CHEMISTRY

BOOKS - MTG IIT JEE FOUNDATION

ACIDS , BASES AND SALTS

Illustrations

1. What is an acid -base indicator ? Give two examples of synthetic acid -base indicators .

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2. What will you observe when :

Mathyl orange is added to dilute hydrochloric acid

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3. A drop of phenolphthalein is added to the solution of lime water

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4. A knife, which is used to cut a fruit, was immediately dipped into water containing drops of blue litmus solution. If the colour of the solution is changed to red,

what inference can be drawn about the nature of the fruit and why ?

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5. What is the name given to the indicators giving different odours in acidic and basic medium ?

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6. Name two substances which can be used as olfactory indicators ?

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7. A solution of acetic acid in water is highly concentrated . Will you call it a strong acid ? Explain ?

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8. What are strong and weak acids? In the following list of acids separate strong acids from weak acids . Hydrochloric acid, citric acid , acetic acid, nitric acid formic acid , suphuric acid.

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9. When zinc metal is treated with a dilute solution of a strong acid, a gas is evolved which is utilised in the

hydrogenation of oil. Name the gas evolved . Write the chemical equation of the reaction involved and also wrote a test to detect the gas formed.

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10. The following reactions occur in aqueous solution .Predict the products and identify the acids and bases (and their conjugate species) in the reaction of NH_3 with CH_3COOH

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11. H_3O^+ with OH^-

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12. HSO_4^- with $HCOO^-$

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13. What is Arrchenius definition of bases ?

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14. NH_3 does not contain hydroxyl group , then why is it a base ?

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15. What is the difference between a strong base and a weak base .Give two examples of each of them .

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16. When a drop of orange juice is added to pure water , how the pH value will very for water ? If a drop of lemon juice is also added , will there be any more change in the pH value ?

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17. Why do we feel a burning sensation in the stomach when we overeat ? What is the medicine used to cure it

called ? Give one example .

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18. Why does tooth decay start when the pH of mouth is lower than 5.5?

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19. What happens when chlorine is passed over slaked lime at 313 K ? Write chemical equation of the reaction involved and state two uses of the product obtained .

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20. Predict whether the solution of following salts will be acidic , basic or neutral .Justify your answer .

KCl

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21. $NH_4NO_3 is$

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22. A compound which is prepared from gypsum has the property of hardening when mixed with proper quantity of water. Identify the compound. Write chemical equation

to preapar the compound. Mention one important use of the compound.

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23. What is water of crystallization ? Write the common name and chemical formula of a commercially important compound which has ten water molecules as water of crystallization .

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24. What should be the ratio of concentration of formate ion and formic acid in a buffer solution so that its pH

should be 4 ? Around what pH will this buffer have maximum buffere capacity ? $\left(K_a = 1.8 \times 10^{-4}\right)$

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Solved Examples

1. Give general equation for the reactions of acids with metal carbonates

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2. Give general equation for the reaction of acids with metal oxides

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3. How does the flow of acid rain water into a river make the survival of aquatic life in the river difficult ?

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4. Write the chemical formula of washing soda .What happens when crystals of washing soda are exposed to air ?

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5. A person found that the cake prepared by him is hard and small in size. Which ingredient has he forgotten to add that would have caused to cake to rise and become light/ Explain your answer.

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6. Name the substance obtained by action of chlorine on dry slaked lime .Write chemical equation of the reaction .

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7. A white powdered solid when added to water produces hissing sound . Identify the compound. How does this

compound react with moist hydrogen chloride gas ? Write the chemical equation .

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8. Tooth enamel is one of the hardest substances in our body .How does it gets damaged due to eating chocolates and sweets ? What should we do to prevent it ?

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9. With the help of labelled diagrams, describe an activity to show that acids produce ions only in aqueous

solution.

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10. Write the chemical formula for bleaching powder .How is bleaching powder prepared ? For what purpose is it used in paper factories ?

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11. How can you test that metal oxides are basic while non - metal oxides are acidic .Explain with one example in eahc case .

