



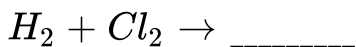
CHEMISTRY

BOOKS - EVERGREEN CHEMISTRY (ENGLISH)

STUDY OF COMPOUNDS - HYDROGEN CHLORIDE

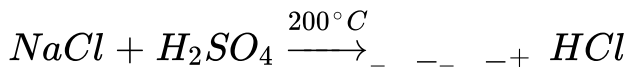
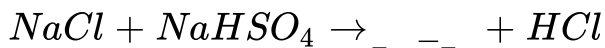
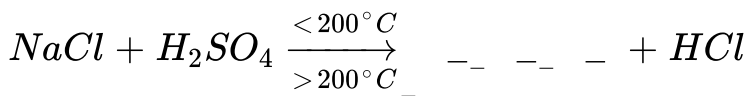
Equation Worksheet

1. By direct combination



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2. Laboratory preparation [metal chloride]



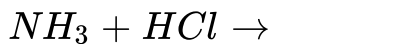
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3. Thermal dissociation



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4. Reaction with ammonia



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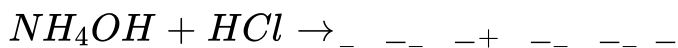
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6. Complete and balanced the equations:



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7. Complete the following reaction



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8. Sodium carbonate



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9. Sodium carbonate



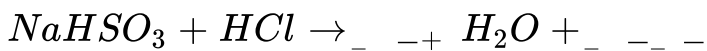
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10. Sodium sulphite



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11. Sodium bisulphite



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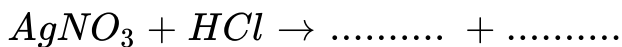
12. Identify the gas evolved and give the chemical test in each of the following cases :

(i) Dilute hydrochloric acid reacts with sodium sulphite.

(ii) Dilute hydrochloric acid reacts with iron (II) sulphide.

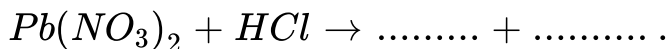
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13. Silver nitrate



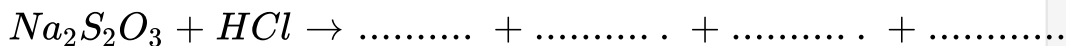
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14. Lead nitrate



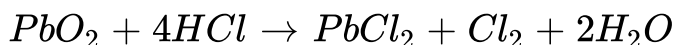
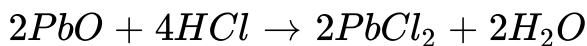
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15. Sodium thiosulphate soln .



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16. PbO and PbO_2 react with HCl according to following chemical equations



Why do these compounds differ in their reactivity?



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17. Red lead tetroxide]



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18. Potassium permanganate



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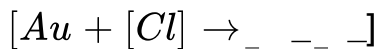
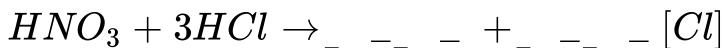
19. Potassium dichromate



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20. Nitric acid [conc]



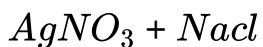
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21. Glass rod dipped in ammonia soln.



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22. silver nitrate soln.



1. From the list - Ammonia, Copper oxide ,Copper sulphate , Hydrogen chloride , Hydrogen sulphide , Lead bromide - select the compound which can be oxidied to chlorine .

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2. Write balanced chemical equation for the reaction of zine and dilute hydrochloric acid.

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3. State what is observed when hydrochloric acid is added to silver nitrate solution.

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4. Write a balanced chemical equation for the reaction of calcium bicarbonate & dil . Hydrochloric acid.

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5. Write balanced equations for the following reactions :

Sodium chloride from sodium carbonate solution and dilute hydrochloric acid.

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6. Of the two gases, ammonia and hydrogen chloride, which is more dense ? Name the method of collection of this gas.

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7. Give one example of a reaction between two gases which produces a solid .

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8. Write equations for the reaction of dil HCl with each of the following - i] iron , ii] sodium bicarbonate , iii] iron[II] sulphide , iv] sodium sulphite.

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9. What property of hydrogen chloride is demonstrated when it is collected by downward delivery (upward displacement]. Why is hydrogen chloride not collected over water .

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10. Write equations for the reactions :-
i] dil . HCl & sodium thiosulphate .
ii] dil HCl & lead nitrate solution.

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11. Name the gas evolved - The gas produced by the action of conc . Sulphuric acid on sodium chloride .

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12. Match each substance A to E listed below with the appropriate description given below :

(A) sulphur

(B) Silver chloride

C Hydrogen chloride

D Copper [II] Sulphate

E] Graphite.

