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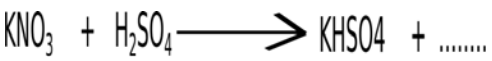
Qn No. 1 *Chapter Name:Compounds of Nonmetals*

Qn.
The equation showing the reaction between potassium nitrate (KNO_3) and sulphuric acid (H_2SO_4) is given



a) Complete the equation

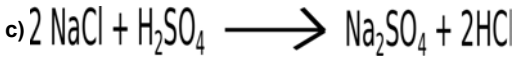
b) Which of the given salts react with H_2SO_4 to form HCl

($NaNO_3$, $Mg(OH)_2$, $CaSO_4$, NaCl)

c) Write down the equation to represent the above reaction

Hint.
a) HNO_3

b) NaCl

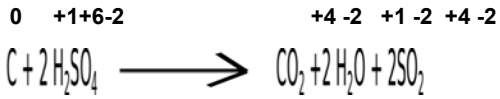
c) 

Marks :(3)

Hide Answer

Qn No. 2 ***Chapter Name:Compounds of Nonmetals***

Qn.
The equation of the reaction of Conc.H_2SO_4 with carbon is given



a) The oxydation state of which one gets increased

b) Which is the reducing agent?

c) Which substance gets reduced?

Hint.
a) C

b) C

c) H_2SO_4

Marks :(3)

Hide Answer

Qn No. 3 ***Chapter Name:Compounds of Nonmetals***

Qn.
When a few drops of an acid was added to blue copper sulphate crystals it was decolourised.

a) Which acid shows the above property?

b) Name the process of manufacture of the acid

c) Write any one use of the acid

Hint.
a) H_2SO_4

b) Contact process

c) Any one use

Marks :(3)

Hide Answer

Qn No. 4 ***Chapter Name:Compounds of Nonmetals***

Qn.
a) Choose the chemicals used to prepare ammonia from the box given below

KNO_3 , $BaCl_2$, NH_4Cl , NaCl , $Ca(OH)_2$, H_2SO_4

b) Complete the equation

$NH_3 + H_2O \longrightarrow$ .....

c) Liquor ammonia : concentrated aquous solution of ammonia

Liquid ammonia : . .....

Hint.
a) NH_4Cl , $Ca(OH)_2$

b) NH_4OH

c) Liquified ammonia

Marks :(4)

Hide Answer

Qn No. 5 ***Chapter Name:Compounds of Nonmetals***

Qn.
A pungent smell was felt when calcium hydroxide and ammonium chloride were mixed in a glass jar. The equation of the same is given below

$2\,NH_4Cl + Ca(OH)_2 \longrightarrow CaCl_2 + 2\,H_2O + 2NH_3$

a) Which is the gas formed here?

b) Write any one physical property of the gas formed

c) Write any one use of the gas formed

.

Hint.
a) Ammonia

b) Pungent smell / dissolve in water/ Density of ammonia is less than that of air

c) For the manufacture of chemical fertilisers / as a refrigent

Marks :(3)

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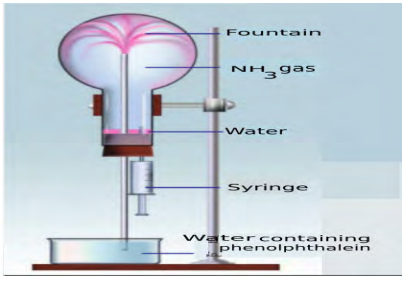
Qn No. 6 ***Chapter Name:Compounds of Nonmetals***

Qn.

Analyse the figure and answer the questions



a) Why did water get into the flask on pressing the piston of syringe

b) What property of ammonia is exhibited by the change of colour of water entering the flask in to pink?

c) Complete the equation

$NH_3 + H_2O \longrightarrow$ .....

Hint.
(a) Decreasing the pressure in the flasks

(b) Basic nature

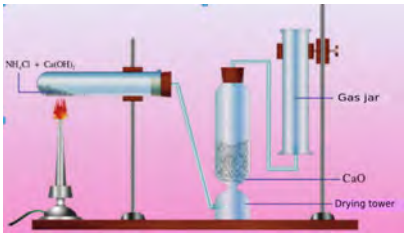
(c) $NH_3 + H_2O \longrightarrow NH_4OH$

Marks :(3)

Hide Answer

Qn No. 7 ***Chapter Name:Compounds of Nonmetals***

Qn.
The figure of preparation of Ammonia in the laboratory is given



a) Complete the equation

$$2\,NH_4Cl + Ca(OH)_2 \longrightarrow CaCl_2 + 2\,H_2O + ...$$

b) Why is the gas formed passed through the drying tower?

c)Can sulphuric acid be used as the drying agent in ammonia preparation. Why?

d) Ammonia is collected in an inverted gas jar. Why?