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12. How would you distinguish between baking powder and washing soda by heating ?

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13. Answer the following :

(a) Why is Plaster of Paris written as $CaSO_4 1/2 H_2O$ How is it possible to have half a water molecule attached to $CaSO_4$?

(b) Why is sodium hydrogen carbonate an essential ingredient in antacids ?

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14. Answer the following :

(a) Why is Plaster of Paris written as $CaSO_4 1/2 H_2O$ How is it possible to have half a water molecule attached to $CaSO_4$?

(b) Why is sodium hydrogen carbonate an essential ingredient in antacids ?

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15. When electricity is passed through an aqueous solution of sodium chloride , three products are obtained .why is the process called chlor - alkali ?

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16. Write the balanced equation in molecular form illustrating the complete neutralisation of $Al(OH)_3$ with H_2SO_4 .

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17. What happens when

Bleaching powder reacts with dilute sulphuric acid .

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18. Slaked lime reacts with chlorine to form

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19. Sodium hydrogencarbonate is heated .

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20. Gypsum is heated .

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Ncert Section

1. You have been provided with three test tubes. One of them contains distilled water and the other two contain an acidic solution and a basic solution, respectively. If you

are given only red litmus paper, how will you identify the contents of each test tube?

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2. Why should curd and sour substances not be kept in brass and copper vessels?

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3. Which gas is usually liberated when an acid reacts with a metal? Illustrate with an example. How will you test for the presence of this gas?

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4. Metal compound A reacts with dilute hydrochloric acid to produce effervescence. The gas evolved extinguishes a burning candle. Write a balanced chemical equation for the reaction if one of the compounds formed is calcium chloride.

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5. Why do HCl, HNO_3, etc., show acidic characters in aqueous solutions while solutions of compounds like alcohol and glucose do not show acidic character?

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6. Why does an aqueous solution of acid conduct electricity ?

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7. Why does dry HCl gas not change the colour of the dry litmus paper?

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8. While diluting an acid, why is it recommended that the acid should be added to water and not water to the acid?

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9. How is the concentration of hydronium ions $\left(H_3O^+\right)$ affected when a solution of an acid is diluted?

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10. How is the concentration of hydroxide ions $\left(OH^-\right)$ affected when excess base is dissolved in a solution of sodium hydroxide?

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11. You have two solutions, A and B. The pH of solution A is 6 and pH of solution B is 8. Which solution has more

hydrogen ion concentration? Which of this is acidic and which one is basic?

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12. What effect does the concentration of $H^+(aq)$ ions have on the nature of the solution?

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13. Do basic solutions also have $H^+(aq)$ ions? If yes, then why are these basic?

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14. Under what soil condition do you think a farmer would treat the soil of his fields with quick lime (calcium oxide) or slaked lime (calcium hydroxide) or chalk (calclum carbonate)?

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15. What is the common name of the compound $CaOCl_2$?

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16. Name the substance which on treatment with chlorine yields bleaching powder.

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17. Name the sodium compound which is used for softening hard water.

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18. What will happen if a solution of sodium hydrocarbonate is heated? Give the equation of the reaction involved.

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19. Write an equation to show the reaction between Plaster of Paris and water

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20. A solution turns red litmus blue, its pH is likely to be

A. 1

B. 4

C. 5

D. 10

Answer: D

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21. A solution reacts with crushed egg-shells to give a gas that turns lime-water milky. The solution contains

A. NaCl

B. HCl

C. LiCl

D. Kcl

Answer: B

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22. 10 mL of a solution of NaOH is found to be completely neutralised by 8 mL of a given solution of HCl. If we take 20 mL of the same solution of NaOH, the amount HCl solution (the same solution as before) required to neutralise it will be

A. 4 mL

B. 8 mL

C. 12 m L

D. 16 m L

Answer: D

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23. Which one of the following types of medicines is used for treating indigestion?