(i) A covalent compound which behaves like an ionic compound in aqueous solution .

(ii) A compound which is insoluble in cold water but soluble in excess of ammonia solution.

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13. Write a fully balanced equation for each of the following cases : Magnesium metal is treated with dilute hydrochloric acid.

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14. For the preparation of hydrochloric acid in the laboratory :
Why is direct absorption of hydrogen chloride gas in water not feasible ?

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15. Select the correct word from the list in bracket to complete each statement .

Aqua regia is a mixture of one part of ____ and three parts of ____ [conc. Hydrochloric acid/ conc .nitri acid] in which nitric acid ____ [reduces/ oxidises] hydrochloric acid to chlorine.

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16. State your observation for the following cases :

Glass rod dipped in ammonium hydroxide is brought near the mouth of the concentrated hydrochloric acid bottle.

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17. State the salt and acid , used in the laboratory preparation of hydrogen chloride.

Give the equation for the preparation .

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18. By the addition of only one solution how would you distinguish between dilute hydrochloric acid and dilute nitric acid ?



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19. 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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20. Choose the correct answer from the options given below:

Hydrogen chloride gas being highly soluble in water is dried

by:

A. Anhydrous calcium choride

B. Phosphorous pentoxide

C. Quick lime

D. Conc sulphuric acid .

Answer:

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21. Write balanced equation of dil HCl with - Calcium bicarbonate.

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22. In the laboratory preparation of hydrochloric acid , hydrogen chloride gas is dissolved in water .

(i) Draw a diagram to show the arrangement used for the absorption of HCl gas in water.

(ii) State why such an arrangement is necessary . Give two

reasons for the same .

(iii) Write balanced chemical equations for the laboratory preparation of HCl gas when the reactants are :

A below $200^{\circ}C$

B above $200^{\circ}C$

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23. Some word/words are missing in the following statements.

You are required to rewrite the statements in the correct form using the appropriate word/words:

Aqua regia contains one part by volume of nitric acid and three parts by volume of hydrochloric acid.

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24. Give reason for the following:

Hydrogen chloride gas cannot be dried over quick lime.

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25. Give a balanced equation for the reaction : Conc hydrochloric acid & potassium permanganate soln.

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26. Give balanced equations with conditions , if any , for the following conversions A to D .

(A) Sodium Chloride \rightarrow Hydrogen Chloride

(B) Hydrogen Chloride \rightarrow Iron (II) chloride

(C) Hydrogen Chloride → Ammonium chloride

(D) Hydrogen Chloride → Lead chloride

A. Sodium Chloride → Hydrogen Chloride

B. Hydrogen Chloride → Iron (II) chloride

C. Hydrogen Chloride → Ammonium chloride

D. Hydrogen Chloride → Lead chloride

Answer:



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27. Identify the gas evolved in the following reactions when :
concentrated hydrochloric acid is made to react with
manganese dioxide.



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28. State one appropriate observation for :

(i) Copper sulphide is treated with dilute hydrochloric acid .

(ii) A few drops of dil HCl are added to $AgNO_3$ soln , followed by addition of NH_4OH soln.

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29. Fill in the blank from the choices given within bracket:

Quicklime is not used to dry HCl gas because (CaO is alkaline, CaO is acidic, CaO is neutral)

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30. Write balanced equation for : Action of dilute hydrochloric acid on sodium sulphide.

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31. State your observation : Dilute HCl is added to sodium carbonate crystals.

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32. Study the figure given aside & answer the questions that follow :

Identify the gas Y.

What property of gas Y does this experiment demonstrate.

Name another gas which has the same property & can be demonstrated through this experiment.

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33. Select from the list the gas that matches the description given in each case :

[ammonia, ethane, hydrogen chloride, hydrogen sulphide, ethyne]

This gas produces dense white fumes with ammonia gas.

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34. Identify the acid which on mixing with $AgNO_3$ soln gives white precipitate, soluble in excess ammonium hydroxide.

