaline in nature .

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14. From the substances - Ammonium sulphate , Lead carbonate ,Chlorine ,Copper nitrate ,Iron [II] sulphate - A compound which on heating with $NaOH$ produces a gas which forms dense white fumes with HCl.

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15. State what is observed when excess of ammonia passed through an aqueous solution of lead nitrate.

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16. Name the substance used for drying ammonia.

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17. Write an equation to illustrate the reducing nature of ammonia.

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18. With reference to Haber's process for the preparation for ammonia, write the equation and the conditions required.

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19. Write balanced equations for the following reactions :

Ammonium sulphate from ammonia and dilute sulphuric acid.

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20. Write a balanced equation for a reaction in which ammonia is oxidised by: a metal oxide.

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21. You enter a laboratory after a class has completed the Fountain Experiment. How will you be able to tell whether the gas used in the experiment was hydrogen chloride or ammonia ?

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22. Ammonia can be obtained by adding water to Magnesium nitrate.

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23. Identify the following substances :

An alkaline gas which gives dense white fumes with hydrogen chloride.

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24. Write the equation for the following reaction :Magnesium nitride and water .

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25. Complete the table relating to an important industrial process .

[Output refers to the product of the process]

Name of process	Inputs	Catalyst	Equation for catalyzed reaction	Output
Haber process	Hydrogen +			

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26. Name the gas - that burns in oxygen with a green flame :

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27. Write a fully balanced equation for -Magnesium nitride is treated with warm water .

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28. Identify the substance Q based on the information given below: The white crystalline solid Q is soluble in water. It liberates a pungent smelling gas when heated with sodium hydroxide solution.

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29. Complete the blanksa] to to e] in the passage given , using the following words .[Ammonium ,reddish brown,hydroxyl,nitrogen dioxide ,ammonia ,dirty green alkaline , acidic].In the presence of a catalyst , nitrogen & hydrogen combine to give a] _____ gas. When the same gasispassed through water ,it formsa soln ,which will be b]_____ in nature & will contain the ions c]___& d]___.e]A ___ coloured ppt . of iron [II] hydroxide is formed when the above soln is added to iron [II] sulphate soln.

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30. State your observation for the following cases :

Ammonia gas is burnt in an atmosphere of oxygen in the absence of a catalyst.

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31. Write the equation for each of the following reactions :

Ammonium chloride is heated with sodium hydroxide.

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32. In the manufacture of ammonia ,I] Name the process ii] State the ratio of the reactants

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33. Write a relevant equation , to show that ammonia acts as a reducing agent.

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34. Name two gases which can be used in the study of the fountain experiment. State the common property demonstrated by the

fountain experiment.

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35. What would you observe in the following ? Ammonium hydroxide is first added in a small quantity and then in excess to a solution of copper sulphate.

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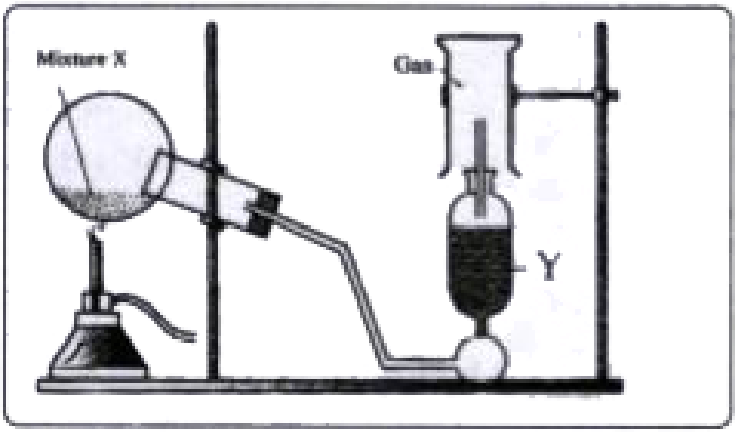
36. The diagram shows an experimental set up for the laboratory preparation of a pungent smelling gas. The gas is alkaline in nature.



Name the gas collected in the jar.

