



ST. LAWRENCE HIGH SCHOOL



A JESUIT CHRISTIAN MINORITY INSTITUTION

- **Subject :Chemistry Answers ofWorksheet- 1Class -IX**
- **Date : 11.05.2020**
- **Chapter: Acids,bases and salts**
- **Answer the following questions (MCQ) : (1×15)**

Question 1.Choose the correct answer:

(a) The nitrate salt which does not give a mixture of NO_2 and O_2 on heating is:

- (i) AgNO_3
- (ii) KNO_3
- (iii) $\text{Cu(NO}_3)_2$
- (iv) $\text{Zn(NO}_3)_2$

(b) The chemical used in the brown ring test is:

- (i) CuSO_4
- (ii) FeSO_4
- (iii) $\text{Fe}_2(\text{SO}_4)_3$
- (iv) ZnSO_4

(c) Lead nitrate decomposes on heating to give:

- (i) NO
- (ii) N_2O
- (iii) NO_2
- (iv) N_2O_5

Solution 1

- (a) KNO_3
- (b) FeSO_4
- (c) NO_2

Question 2

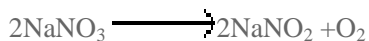
Name: _____

(a) A nitrate of metal which on heating does not give nitrogen dioxide. _____

- (b) A nitrate which on heating leaves no residue behind.
 (c) A metal nitrate which on heating is changed into metal oxide.
 (d) A metal nitrate which on heating is changed into metal.
 (e) A solution which absorbs nitric oxide.
 (f) The oxide of nitrogen which turns brown on exposure to air. How is it prepared?

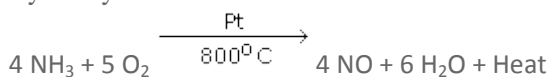
Solution 2

- (a) Sodium nitrate



- (b) A nitrate which on heating leaves no residue behind- Ammonium nitrate.
 (c) A metal nitrate which on heating is changed into metal oxide- Calcium nitrate
 (d) A metal nitrate which on heating is changed into metal- Silver nitrate
 (e) A solution which absorbs nitric oxide- Freshly prepared ferrous sulphate
 (f) The oxide of nitrogen which turns brown on exposure to air. - nitric oxide

By catalytic oxidation of ammonia.



Question 3

Mention three important uses of nitric acid. Give the property of nitric acid involved in the use.

Solution 3

Three important uses of Nitric acid and the property of nitric acid involved is:

S.NO.	Use	Property
1.	To etch designs on copper and brassware.	Nitric acid act as solvent for large number of metals.
2.	To purify gold.	Impurities like Cu, Ag, Zn, etc. dissolve in nitric acid.
3.	Preparation of aqua regia.	Dissolves noble metals.

Question 4

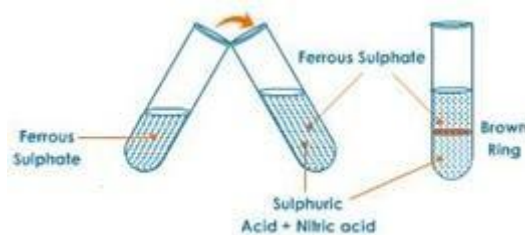
- (a) Explain with the help of a balanced equation, the brown ring test for nitric acid.
 (b) Why is freshly prepared ferrous sulphate solution used for testing the nitrate radical in the brown ring test?

Solution 4

(a) Brown ring test

Procedure:

- (i) Add freshly prepared saturated solution of iron (II)sulphate to the aq. solution of nitric acid.
- (ii) Now add conc. Sulphuric acid carefully from the sides of the test tube, so that it should not fall drop wise in the test tube.
- (iii) Cool the test tube in water.
- (iv) A brown ring appears at the junction of the two liquids.



(b) A freshly prepared ferrous sulphate solution is used because on exposure to the atmosphere, it is oxidized to ferric sulphate which will not give the brown ring.

Question 5

From the following list of substances, choose one substance in each case which matches the description given below:

Ammonium nitrate, Calcium hydrogen carbonate, copper carbonate, lead nitrate, potassium nitrate, sodium carbonate, sodium hydrogen carbonate, zinc carbonate.

- (a) A nitrate which gives off only oxygen when heated.
- (b) A nitrate which on heating decomposes into dinitrogen oxide (nitrous oxide) and steam.
- (c) A nitrate which gives off oxygen and nitrogen dioxide when heated.