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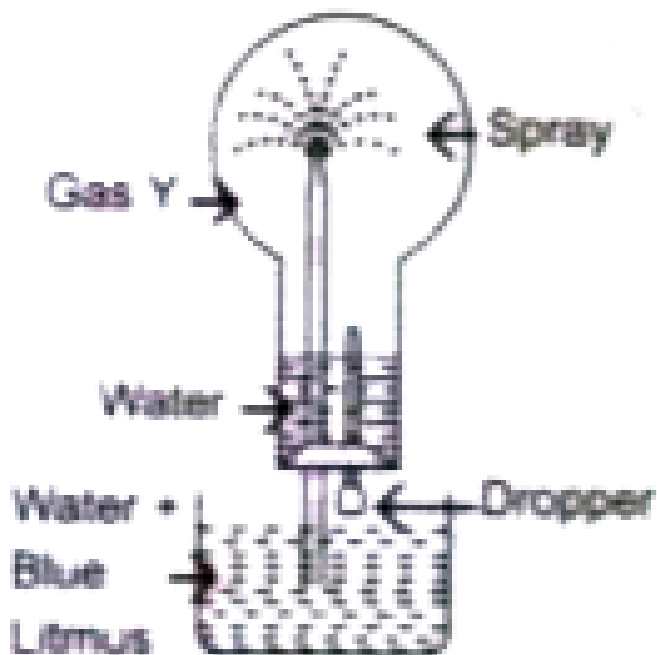
35. The following questions pertain to the laboratory preparation of hydrogen chloride. Gas :

Write the equation for its preparation ,menfioning the condition required .

Name the drying agent used in the above preparation and give a reason for the choice.

(iii State a safety precaution taken during the preparation of

hydrochloric acid .



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36. Choose the correct answer from the options given below:

(i) The aim of the Fountain Experiment is to prove that:

A. HCl turns blue litmus red

B. HCl is denser than air

C. HCl is highly soluble in water

D. HCl fumes in moist air .

Answer:

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37. Fill in the blank with the choices given in bracket :

($AgCl/PbCl_2$) a white precipitate is soluble in excess

NH_4OH .

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38. Write balanced chemical equation : Action of hydrochloric acid with sodium bicarbonate

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39. State your observations when mixture is heated

(ii) Copper carbonate .

(iii) Sodium thiosulphate

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40. Identify the gas evolved and give the chemical test in each of the following cases :

(i) Dilute hydrochloric acid reacts with sodium sulphite.

(ii) Dilute hydrochloric acid reacts with iron (II) sulphide.



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41. Fill in the blank from the choices given in brackets:

Potassium sulphite on reacting with hydro chloric acid releases gas. (Cl_2 , SO_2 , H_2S)



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42. Identify the substance underlined in the following case :

A solid formed by reaction of two gases, one of which is acidic and the other basic in nature.



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43. State one relevant observation for the following reaction :

Action of dilute Hydrochloric acid on iron (II) sulphide.

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44. Certain blanks spaces are left in the following table as A &

B. Identify each of them .

Lab preparation of	Reactants used	Products formed	Drying agent	Method of collection
HCl gas	$\text{NaCl} + \text{H}_2\text{SO}_4$	A	Conc. H_2SO_4	B

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45. Write a balanced chemical equation for the following:

of dilute hydrochloric acid on magnesium sulphite.

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46. State one relevant observation for the following:

Lead nitrate solution is mixed with dilute hydrochloric acid and heated.

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47. Write balanced equation for : Action of dilute hydrochloric acid on sodium sulphide.

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48. Fill up the blank with the correct choice given in bracket.

Dry hydrogen chloride gas can be collected by _____ displacement of air. (downward/upward)



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49. Name the acid used for the preparation of hydrogen chloride gas in the laboratory. Why is this particular acid preferred to other acids?



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50. Write the balanced chemical equation for the laboratory preparation of hydrogen chloride gas.



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51. For the preparation of hydrochloric acid in the laboratory
0= |] State why direct absorption of hydrogen gas in water is

not feasible . li] State what arrangement is used to dissolve hydrogen chloride gas in water.



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52. Drying agent used to dry HCl gas.

A. Conc H_2SO_4

B. ZnO

C. Al_2O_3

D. CaO .

Answer:



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53. Fill in the blanks with the choices given in bracket : when sodium chloride is heated with concentrated sulphuric acid below $200^{\circ}C$, one of the products formed is _____ [sodium hydrogen sulphate /sodium sulphate /chlorine]

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54. State one observation for the following : A small piece of zinc is added to dilute hydrochloric acid.

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55. Hydrogen chloride gas is not dried using _____[conc . H_2SO_4 , CaO].

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56. Hydrogen chloride gas on heating above $500^{\circ}C$ gives hydrogen and chlorine .The reaction is an example of _____[thermal decomposition , thermal dissociation].

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57. Iron react with hydrogen chloride gas forming_____ [iron [II] chloride , iron [III] chloride]and hydrogen .The reaction is an example of _____ [double decomposition , synthesis , single displacement].

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58. Hydrogen chloride and water are examples of _____
[polar covalent compounds , non - polar covalent compounds]
and a solution of hydrogen chloride in water _____ [contains ,
does not contain]free ions.