Hint.

a)

$$2\,NH_4Cl + Ca(OH)_2 \longrightarrow CaCl_2 + 2\,H_2O + 2NH_3$$

b) To remove the moisture

c) Ammonia is a base and it reacts with sulphuric acid

d) Density of ammonia is less than that of air

Marks :(4)

Hide Answer

Qn No. 8 ***Chapter Name:Compounds of Nonmetals***

Qn.

The equation of manufacture of ammonia is given

$$N_2 + 3H_2 \xrightarrow[\text{High pressure / Temperature}]{\text{Catalyst}} 2NH_3$$

a) Name the process

b) Give any one use of ammonia

c) How can you identify Ammonia

Hint.

a) Haber process

b) For the manufacture of chemical fertilisers / as a refrigent

c) White fumes are formed when a glass tube dipped in HCl is shown in ammonia gas

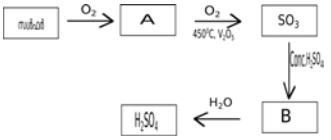
Marks :(2)

Hide Answer

Qn No. 9 ***Chapter Name:Compounds of Nonmetals***

Qn.

The flow chart of manufacture of sulphuric acid is given.



a) What are A and B

b) Sulphuric acid will be formed on dissolution of SO_3 in water. But this is not used in the manufacturing process.Why?

c) Write any one use of sulphuric acid

Hint.
a) A - SO_2

B - $H_2S_2O_7$

b) Dissolution of SO_3 in water is an exothermic process. So the droplets of H_2SO_4 formed causes 'fog' preventing further dissolution.

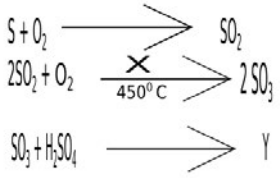
c) Any one use

Marks :(4)

Hide Answer

Qn No. 10 ***Chapter Name:Compounds of Nonmetals***

Qn.
Different stages of manufacture of sulphuric acid are given below.



a) What are X and Y

b) How is Y converted to H_2SO_4

c) Name the process of manufacture of sulphuric acid

Hint.
a) X - V_2O_5

Y - $H_2S_2O_7$ (Oleum)

b) By dissolving oleum ($H_2S_2O_7$ or Y) in water.

c) Contact process

Marks :(4)

Hide Answer

Qn No. 11 ***Chapter Name:Compounds of Nonmetals***

Qn.
Which property of sulphuric acid is exhibited in the following reactions?

.

I) $C + H_2SO_4 \longrightarrow CO_2 + H_2O + SO_2$

II) $C_{12}H_{22}O_{11} \xrightarrow{Conc.H2SO4} 12C + 11H_2O$

Hint.
a) Oxidising property

b) Dehydrating property

Marks :(2)

Hide Answer

Qn No. 12 ***Chapter Name:Compounds of Nonmetals***

Qn.
a) A black substance is obtained when a few drops of Conc.H_2SO_4 is added to a little sugar taken in a watch glass. Identify the substance

b) Which property of sulphuric acid is exhibited here?

c) Complete the eqution

$C_{12}H_{22}O_{11} \xrightarrow{Conc.H2SO4} 12C + ...$

Hint.
a) carbon / C

b) Dehydration

c) 11 H_2O

Marks :(3)

Hide Answer

Qn No. 13 ***Chapter Name:Compounds of Nonmetals***

Qn.
Equation of the reaction between Cu and H_2SO_4 is given

$Cu + 2H_2SO_4 \longrightarrow CuSO_4 + 2H_2O + 2SO_2$ **a) The oxidation number of which one gets increased?**

b) Which substance gets reduced?

c) Which is the reducing agent?

Hint.
a) Cu

b) H_2SO_4

c) Cu

Marks :(3)

Hide Answer

Qn No. 14 *Chapter Name:Compounds of Nonmetals*

Qn.
Write down an experiment to identify sulphate salts?