A. Antibiotic

B. Analgesic

C. Antacid

D. Antiseptic

Answer: C

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24. Write word equations and then balanced equations for the reaction , taking place when :

Dilute sulphuric acid reacts with zinc granules

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25. Dilute hydrochloric acid reacts with magnesium ribbon

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26. Dilute sulphuric acid reacts with aluminium powder

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27. Dilute hydrochloric acid reacts with iron fillings .

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28. Compounds such as alcohols and glucose also contain hydrogen but are not categorised as acids. Describe an Activity to prove it.

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29. Why does distilled water not conduct electricity, whereas rain water does?

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30. Why do acids not show acidic behaviour in the absence of water?

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31. Five solutions A , B ,C , D and E when tested with universal indicator showed pH as 4,1,11,7 and 9 respective,y .Which solution is :

Neutral ?

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32. strongly alkaline ?

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View Text Solution

33. strongly acidic ?

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34. weakly acidic /

View Text Solution

35. weakly alkaline ?

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36. Arrange the pH in increasing order of hydrogen ion concentration .

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37. Equal lengths of magnesium ribbons are taken in test tubes A and B. Hydrochloric acid (HCl) is added to test tube A, while acetic acid (CH_3COOH) is added to test tube B. Amount and concentration taken for both the acids are same. In which test tube will the fizzing occur more vigorously and why?

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38. Fresh milk has a pH of 6. How do you think the pH will change as it turns into curd? Explain your answer.

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39. A milkman adds a very small amount of baking soda to fresh milk .

Why does he shift the pH of the fresh milk from 6 to slightly alkaline ?

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40. Why does this milk take a long time to set as curd ?

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41. Plaster of Paris should be stored in a moisture-proof container. Explain why?

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42. What is a neutralisation reaction? Give two examples.

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43. Give two important uses of washing soda and baking soda.

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Exercise Multiple Choice Questions Level 1

1. Which one of the following will turn red litmus blue ?

A. Vinegar

B. Baking soda solution

C. Lemon juice

D. Soft drinks

Answer: B

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2. When zinc reacts with sodium hydroxide the products formed are

A. zinc hydroxide and sodium

B. sodium zincate and water

C. sodium zincate and hydrogen

D. sodium zincate and oxygen.

Answer: C

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3. Which of the following is a strongest base ?

A. Ammonium hydroxide

B. Sodium hydroxide

C. Magnesium hydroxide

D. Copper hydroxide

Answer: B

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4. Which of the following is not a base ?

A. KOH

B. ZnO

C. $Al(OH)_3$

D. NaCl

Answer: D

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5. Acetic acid is a weak acid because

A. its aqueous solution is acidic

B. it is highly ionised

C. it is weakly ionised

D. it contains - COOH group .

Answer: C

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6. Partial neutralisation of a polybasic acid gives

A. acidic salt

B. basic salt

C. normal salt

D. double salt .

Answer: A

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7. Which of the following can form more than one acidic salt ?

A. CH_3COOH

B. H_3PO_4

C. CH_3CH_2COOH

D. ZnO

Answer: B

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8. A solution turns blue litmus red. The pH of the solution is probably.

A. 8

B. 10

C. 12

D. 6

Answer: D

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9. When black copper oxide placed in a beaker is treated with dilute HCl is colour changes to

A. white

B. dark red

C. bluish green

D. no change .

Answer: C

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10. pH of a solution having hydrogen ion concentration of 1 M is

A. 0

B. 1

C. 10

D. 14

Answer: A

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11. Which of the following acids is present in vinegar ?

A. Lactic acid

B. Malic acid

C. Acetic acid

D. Tartaric acid

Answer: C

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12. Basic salts are formed by neutralization of

A. strong acid and strong base

B. strong acid and weak base

C. weak acid and weak base

D. strong base and weak acid .

Answer: D

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13. Plaster of Paries is obtained

A. by adding water to calcium sulphate

B. by adding sulphuric acid to calcium hydroxide

C. by heating gypsum to a very high temperature

D. by heating gypsum to $100^{\circ} C$.

Answer: D

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14. Which of the following statements is not correct ?