Solution 5

- (a) Potassium nitrate
- (b) Ammonium nitrate
- (c) Lead nitrate

Question 6

The action of heat on the blue crystalline solid X gives a reddish brown gas Y, a gas which re-lights a glowing splint and leaves a black residue. When gas Z, which has a rotten egg smell, is passed through a solution of X, a black ppt. is formed.

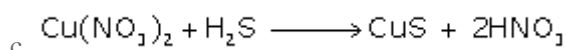
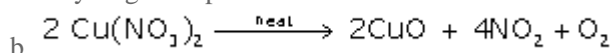
- Identify X, Y and Z.
- Write the equation for action of heat on X.
- Write the equation between solution X and gas Z.

Solution 6

a. X is copper nitrate.

Y is nitrogen dioxide.

Z is hydrogen sulphate.



Question 7

X, Y and Z are three crystalline solids which are soluble in water and have common anion.

To help you to identify X, Y and Z you are provided with the following experimental observations. Copy and complete the corresponding inferences in (a) to (f).

(a) A reddish-brown gas is obtained when X, Y and Z are separately warmed with concentrated sulphuric acid and copper turning added to the mixture.

Inference 1: The common anion is the _____ ion.

(b) When X is heated, it melts and gives off only one gas which re-lights a glowing splint.

Inference 2: The cation in X is either _____ or _____.

(c) The action of heat on Y produces a reddish brown gas and yellow residue which fuses with glass of the test tube.

Inference 3: The metal ion present in Y is the _____ ion.

(d) When Z is heated, it leaves no residue. Warming Z with sodium hydroxide solution liberates a gas which turns moist red litmus paper blue.

Inference 4: Z contains the _____ cation.

(e) Write the equations for the following reactions:

(1) X and concentrated sulphuric acid (below 200°C). (One equation only for either of the cations given in Inference 2)

(2) Action of heat on Y.

(3) Concentrated nitric acid is added to copper turnings kept in a beaker.

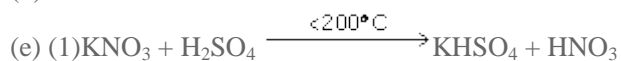
Solution 7

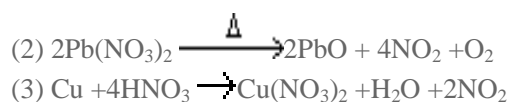
(a) Nitrate.

(b) Sodium or potassium

(c) Lead

(d) Ammonia





Question 8

a. Dilute nitric acid is generally considered a typical acid except for its reaction with metals. In what way is dilute nitric acid different from other acids when it reacts with metals?

b. Write the equation for the reaction of dilute nitric acid and conc. nitric acid with copper.

Solution 8

a. Dilute nitric acid is generally considered a typical acid except for its reaction with metals because it does not liberate hydrogen. It is a powerful oxidising agent, and nascent oxygen formed oxidises hydrogen in water.

b.

i. Reaction of dilute nitric acid with copper:



ii. Reaction of conc. nitric acid with copper:



Question 9

Explain why:

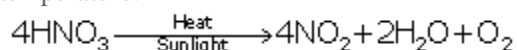
a. Only all-glass apparatus should be used for the preparation of nitric acid by heating concentrated sulphuric acid and potassium nitrate.

b. Nitric acid is kept in a reagent bottle for a long time.

Solution 9

a. The glass apparatus is purposely used because nitric acid vapours are highly corrosive in nature and corrode cork, rubber etc. if used as a stopper.

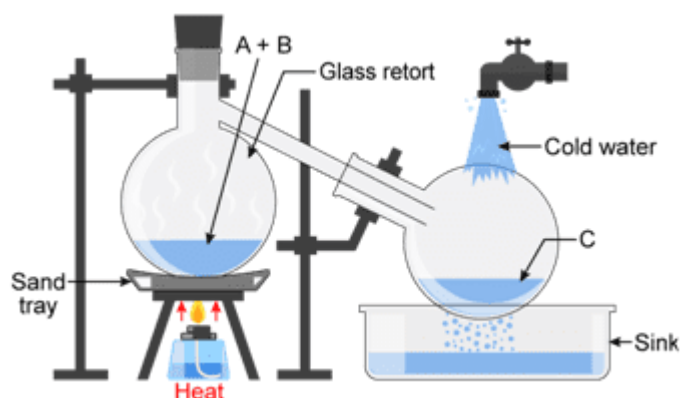
b. Pure nitric acid is unstable to heat or sunlight. In the presence of sunlight, it decomposes even at room temperature.



Nitric acid stored in a bottle turns yellow. This colour is due to dissolved NO_2 in HNO_3 . To avoid decomposition, nitric acid is normally stored in colourless bottles.