Hint.

Experiment	Observation
Add a little barium chloride solution to the sulphate solution taken in a test tube	A thick white precipitate is formed
To thick white precipitate add 2-3 drops of conc.HCl	white precipitate which does not dissolve in dil.HCl

Marks :(4)

Hide Answer

Qn No. 15 *Chapter Name:Compounds of Nonmetals*

Qn.
Complete the equation

$Cu + 2H_2SO_4 \longrightarrow CuSO_4 + 2H_2O +$.....

b) Which is the oxidising agent in this reaction?

Hint.
a) SO_2

b) Sulphuric acid

Marks :(2)

Hide Answer

Qn No. 16 *Chapter Name:Compounds of Nonmetals*

Qn.
Equation of the reaction between Cu and H_2SO_4 is given

$Cu + 2H_2SO_4 \longrightarrow CuSO_4 + 2H_2O + 2SO_2$ **a) The oxidation number of which one gets increased?**

b) Which substance gets reduced?

c) Which is the reducing agent?

Hint.
a) Cu

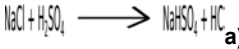
b) H_2SO_4

c) Cu

Marks :(3)

Hide Answer

Qn No. 17 ***Chapter Name:Compounds of Nonmetals***

Qn.

a) In the above reaction sodium chloride reacts with sulphuric acid to form hydrochloric acid. Like wise, if you want to prepare nitric acid which is the salt to be used

b) Write the equation of the reaction

Hint.
a) KNO_3 / Any one Nitrate salt

b) $KNO_3 + H_2SO_4 \rightarrow KHSO_4 + HNO_3$

Marks :(2)

Hide Answer

Qn No. 18 ***Chapter Name:Compounds of Nonmetals***

Qn.
a) Gases like Cl_2 , SO_2 , HCl are passed through Conc. H_2SO_4 during their laboratory preparation. Which property of sulphuric acid is utilised here?

b) NH_3 gas is not passed through H_2SO_4 during its lab preparation. Why?

Hint.
a) Property as a drying agent

b) Ammonia which is basic reacts with sulphuric acid

Marks :(2)

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Hide Answer

Qn No. 19 *Chapter Name:Compounds of Nonmetals*

Qn.
A few drops of Conc. H_2SO_4 are added to a little sugar crystals taken in a watch glass

a) What will be the observation?

b) Analyse the equation and explain the reason

$$C_{12}H_{22}O_{11} \xrightarrow{\text{Conc. } H_2SO_4} 12\,C + H_2O$$

c) Which property of sulphuric acid is exhibited here?

Hint.
a) Black/Brown colour develops

b) Sulphuric acid absorbs the elements hydrogen and oxygen present in sugar in the ratio 2:1 after converting it into water. So the sugar gets charred.

(or is converted to carbon)

c) Dehydration

Marks :(3)

Hide Answer

Qn No. 20 *Chapter Name:Compounds of Nonmetals*

Qn.
Why SO_3 is dissolved in concentrated sulphuric acid instead of in water during the manufacture of sulphuric acid?

Hint.
Dissolution of SO_3 in water is an exothermic process. So the droplets of sulphuric acid formed first forms fog which prevents the further dissolution

Marks :(2)

Hide Answer

Qn No. 21 *Chapter Name:Compounds of Nonmetals*

Qn.
$NaCl + H_2SO_4 \longrightarrow NaHSO_4 + HC$ **a) In the above reaction sodium chloride reacts with sulphuric acid to form hydrochloric acid. Like wise, if you want to prepare nitric acid which is the salt to be used**

b) Write the equation of the reaction

Hint.

a) KNO_3 / Any one Nitrate salt

b) $KNO_3 + H_2SO_4 \rightarrow KHSO_4 + HNO_3$

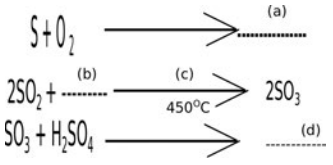
Marks :(2)

Hide Answer

Qn No. 22 ***Chapter Name:Compounds of Nonmetals***

Qn.