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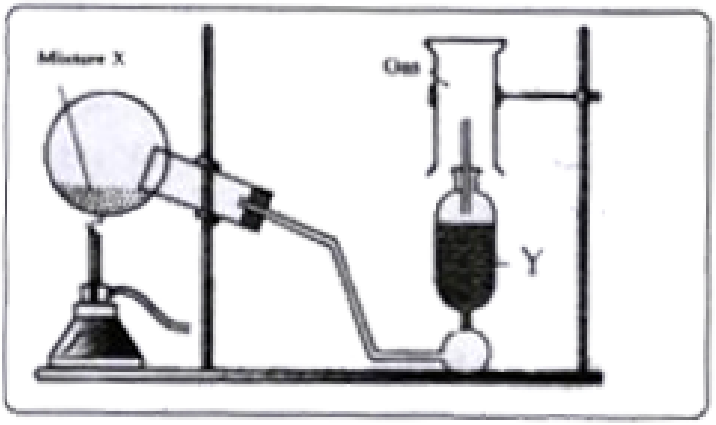
37. The diagram shows an experimental set up for the laboratory preparation of a pungent smelling gas. The gas is alkaline in nature.



Write the balanced equation for the above preparation.

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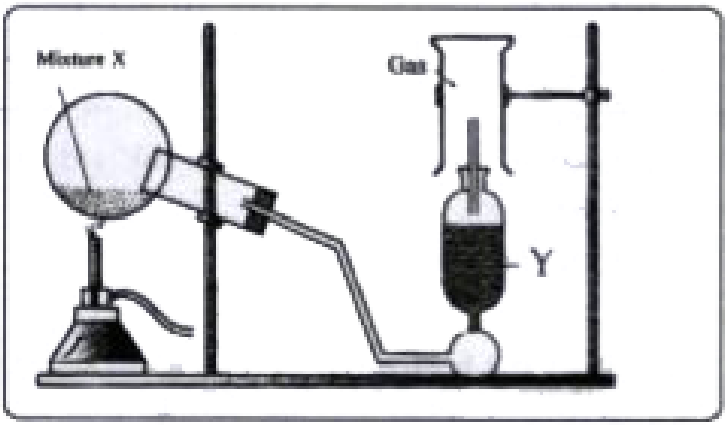
38. The diagram shows an experimental set up for the laboratory preparation of a pungent smelling gas. The gas is alkaline in nature.



How is the gas being collected ?

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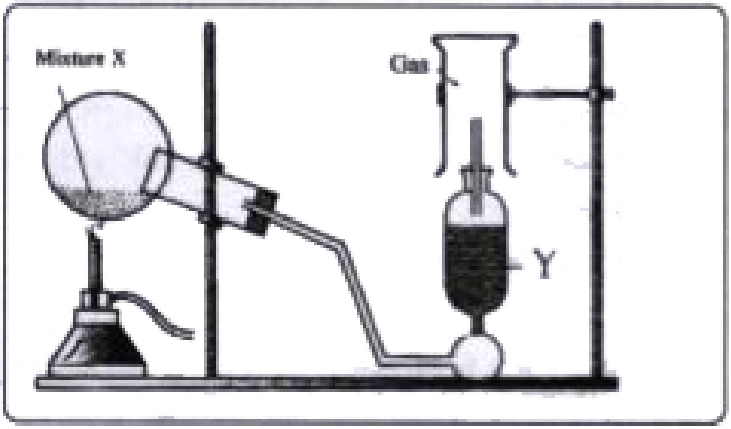
39. The diagram shows an experimental set up for the laboratory preparation of a pungent smelling gas. The gas is alkaline in nature.



Name the drying agent used.