Question 10

The figure given below illustrates the apparatus used in the laboratory preparation of nitric acid.



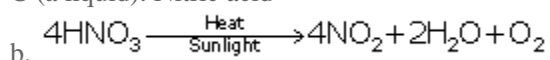
- Name A (a liquid), B (a solid) and C (a liquid). (Do not give the formulae).
- Write an equation to show how nitric acid undergoes decomposition.
- Write the equation for the reaction in which copper is oxidised by concentrated nitric acid.

Solution 10

a. A (a liquid): Conc. sulphuric acid

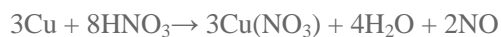
B (a solid): Sodium nitrate

C (a liquid): Nitric acid



c.

i. Reaction of dilute nitric acid with copper:



ii. Reaction of conc. nitric acid with copper:



Question 11

a. A dilute acid B does not normally give hydrogen when reacted with metals but does give a gas when reacts with copper. Identify B. Write the equation with copper.

b. Complete the table:

Name of Process	Inputs	Equation	Output
	Ammonia + Air		Nitric acid

c. What is the property of nitric acid which allows it to react with copper?

Solution 11

a. The dilute acid is nitric acid.

Reaction of dilute nitric acid with copper:



b.

Name of Process	Inputs	Equations	Output
Ostwald process	Ammonia + Air	$4\text{NH}_3 + 5\text{O}_2 \xrightarrow[800^\circ\text{C}]{\text{Pt}} 4\text{NO} + 6\text{H}_2\text{O} + \text{heat}$ $2\text{NO} + \text{O}_2 \xrightarrow{50^\circ\text{C}} 2\text{NO}_2$ $4\text{NO}_2 + 2\text{H}_2\text{O} + \text{O}_2 \longrightarrow 4\text{HNO}_3$	Nitric acid

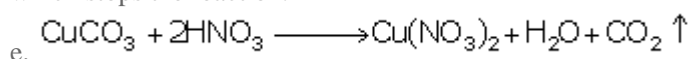
c. Its oxidising property allows it to react with copper.

Question 12

- Name the gas produced when copper reacts with conc. HNO_3 .
- State your observation: Zinc nitrate crystals are strongly heated.
- Correct the statement: Magnesium reacts with nitric acid to liberate hydrogen gas.
- Iron is rendered passive with fuming HNO_3 . Give reason.
- Give the balanced equation for dilute nitric acid and copper carbonate.

Solution 12

- Nitrogen dioxide gas is produced when copper reacts with conc. HNO_3 .
- When zinc nitrate crystals are strongly heated, they decompose into yellow-coloured zinc oxides and nitrogen dioxides, and oxygen gas is liberated.
- Very dilute (about 1%) acid reacts with magnesium at room temperature to give magnesium nitrate and hydrogen gas.
- Iron is rendered passive with fuming HNO_3 . This is due to the formation of insoluble metallic oxide which stops the reaction.



Question 13

- Identify the gas evolved when
 - Sulphur is treated with conc. nitric acid.
 - A few crystals of KNO_3 are heated in a hard glass test tube.

b. State two relevant observations for: Lead nitrate crystals are heated in a hard glass test tube.

c. Give a balanced equation for: Oxidation of carbon with conc. HNO_3 .

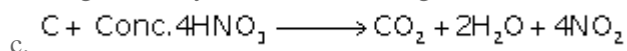
Solution 13

a.

i. When sulphur is treated with conc. nitric acid, it produces nitrogen dioxide gas.

ii. When a few crystals of KNO_3 are heated in a hard glass test tube, it decomposes to form KNO_2 , and O_2 gas is liberated.

b. First, it decomposes with slight decrepitation, and second, it is reddish brown in colour when hot. After cooling, it turns yellow and fuses in glass.



Question 14

a. Fill in the blank:

Cold dil. nitric acid reacts with copper to form (hydrogen, nitrogen dioxide, nitric oxide).

b. Give balanced equations for the following:

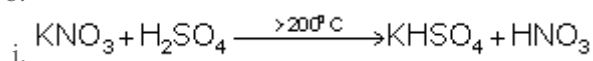
i. Laboratory preparation of nitric acid.

ii. Action of heat on a mixture of copper and nitric acid.

Solution 14

a. Nitric oxide

b.



ii. Reaction of dilute nitric acid with copper:



Question 15

(a) Identify **the acid**

(i) The acid which is used in the preparation of a non-volatile acid.

(ii) The acid which is prepared by catalytic oxidation of ammonia.

Solution 15

(i) Sulphuric acid

(ii) Nitric acid

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