Complete the following equations related with the manufacture of sulphuric acid



i) Write a,b,c,d

ii) How is sulphuric acid prepared from oleum

Hint.

i) a - SO_2

b - O_2

c - Vanadium pentoxide/V_2O_5

d - $H_2S_2O_7$

ii) Oleum dissolved in water

Marks :(3)

Hide Answer

Qn No. 23 ***Chapter Name:Compounds of Nonmetals***

Qn.

a) Name the process of manufacture of sulphuric acid ?

b) Which is the catalyst used in this process ?

Hint.

a) Contact process

b) Vanadium pentoxide /V_2O_5

Marks :(2)

Hide Answer

Qn No. 24 *Chapter Name:Compounds of Nonmetals*

Qn.
Carboxylic acid + Alcohol + Heat ⇋ Ester + Water

a. In order to get ester we have to heat the mixture. Do you agree with this statement. Explain your answer based on Le-Chatelier's Principle

b. What will happen to the forward reaction if the water formed in the system is removed from this system

Hint.
a. As the forward reaction is endothermic, heating leads to the formation of more amount of product

b. Rate of forward reaction increases

Marks :(4)

Hide Answer

Qn No. 25 *Chapter Name:Compounds of Nonmetals*

Qn.
$H_2 + I_2 \leftrightharpoons 2HI + Heat$

Consider the equilibrium and answer the questions

a. Which reaction is favoured on increasing the concentration of I_2

b. What is the effect of pressure on this equilibrium

c. HI is to be kept at low temperature to prevent decomposition. What is your opinion about this statement

Hint.
a. Forward reaction

b. Pressure has no effect

c. High temperatures favour the backward reaction, decomposition of HI. So it is to be kept at low temperature to prevent dissociation

Marks :(3)

Hide Answer

Qn No. 26 *Chapter Name:Compounds of Nonmetals*

Qn.
$N_2O_{4(g)} \leftrightharpoons 2NO_{2(g)}$

Consider this equilibrium and complete the table given below

Activity	Change in rate of forward reaction
• Heats	•
• Increase the pressure	•
• Removes NO_2	•

Hint.
a. Increases

b. Decreases

c. Increases

Marks :(3)

Hide Answer

Qn No. 27 ***Chapter Name:Compounds of Nonmetals***

Qn.
Equation showing the decomposition of calcium cabonate is given.

$CaCO_{3(s)}$ + Heat $\leftrightharpoons$ $CaO_{(g)}$ + $CO_{2(g)}$

Say whether high temperature or low temperature is preferrable to enhance the rate of forward reaction

Hint.
High temperature. As the forward reaction is endothermic, high temperature enhances the rate of forward reaction.

Marks :(2)

Hide Answer

Qn No. 28 ***Chapter Name:Compounds of Nonmetals***

Qn.
Equation of ammonia manufacture is given

N_2+3H_2 $\leftrightharpoons$ 2NH_3 + Heat

a. Name the process of manufacture of ammonia.

b. What is the effect of pressure in the equilibrium?

c. Though the forward reaction is exothermic a comparatively high temperature of 450^0c is used here, why?

Hint.
a. Haber process

b. Rate of forward reaction increases when the pressure is increased.

c. As the forward reaction is exothermic a low temperature can be preferred. But at low temperature, the speed of forward reaction will be low as the number of molecules possessing threshold energy is less. So optimum temperature of 450^0c is used.

Marks :(4)

Hide Answer

Qn No. 29 ***Chapter Name:Compounds of Nonmetals***

Qn.
$N_2 + O_2 + Heat \leftrightharpoons 2NO$

How does each of the factors given below affect the rate of forward reaction?

a. Decrease in temperature

b. Increase in pressure

c. Removal of NO

Hint.
a. Rate of forward reaction decreases

b. Does not have any effect in this reaction

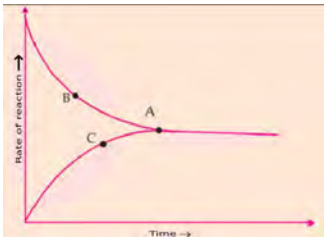
c. Rate of forward reaction increases

Marks :(3)

Hide Answer

Qn No. 30 ***Chapter Name:Compounds of Nonmetals***

Qn.
The graph representing a reversible reaction is given.



a. Which of the graph represents backward reaction?

b. At which point does the system attain equilibrium?

c. When a system attains equilibrium, the concentration of reactants and products will not change. Why?