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59. A white compound which is insoluble in nitric acid but
soluble in ammonium hydroxide.

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60. Give balanced equations for the following:

Iron (II) sulphide is reacted with dilute hydrochloric acid.

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61. Select the correct word from the list in bracket to complete each statement .

Aqua regia is a mixture of one part of ___ and three parts of _____ [conc. Hydrochloric acid/ conc .nitri acid] in which nitric acid _____[reduces/ oxidises] hydrochloric acid to chlorine.

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62. Hydrochloric acid can be converted chlorine by heating with _____[calcium oxide , lead [II] oxide , lead [IV] oxide] which acts as a /an _____[oxidising reducing agent .

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Additional Questions

1. Give reason - Hydrogen chloride can be termed as a polar covalent compound.

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2. Give the equation for preparation of HCl gas by synthesis
State two conditions involved in the synthesis.

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3. Give a balanced equation for preparation of HCl gas in the laboratory from sodium chloride.

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4. In the laboratory preparation of HCl from sodium chloride , state why the following are preferred -

(i) Conc . H_2SO_4 as a reactant

(ii) Temp . Below $200^\circ C$

(iii) conc . H_2SO_4 as drying agent



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5. Give a balanced equation for preparation of HCl gas in the laboratory from sodium chloride.



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6. Compare the density of HCl gas with air and state the solubility of HCl gas in water.

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7. Hydrogen chloride gas fumes in moist air due to its high in water.

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8. State what the fountain experiment demonstrates with reference to HCl gas.

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9. State the colour change in three different indicators in presence of HCl gas.



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10. Give a balanced equation for thermal dissociation of (i) a gas

(ii) a solid [both containing the chloride ion].



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11. Give the equation and state the observation seen when HCl gas reacts with ammonia.



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12. Convert iron to iron [II] chloride using HCl gas.

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13. Explain the arrangement (i) not used

(ii) used - for converting HCl gas into HCl acid.

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14. Explain the term constant boiling mixture.

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15. State why dilute HCl cannot be concentrated beyond a certain concentration by boiling.

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16. Name the ions obtained when HCl dissociates in aqueous solution .

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17. Name the ion responsible for acidic nature of HCl acid.

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18. State which of two - a solution of HCl in water or in toluene is an electrolyte , giving reasons

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19. Give four different word equations relating to acidic properties of an aq. Soln of HCl gas.

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20. Give balanced equation to obtain

(i) H_2

(ii) CO_2

(iii) SO_2

(iv) H_2S from dil HCl.

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21. Convert two soluble metallic nitrates to insoluble metallic chlorides using dil. HCl.



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22. State how you would prove that HCl contains

(i) hydrogen - using an active metal below magnesium

(ii) Chlorine - using an oxidising agent not containing lead.



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23. State the composition of aqua regia . State which component is the oxidising agent in aqua regia.



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24. Convert hydrochloric acid to nascent chlorine.



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25. State why aqua regia dissolves gold , which is insoluble in all other acids.

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26. Give three tests for hydrochloric acid . Convert silver nitrate to a soluble salt of silver using hydrochloric acid and an alkali.

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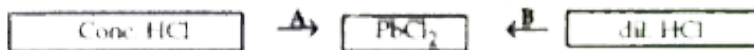
27. State two industrial products manufactured from hydrochloric acid , which are also manufactured from nitric

and sulphuric acid Give two general uses of hydrochloric acid.

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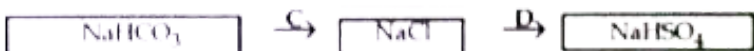
Unit Test Paper 7 A Hydrogen Chloride

1. Give balanced equations for the conversions A,B,C,D & E give below:



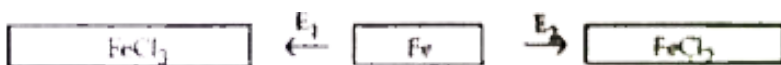
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2. Give balanced equations for the conversions A,B,C,D & E give below:



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3. Give balanced equations for the conversions A,B,C,D & E give below:



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4. Give reasons for the following :

In the laboratory preparation of HCl acid from NaCl and conc . H_2SO_4 , the residual salt formed at temperatures above 200°C forms a hard crust and sticks to the glass.

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5. Give reasons for the following

Dense white fumes are obtained when a jar of HCl gas is inverted over a jar of ammonia gas.



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6. Give reasons for the following

In the fountain experiment to demonstrate the high solubility of HCl gas in water, dry HCl gas is filled in the round bottom flask



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7. Give reasons for the following

Iron sheets are cleaned with hydrochloric acid before dipping

into molten zinc for galvanizing.