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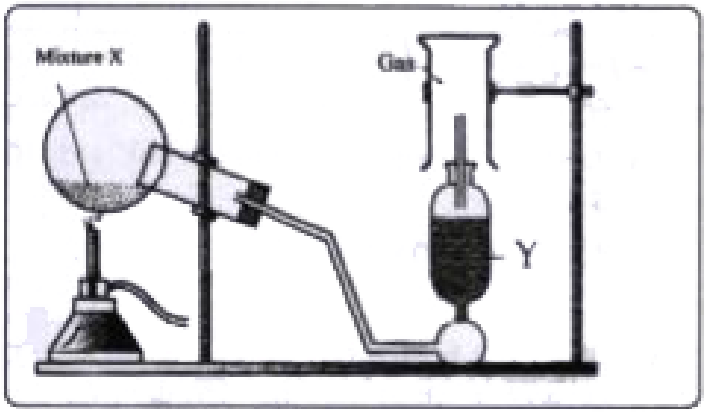
40. The diagram shows an experimental set up for the laboratory preparation of a pungent smelling gas. The gas is alkaline in nature.



How will you find that the jar is full of gas?

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41. Write balanced chemical equation for the following: Chlorine reacts with excess of ammonia.

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42. What would you observe in the following case ?

Water is added to the product formed, when aluminium is burnt in

a jar of nitrogen gas.

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43. Name the gas in the following: The gas produced when excess ammonia reacts with chlorine.

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44. Some word/words are missing in the following statement. You are required to rewrite the statement in the correct form using the appropriate word/words: Magnesium nitride reacts with water to liberate ammonia.

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45. Give balanced equation for the reaction : Ammonua & oxygen in the presence of a catalyst.

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46. The following questions are based on the preparation of ammonia gas in the laboratory :

Explain why ammonium nitrate is not used in the preparation of ammonia.

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47. State one appropriate observation for the following: Excess of chlorine gas is reacted with ammonia gas.

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48. Nitrogen gas can be obtained by heating : A: Ammonium nitrate B: Ammonium nitrte C: Magnesium nitride D: Ammonium chloride

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49. State two observations for : NH_4OH soln . Is added to zinc nitrate soln .slowly and then in excess.

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50. Give a balanced equation for : Reduction of hot Copper (II) oxide to copper using ammonia gas .

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51. State the -i] Temperature ii]Catalyst used in the Haber 's process for manufacture of ammonia. Give the equation for the catalyzed reaction.

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52. Identify : An alkaline gas which produces dense white fumes when reacted with HCl gas .

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53. Fill in the blank from the choices given within brackets :

Ammonia gas is collected by ..... (an upward displacement of air, a downward displacement of water, a downward displacement of air)

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54. Write balanced equation for : Action of warm water om magnesium nitride.

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55. Distinguish between the following pairs of compounds using the test given in bracket:

(i) Iron[II] sulphate & a zinc salt [using excess ammonium hydroxide]

(ii) A lead salt & a zinc salt [using excess ammonium hydroxide]

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56. State your observation :alcium hydroxide is heated with ammonium chloride crystals.

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57. Name the other ion formed when ammonia dissolves in water Give one test that can be used to detect the presence of the ion produced .

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58. State the conditions required for : Catalytic oxidation of ammonia to nitric oxide.

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59. From the list of the gases - Ammonia ethane,hydrogen chloride hydrogen sulphide,ethyne- Select the gas which is used as a reducing agent in reducing copper oxide to copper.

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60. State one relevant obervation - Ammonia gas is burn in a atmosphere of excess oxyen.

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61. A metal 'X' has valency 2 & a non - metal 'Y' has a valency 3. If 'Y' is a diatornic gas ,write an equation for the direct combination of X&Y to form a compound.

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62. Give balanced chemical eqauations for - i] Lab preparation of ammonia using an ammonium salt.

(ii) Reaction of ammonia with excess chlorine .iii] Reaction of ammonia with sulphuric acid.

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63. Write balanced equations for .i]Action of warm water on AIN .ii] Excess of ammonia is treated with chlorine iii] An equation to illustrate the reducing nature of ammonia.

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64. Name the gas evolved when the following mixtures are heated : i] Calcium hydroxide & Ammonium chloride ii] Sodium nitrite & Ammonium chloride

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65. Write the balanced chemical equation for each of the following - I] Reaction of ammonia with heated copper oxide.ii] Laboratory preparation of ammonia from ammonium chloride.