Hint.
a. AC

b. A

c. Rate of forward and backward reactions are equal

Marks :(3)

Hide Answer

Qn No. 31 *Chapter Name:Compounds of Nonmetals*

Qn.

$CO_{(g)} + H_2O_{(g)} \leftrightharpoons CO_{2(g)} + H_{2(g)}$

How do the factors given below affect the above system at equilibrium.

a Carbon dioxide is removed

b. More carbonmonoxide is added

c More hydrogen is added

Hint.

a. Rate of forward reaction is increased

b. Rate of forward reaction is increased

c Rate of forward reaction is decreased

Marks :(3)

Hide Answer

Qn No. 32 *Chapter Name:Compounds of Nonmetals*

Qn.

$N_{2(g)} + 3H_{2(g)} \leftrightharpoons 2NH_{3(g)}$

Consider the system at equilibrium

a. Write any two methods to increase the amount of product.

b. Which is the catalyst that can be used here?

c. What is the effect of a catalyst on an equilibrium?

Hint.

a. Any two methods

b. Iron

c. A catalyst increase simultaneously the rate of forward and backward reactions, so the system can attain equilibrium very fast.

Marks :(4)

Hide Answer

Qn No. 33 *Chapter Name:Compounds of Nonmetals*

Qn.

$2SO_{2(g)} + O_{2(g)} \leftrightharpoons 2SO_{3(g)}$ + Heat

a. How will the increase in the amount of oxygen affect the forward reaction?

b. Will an increase in pressure help formation of more amount of products.

Hint.
a. Rate of forward reaction increases

b. Yes. According to Le- Chateleir principle, at high pressure, the system tries to decrease the volume by decreasing the number of gaseous molecules. Rate of forward reaction increases.

Marks :(3)

Hide Answer

Qn No. 34 *Chapter Name:Compounds of Nonmetals*

Qn.
Consider the following chemical equilibrium

14. $2CO(g) + O_2(g) \leftrightharpoons 2CO_2(g)$

a. What are the reactants

b. What will happen to the equilibrium if more oxygen is added to the system. Explain

c. What will be the effect of increase in pressure on the forward reaction

Hint.
a. CO, O_2 (1)

b. According to the Le-Chateleir principle the system adjusts in such a way as to decrease the amount of oxygen.So the rate of forward reaction increases to form more products.

c. Increase the rate of forward reaction.

Marks :(4)

Hide Answer

Qn No. 35 *Chapter Name:Compounds of Nonmetals*

Qn.
$N_2(g) + 3H_2(g) \leftrightharpoons 2NH_3(g)$ + താപം

What will be the effect of the following factors on the system at equilibrium

a. Ammonia is removed from the system

b. Decreased the temperature

c. Decreased the pressure

d. Hydrogen is added

Hint.
a. Rate of forward reaction is increased to form more amount of product

b. Rate of forward reaction is increased

c. Increase the rate of backward reaction

d. Increase the rate of forward reaction

Marks :(4)

Hide Answer

Qn No. 36 ***Chapter Name:Compounds of Nonmetals***

Qn.
12. A,B and C are three gases .1 mole of A reacts reversibly with 1 mole of B to form 2 mole of C.

a. Write the equation of the above reaction?

b. What will be the effect of pressure on this system when it attains equilibrium

c. What will happen to the equilibrium when more of A is added to the system

d. What will happen to the system at equilibrium when the amount of C is increased

Hint.
a. $A + B \leftrightharpoons 2C$

b. Pressure has no effect

c. Increase the rate of forward reaction to form more amount of products.

d. Increase the rate of backward reaction.

Marks :(4)

Hide Answer

Qn No. 37 ***Chapter Name:Compounds of Nonmetals***

Qn.
$2HI_{(g)} + Heat \leftrightharpoons H_{2(g)} + I_{2(g)}$

Which among the following factor does not affect the system at equlibrium. Why?

(i) Increased the concentration of reactants

(ii) Added more hydrogen

(iii) Increased the temperature

(iv) Increased the pressure

Hint.
Increased the pressure. As the number of gaseous reactant molecules and gaseous product molecules are the same, pressure has no effect on this equilibrium.