A. Acids turn blue litmus solution to red .

B. Raw onion can be used as an olfactory indicator .

C. Bases are sour taste .

D. Vanilla essence does not give odour in strongly basic solution .

Answer: C

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15. Baking powder contains sodium hydrogen carbonate and

A. tartaric acid

B. washing soda

C. calcium chloride

D. acetic acid .

Answer: A

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16. Plaster of Paris hardens by

A. giving off CO_2

B. changing into $CaCO_3$

C. combining with water

D. giving out water .

Answer: C

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17. The difference of number of water molecules in gypsum and plaster of Pairs is

A. $5/2$

B. 2

C. $1/2$

D. $3/2$

Answer: D

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18. Bleaching powder gives smell of chlorine because it

A. is unstable

B. gives chlorine on exposure to atmosphere

C. is a mixture of chlorine and slaked lime

D. contains excess of chlorine .

Answer: B

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19. The solution with the lowest concentration of H^+ ion is

A. pH =7

B. pH = 8 . 6

C. pH =2.0

D. pH =6.8

Answer: B

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20. The incorrect statement about acids is

A. they give H^+ ion in water

B. they are sour in taste

C. they turn blue litmus red

D. they give pink colour with phenolphthalein.

Answer: D

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21. Soda -acid fire extinguisher extinguishes the fire by

A. cutting the supply of air

B. removing the combustible substance

C. raising the ignition temperature

D. none of these .

Answer: A

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22. Which gas is evolved when acids react with metal carbonates ?

A. CO_2

B. H_2

C. NH_3

D. O_2

Answer: A

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23. Which acid is used in flovoured drinks ?

A. Boric acid

B. Carbonic acid

C. Sulphuric acid

D. Oxalic acid

Answer: B

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24. If tartaric acid is not added in baking powder , the cake will taste bitter due to the presence of

A. sodium hydrogencarbonate

B. sodium carbonate

C. carbon dioxide

D. none of these .

Answer: B

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25. An aqueous solution with pH=0 is

A. acidic

B. alkaline

C. neutral

D. amphoteric .

Answer: A

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26. Arrhenius acid gives

A. H^+ in water

B. OH^- in water

C. both (a) and (b)

D. none of these .

Answer: A

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27. Which of the following does not give H^+ ions in aqueous solution ?

A. H_2CO_3

B. C_2H_5OH

C. CH_3COOH

D. H_3PO_4

Answer: B

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28. The substances whose odour changes in acidic and basic solutions are known as

A. olfactory indicators

B. acid base indicators

C. visual indicators

D. all of these .

Answer: A

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29. Aqueous solution of copper sulphate reacts with aqueous ammonium hydroxide solution to give

A. brown ppt .

B. pale blue ppt .

C. white ppt .

D. green ppt .

Answer: B

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30. A student takes some zinc granules in a test tube and adds dilute hydrochloric acid to it . He would observe

that the colour of the zinc granules changes to

A. white

B. black

C. brown

D. yellow .

Answer: B

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Exercise Multiple Choice Questions Level 2

1. pH of sodium carbonate (Na_2CO_3) solution will be

A. 7

B. > 7

C. < 7

D. 1

Answer: B

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2. When bitten by ant, the sting causes irritation due to the presence of

A. a base in the sting

B. formic acid in the sting

C. poisonous chemicals in the sting

D. both (a) and (b) .

Answer: B

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3. Acidity in the sugarcane juice is removed by adding

A. $Ca(OH)_2$

B. CO_2

C. SO_2

D. H_2O

Answer: A

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4. Which of the following salts on dissolving in water will give a solution with pH less than 7 at 298 K ?