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66. State one relevant observation for the following reaction :

Burning of ammonia in air.

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67. Certain blanks spaces are lest in the following table as C,D & E.Identify each of them.

Lab preparation of	Reactants used	Products formed	Drying agent	Method of collection
NH_3 gas	C	$Mg(OH)_2$, NH_3	D	E

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68. Give a balanced chemical equation for each of the following -I]Catalytic oxidation of ammonia. Ii] Reaction of ammonia with nitric acid.

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69. Write the balanced chemical equation to prepare ammonia gas in the laboratory by using an alkali.

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70. Give areason why -i]Concentrated sulphuric acid ,is not used for drying ammonia gas ii] Ammonia gas is not collected over water.

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71. Fill in the blanks with the choices given in braket : Ammonia reacts with excess chlorine to form_____[nitrogen/nitrogen trichloride /ammonium chloride]

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72. State one obervation for the following : Ammonia gas is passed over heated copper [II] oxide.

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73. Identify the substance italicised : The catalyst used to oxidise ammonia.

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74. Name the gas evolved when : Ammonia reacts with heated copper [II] oxide

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75. Study the flow chart given & give balanced equations to represent the reactions A,B,&C.

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76. Copy and complete the following table which refers to the industrial method for preparation of - ammonia

Name of the compound	Name of the process	Catalytic equation [with the catalyst]
Ammonia		

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Additional Questions

1. State why nitrogenous matter produces ammoina .State a liquid source of ammonia .

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2. Give the word equation and balanced molecular equation for the laboratory preparation of ammonia from NH_4Cl and calcium hydroxide.

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3. Convert ammonium sulphate to ammonia using two different alkalis.

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4. State why ammonia is not obtained in the laboratory from NH_4NO_3 and $NaOH$.

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5. State the method used with reasons for drying and collecting ammonia gas.

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6. State how you would convert i] Mg ii]Ca iii]Al- to ammonia.

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7. Give a balanced equation with all conditions to obtain NH_3 from N_2 and H_2.

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8. State two physical properties of NH_3 which enable separation of NH_3 from a mixture of NH_3, N_2 and H_2.

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9. Compare the density of ammonia with that of air Name two gases lighter than ammonia.

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10. Ammonia is highly soluble in water Name two other gases showing similar solubility.

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11. Name the experiment and state its procedure to demonstrate the high solubility of ammonia.

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12. Give an equation for the burning of ammonia in oxygen .State the observation seen.

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13. Convert ammonia to nitric oxide by catalytic oxidation of ammonia .State all conditions.

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14. Explain catalytic oxidation of ammonia.

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15. Give reasons for the observation seen during catalytic oxidation of ammonia.

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16. Name an industrial process which involves ammonia ,oxygen and a catalyst as its starting reactants.

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17. State what an aqueous solution of NH_3 is called . State how it is prepared givin reasons.

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18. State why an aq. solution of NH_3 i] turns red litmus blue ii] is a weak base and a weak electrolyte.

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19. State two different methods of preparing NH_4Cl using hydrochloric acid.

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20. Convert i] ammonia ii] ammonium hydroxide to an ammonium salt using a] HNO_3 b] H_2SO_4.

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21. State a reason why reaction of liquor ammonia with nitric acid is a neutrlization reaction.

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22. State why an aqeous solution of ammonia $[NH_4OH]$ is used for identifying cations.

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23. State how NH_{40OH} is used for identifying i] Fe^{2+} ii] Fe^{3+} iii] Pb^{2+} iv] Zn^{2+} v]Cu^{2+} cations. Give also a balanced equation in each case for a known example.

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24. State why the blue ppt . Formed on addition of NH_4OH to $CuSO_4$ soln .dissoves to give adeep blue solution with excess of NH_4OH . Give an equation for the reaction . State why $Zn(OH)_2$ is soluble in excess of NH_4OH .

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25. Give balanced equations for the reducing reactions of ammonia with

i] copper [II] oxide ii] lead [II] oxide

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26. Sate five test for ammonia where a colour change is involved .