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8. Give reasons for the following

Hydrogen chloride gas fumes in moist air but hydrogen sulphide gas does not.



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9. Complete the statements given below using the correct word /s

An aqueous solution of HCl gas is named _____ [aqua fortis /muriatic acid/oil of vitrol]



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10. Complete the statements given below using the correct word /s

The salt obtained when rock salt reacts with conc. H_2SO_4 at temperatures below $200^\circ C$ is a/an _____ [acid /normal] salt.

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11. Complete the statements given below using the correct word /s

In the preparation of HCl acid from HCl gas, a funnel arrangement provides _____ [less/more] surface area for absorption of the gas.

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12. Complete the statements given below using the correct word /s

The ions which impart acidic properties to an aqueous solution of hydrogen chloride are _____[chloride/hydrogen/hydronium]

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13. Complete the statements given below using the correct word /s

The indicator which does not change colour on passage of hydrogen chloride gas is _____[moist blue litmus/phenolphthalein / methyl orange]

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14. Choose from the letters A,B,C,D and E, to match the descriptions 1 to 5 given below: ,

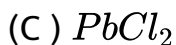
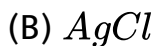


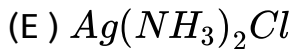
A soluble salt obtained on reaction of a metallic chloride with liquor ammonia.



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15. Choose from the letters A,B,C,D and E, to match the description given below: ,





A salt which is insoluble in dilute nitric acid but soluble in ammonium hydroxide.

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16. Choose from the letters A,B,C,D and E, to match the descriptions 1 to 5 given below: ,



A salt obtained when a basic gas reacts with hydrogen chloride gas.

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17. Choose from the letters A,B,C,D and E, to match the descriptions 1 to 5 given below: ,

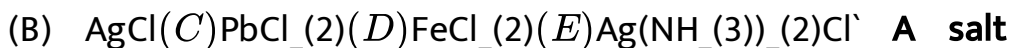


A salt obtained when a basic gas reacts with hydrogen chloride gas.



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18. Choose from the letters A,B,C,D and E, to match the descriptions 1 to 5 given below: ,



soluble in hot water but not in cold ,obtained on heating an oxidising agent with conc .HCl.

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19. Select the correct word or formula from the same give in bracket :

The substance reacted with conc HCl & heated to prove that conc .HCl containd Cl_2 . [$PbCl_2$ / PbO_2 / PbO]

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20. Select the correct word or formula from the same give in bracket :

The substance reacted with conc HCl & heated to prove that conc .HCl containd Cl_2 . [$PbCl_2$ / PbO_2 / PbO]

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21. Select the correct word or formula from the same give in bracket :

The gases which is /are heavier that air and highly soluble in water . $[NH_3 / HCl / CO_2 / H_2S]$



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22. Select the correct word or formula from the same give in bracket :

The acid which is not an oxidising agent [Conc HNO_3 / Conc HCl / Conc. H_2SO_4]



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23. Select the correct word or formula from the same give in bracket :

The acid which is not a monobasic acid .

[Acetic/Sulphurous/Hydrochloric /Nitric/Formic acid]



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24. Select the correct words from the list given below to complete the following word equations :

Metallic oxide , active metal , metallic carbonate , metallic bisulphite , active metal , metallic hydroxide, metallic bicarbonate , metallic sulphate , metallic sulphide.

_____ + hydrochloric acid \rightarrow salt + hydrogen



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25. Select the correct words from the list given below to complete the following word equations :

Metallic oxide , active metal , metallic carbonate , metallic bisulphite , metallic hydroxide, metallic bicarbonate ,metallic sulphate , metallic sulphide.

_____ + hydrochloric acid [dil] \rightarrow salt + water



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26. Select the correct words from the list given below to complete the following word equations :

Metallic oxide , active metal , metallic carbonate , metallic bisulphite ,active metal , metallic hydroxide, metallic bicarbonate ,metallic sulphate , metallic sulphide.

_____ + hydrochloric acid [dil] → salt + water + carbon dioxide

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27. Select the correct words from the list given below to complete the following word equations :

Metallic oxide , active metal , metallic carbonate , metallic bisulphite , active metal , metallic hydroxide, metallic bicarbonate , metallic sulphate , metallic sulphide.

_____ + hydrochloric acid [dil] → salt + water + sulphur dioxide

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28. Select the correct words from the list given below to complete the following word equations :

Metallic oxide , active metal , metallic carbonate , metallic bisulphite , active metal , metallic hydroxide, metallic bicarbonate ,metallic sulphate , metallic sulphide.

_____ + hydrochloric acid [dil] \rightarrow salt + hydrogen sulphide



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