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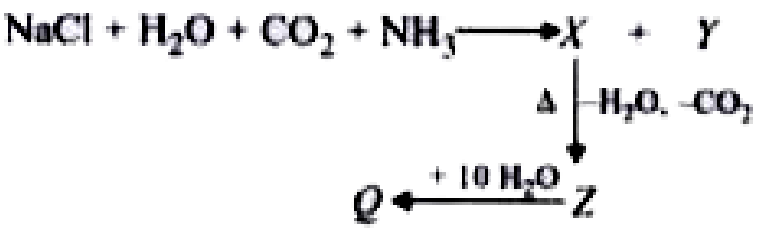
5. In the given series of reaction . What are Y and Z respectively ?



(Q is used in removing permanent hardness of water .)

A. $NaHCO_3, NaOCl_2$

B. NH_4Cl, Na_2CO_3

C. Na_2CO_3, NH_4Cl

D. $Na_2CO_3, NaHCO_3$

Answer: B

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6. What will be the pH value of a solution if salt of a strong acid and weak base undergoes hydrolysis ?

A. pH = 7

B. $pH > 7$

C. $pH < 7$

D. $pH = 1$

Answer: C

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7. The equation between an acid and a base is

$XOH + HY \rightarrow XY + H_2O$

Which of the following is the cation part of salt ?

A. X

B. OH

C. H

D. Y

Answer: A

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8. P is produced by the action of chlorine on dry slaked lime .

Q is a non -corrosive base and used for faster cooking .

On heating R at 373 K , it becomes calcium sulphate

hemihydrate .

Identify P , Q and R respectively .

A. $CaOCl_2, NaHCO_3,$ gypsum

B. $CaO, Na_2CO_3, CaOCl_2$

C. $Ca(OH)_2, NaHCO_3, CaSO_4$

D. $CaOCl_2, Na_2CO_3, NH_4Cl$

Answer: A

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9. Two solutions A and B were found to have pH value of 6 and 8 respectively .The inference that can be drawn is

A. B is an acid while A is a base .

B. A is an acid while B is a base

C. both are acid solutions

D. both are base solutions .

Answer: B

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10. Acetic acid was added to a solid 'X' kept in a test tube. A colourless and odourless gas was evolved. The gas turned lime water milky when passed through it. Predict the nature of the solid.

A. solid X is sodium hydroxide and the gas evolved is CO_2

B. solid X is sodium bicarbonate and the gas evolved is CO_2

C. solid X is sodium actate and the gas evolve is CO_2

D. solid X is sodium chloride and the gas evolved is CO_2.

Answer: B

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11. A blue litmus paper was first dipped in dil .HCl and then in dil .NaOH solution .It was observed that the colour of the litmus paper

A. changed to red

B. changed first to red and then to blue

C. changed blue to colourless

D. remained blue in both the solutions .

Answer: B

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12. $CuO + X \rightarrow CuSO_4 + H_2O$.Here (X) is

A. $CuSO_4$

B. HCl

C. H_2SO_4

D. HNO_3

Answer: C

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13. Which equilibrium can be described as an acid- base reaction using the Lewis acid-base definition but not using the Bronsted-Lowry definition

A. $NH_3 + CH_3COOH \Leftrightarrow CH_3COO^- + NH_4^+$

B. $H_2O + CH_3COOH \Leftrightarrow H_3O^+ + CH_3COO^-$

C.

$$4NH_3 + \left[Cu(H_2O)_4\right]^{2+} \Leftrightarrow \left[Cu(NH_3)_4\right]^{2+} + 4H_2O$$

D. $2NH_3 + H_2SO_4 \Leftrightarrow 2NH_4^+ + SO_4^{2-}$

Answer: C

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14. One molecule of aluminium hydroxide will require how many molecules of dil . HCl . For complete neutralisation ?

A. 1

B. 2

C. 3

D. 4

Answer: C

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15. While preparing 20% aqueous sodium hydroxide solution in a beaker certain observations are recorded . Which of the following statements are correct ?

I . Sodium hydroxide is in the form of pellets flakes .

II . It dissolves in water readily .

III . The beaker appears cold when touched from outside

immediately after adding sodium hydroxide to water .

IV . When red litmus paper is dipped into the solution , it turns blue .