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27. State i] a light neutral gas ii] an acid ii] an explosive iii] a fertilizer - obtained from ammonia .

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28. Name an ammonium salt which is a constituent of a] smelling salts b] dry cells . Give reasons for the use of the named ammonium salt for the same .

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29. Give one use with reason of I] an aqueous solution of NH_3 ii] liquefied NH_3.

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30. State what are chlorofluorocarbons and give their use

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Unit Test Paper 7 B Ammonia

1. Choose the letter corresponding to the correct answer from - A: $NO_2, B: NO, C: N_2, D: N_2O$. The gas obtained when - Dry ammonia and dry oxygen gas are ingnited together.

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2. Choose the letter corresponding to the correct answer from - A: $NO_2, B: NO, C: N_2, D: N_2O$. The gas obtained when - Ammonia is passed over heated litharge.

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3. Choose the letter corresponding to the correct answer from - A: $NO_2, B: NO, C: N_2, D: N_2O$. The gas obtained when - A greenish yellow gas reacts with excess ammonia.

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4. Choose the letter corresponding to the correct answer from - A: $NO_2, B: NO, C: N_2, D: N_2O$. The gas obtained when - a] Dry $NH_3 \& O_2$ are passed over heated Pt . B] The gaseous product obtained is further oxidised.

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5. Choose the letter corresponding to the correct answer from - A: $NO_2, B: NO, C: N_2, D: N_2O$. The gas obtained when - Ammonium

nitrite undergoes thermal decomposition.

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6. State the colour of -

Phenolphthalein solution after passage of ammonia through it .

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7. State the clour of -

Copper [II] hydroxide solution after addition of ammonium hydroxide in excess to it .

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8. State the clour of -

The flame obtained on burning dry ammonia in oxygen .

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9. State the clour of -

The solution obtained on addition of excess ammonium hydroxide to zinc sulphate solution.

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10. State the clour of -

The vapours obtained when ammonia - oxyen gas mixture is passed over heated Pt.

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11. Give balanced equations for the following conversions -A,B,C,D&E.

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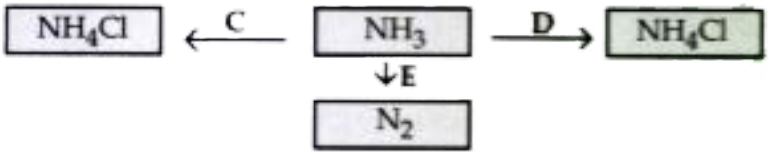
12. Give balanced equations for the following coversions C,D&E.



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13. Give reasins for the following .

An aqueous solution of ammonia acts as a weak base.

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14. Give reasons for the following .

A mixture of ammonium nitrate and slaked lime are not used in the lab preparation of ammonia gas .

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15. Give reasons for the following .

Finely divided iron catalyst does not affect the percentage yield of ammonia in Haber 's process.

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16. Give reasons for the following .

Ammonium salts are formed when ammonia reacts with dilute acids in the gaseous or aq medium.

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17. Give reasons for the following .

Aqueous solution of lead and zinc nitrate can be distinguished

using an aqueous solution of ammonia .

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18. Complete the statements by selecting the correct word from the word in brackets. The salt solution which does not give an insoluble precipitate on addition of ammonium hydroxide in small amount it _____ $[Mg(NO_3)_2 / NaNO_3 / Cu(NO_3)_2]$

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19. Complete the statements by selecting the correct word from the word in brackets. The alkaline behaviour of liquor ammonia is due to the presence of _____ ions. [ammonium/hydronium/hydroxyl]

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20. Complete the statements by selecting the correct word from the word in brackets. Ammonia in the liquefied form is ____[acidic/basic/neutral]

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21. Complete the statements by selecting the correct word from the word in brackets. Ammonia in the liquefied form is ____[acidic/basic/neutral]

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22. Complete the statements by selecting the correct word from the word in brackets.

The chemical not responsible for ozone depletion is _____[methyl chloride /ammonia/ chloroflourocarbons]

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