Marks :(2)

Hide Answer

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Qn No. 38 *Chapter Name:Compounds of Nonmetals*

Qn.
A system at equilibrium is given

$N_{2\,(g)} + 3H_{2\,(g)} \leftrightharpoons 2NH_{3\,(g)} + Heat$

(a) When does a reversible reaction attain equilibrium.

(b) What change occur in concentration of reactants and products when the system is equilibrium

(Concetration of reactant is equal to the concentration of product, Concentration of reactants and concentration of products remain as such, Concentration of product increases)

Hint.
a) When the rate of forward reaction and rate of backward reaction become equal.

b) Concentration of reactants and concentration of products remain as such

Marks :(2)

Hide Answer

Qn No. 39 *Chapter Name:Compounds of Nonmetals*

Qn.
Which among the following does not affect the rate of chemical reaction

(Temperature, Pressure, Colour of reactants, Concentration)

Hint.
Colour of reactants

Marks :(1)

Hide Answer

Qn No. 40 *Chapter Name:Compounds of Nonmetals*

Qn.
Optimum temperature used in the manufacture of ammonia is ----------

Hint.450^0C ***Marks :(1)***

Hide Answer

Qn No. 41 *Chapter Name:Compounds of Nonmetals*

Qn.
$H_2(g) + I_2(g) \leftrightharpoons 2HI(g)$

Which of the following does not have any effect on the equilibrium?

.

(Temperature ,Pressure ,Concentration)

Hint.
Pressure

Marks :(1)

Hide Answer

Qn No. 42 ***Chapter Name:Compounds of Nonmetals***

Qn.
A System at equilibrium is given

$N_2O_{4\,(g)} \leftrightharpoons 2NO_{2\,(g)}$

Write any two conditions which favour the formation of the NO_2 gas

Hint.
Decrease the pressure

Increase the temperature

Marks :(2)

Hide Answer

Qn No. 43 ***Chapter Name:Compounds of Nonmetals***

Qn.
Which of the following equilibria is not affected by change in pressure? Why?

i. $H_{2\,(g)} + I_{2\,(g)} \leftrightharpoons 2HI_{(g)}$

ii. $N_2O_{4\,(g)} \leftrightharpoons 2NO_{2\,(g)}$

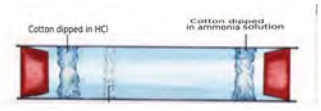
Hint.
i) First case .In this case number of molecules of the reactants and products are same

Marks :(2)

Hide Answer

Qn No. 44 ***Chapter Name:Compounds of Nonmetals***

Qn.
Two bits of cotton wool dipped separately in Con HCl and ammonia solution are placed at the ends of a glass tube as shown in the figure.



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a) What is the white fume formed by the reaction ?

b.Why is the thick white fume formed near the cotton wool dipped in Con.HCl.

Hint.
a. Ammonium chloride

b. Density of ammonia is lower than that of HCl

Marks :(2)

Hide Answer

Qn No. 45 ***Chapter Name:Compounds of Nonmetals***

Qn.
A glass rod dipped in con HCl is shown in a gas jar filled with ammonia

a) Write the observation

b) $NH_3 + HCl \rightarrow$ *.....*

Hint.
a) Dense white forms are formed

b) NH_4Cl **.**

Marks :(2)

Hide Answer

Qn No. 46 ***Chapter Name:Compounds of Nonmetals***

Qn.
What is the difference between liquor ammonia and liquid ammonia.

Hint.
Concentrated aqueous solution is liquor ammonia

Ammonia gas liquefied by high pressure is called liquid ammonia

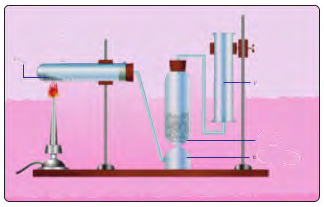
Marks :(2)

Hide Answer

Qn No. 47 ***Chapter Name:Compounds of Nonmetals***

Qn.
Observe the figure showing the the laboratory preparation of ammonia and answer the question

.



a) Through which substance is ammonia passed to make it dry ?

b) Ammonia is collected in an inverted gas jar. why?

c) Complete the equation

$2NH_4Cl + Ca(OH)_2$ ..... $+_2$.....+ H O

Hint.
a) Calcium oxide

b) Density of ammonia is less than that of air

c) $CaCl_2$, $2NH_3$

Marks :(3)

Hide Answer

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