A. I , II and III

B. II , III and IV

C. III , IV and I

D. I , II and IV

Answer: D

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16. Breaking apart of the positive and negative ions of a compound in solution is called

A. conglomeration

B. oxidation

C. dissociation

D. none of above .

Answer: C

17. Iron filings were added to a solution of copper sulphate .After 10 minutes , it was observed that the blue colour of the solution changed and a layer got deposited on iron filings .The colour of the solution and that of the layer would respectively be

A. yellow and green

B. brown and blue

C. red and greenish blue

D. green and reddish brown .

Answer: D

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18. 100 mL of a 0.1 M CH_3COOH is titrated with 0.1 M $NaOH$ solution .The pH of the solution in the titration flask at the titre value of 50 is $[pK_a(CH_3COOH) = 4.74]$

A. 2.37

B. 4.74

C. 1. 34

D. 5. 74

Answer: B

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19. Calculate the pH of the solution in which $0.2MNH_4Cl$ and $0.1MNH_3$ are present. The pK_b of ammonia solution is 4.75.

A. 9 . 95

B. 9. 25

C. 8 .95

D. 7 . 25

Answer: C

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20. The pH of 0.05 M Ba$(OH)_2$ solution is

A. 12

B. 13

C. 1

D. 10

Answer: B

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Exercise Match The Following

1. List -I and List -II are given as options (a) , (b) , (c) and (d) out of which one is correct .

List-I	List-II
(P) HCl	1. Strong acid
(Q) HCN	2. Weak acid
(R) NaOH	3. Weak base
(S) NH_4OH	4. Strong base

A. $P-1, Q-2, R-4, S-3$

B. $P-1, Q-2, R-3, S-4$

C. $P-4, Q-3, R-2, S-1$

D. $P-1, Q-3, R-4, S-2$

Answer: A

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2. List -I and List -II are given as options (a) , (b) , (c) and (d) out of which one is correct .

List-I (Solution)		List-II (pH)
(P)	Vinegar	1. 6.8
(Q)	Milk	2. 7.4
(R)	Human blood	3. 2.4 - 3.4
(S)	Lime water	4. 10.5

A. $P-4, Q-1, R-2, S-3$

B. $P-1, Q-2, R-3, S-4$

C. $P-3, Q-1, R-2, S-4$

D. $P-3, Q-4, R-1, S-1$

Answer: C

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3. List -I and List -II are given as options (a) , (b) , (c) and (d) out of which one is correct .

List-I	List-II
(P) Baking soda	1. NaCl
(Q) Washing soda	2. NaOH
(R) Caustic soda	3. Na_2CO_3
(S) Common salt	4. $NaHCO_3$

A. $P-1, Q-2, R-3, S-4$

B. $P-2, Q-4, R-3, S-1$

C. $P-4, Q-2, R-3, S-1$

D. $P-4, Q-3, R-2, S-1$

Answer: D

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4. List -I and List -II are given as options (a) , (b) , (c) and (d) out of which one is correct .

List-I	List-II
(P) Monobasic	1. KOH
(Q) Dibasic	2. $Ca(OH)_2$
(R) Diacidic	3. H_2SO_4
(S) Monoacidic	4. HNO_3

A. $P-4, Q-3, R-2, S-1$

B. $P-1, Q-2, R-3, S-4$

C. $P-4, Q-2, R-1, S-3$

D. $P-3, Q-4, R-2, S-1$

Answer: A

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5. List -I and List -II are given as options (a) , (b) , (c) and (d) out of which one is correct .

List-I	List-II
(P) Metal + acid	1. Water
(Q) Acid + base	2. Hydronium ion
(R) Metal carbonate + acid	3. Hydrogen gas
(S) Acid + water	4. Carbon dioxide

A. $P-1, Q-4, R-3, S-2$

B. $P-3, Q-1, R-4, S-2$

C. $P-2, Q-1, R-3, S-4$

D. $P-1, Q-3, R-4, S-2$

Answer: B

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Exercise Assertion Reason Type

1. Assertion : Phenolphalaein is an acid -base indicator .

Reason : Phenolphthalein gives diffeent colours in acidic and basic madium .

A. If both assertion and reason are true and reason is the correct explanation of assertion .

B. If both assertion and reason are true but reason is not the correct explanation of assertion .

C. If assertion is true but reason is false .

D. If both assertion and reason are false .

Answer: A

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2. Assertion : pH of ammonium nitrate solution is acidic .

Reason : Solution of salt of weak base and strong acid is acidic .

A. If both assertion and reason are true and reason is the correct explanation of assertion .

B. If both assertion and reason are true but reason is not the correct explanation of assertion .

C. If assertion is true but reason is false .

D. If both assertion and reason are false .

Answer: A

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3. Assertion ,pH = 7 signifies pure water .

Reason : pH of acetic acid is greater than 7 .

A. If both assertion and reason are true and reason is the correct explanation of assertion .

B. If both assertion and reason are true but reason is not the correct explanation of assertion .

C. If assertion is true but reason is false .

D. If both assertion and reason are false .

Answer: D

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4. Assertion : When rain is accompanied by a thunderstorm , the collected rain water will have pH value slightly lower than that of rain water without

thunderstorm .

Reason : Temperature increases due to thunderstorm and so $\left[H^{+}\right]$ increases .

A. If both assertion and reason are true and reason is the correct explanation of assertion .

B. If both assertion and reason are true but reason is not the correct explanation of assertion .

C. If assertion is true but reason is false .

D. If both assertion and reason are false .

Answer: A

View Text Solution

5. Assertion : Acetic acid does not acts as an acid in benzene solution.

Reason : Benzene does not accept proton .

A. If both assertion and reason are true and reason is the correct explanation of assertion .

B. If both assertion and reason are true but reason is not the correct explanation of assertion .

C. If assertion is true but reason is false .

D. If both assertion and reason are false .

Answer: A

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6. Assertion : H_3PO_3 and H_2SO_4 are known as dibasic acids .

Reason : They have two ionisable protons per moleculae of the acid .

A. If both assertion and reason are true and reason is the correct explanation of assertion .

B. If both assertion and reason are true but reason is not the correct explanation of assertion .

C. If assertion is true but reason is false .

D. If both assertion and reason are false .

Answer: A

View Text Solution

7. Assertion : Ammonia is a base .

Reason : It does not contaon OH^- ions .

A. If both assertion and reason are true and reason is the correct explanation of assertion .

B. If both assertion and reason are true but reason is not the correct explanation of assertion .

C. If assertion is true but reason is false .

D. If both assertion and reason are false .

Answer: B

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8. Assertion : Calcium sulphate hemihydrate . $CaSO_4 \cdot \frac{1}{2}H_2O$ is called plaster of Paris .

Reason : Plaster of Paries used for producing moulds for pottery and ceramics and casta of statues .

A. If both assertion and reason are true and reason is the correct explanation of assertion .

B. If both assertion and reason are true but reason is not the correct explanation of assertion .

C. If assertion is true but reason is false .

D. If both assertion and reason are false .

Answer: B

View Text Solution

9. Assertion : Bleaching powder reacts with dilute acids to evolve chlorine .

Reason : The chlorine liberated by the action of dilute acids on bleaching powder is called available chlorine .

A. If both assertion and reason are true and reason is the correct explanation of assertion .

B. If both assertion and reason are true but reason is not the correct explanation of assertion .

C. If assertion is true but reason is false .

D. If both assertion and reason are false .

Answer: B

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10. Assertion : Solvay process is used for the preparation of sodium carbonate .

Reason : Sodium carbonate is used in petroleum refining .

A. If both assertion and reason are true and reason is the correct explanation of assertion .

B. If both assertion and reason are true but reason is not the correct explanation of assertion .

C. If assertion is true but reason is false .

D. If both assertion and reason are false .

Answer: B

View Text Solution

Exercise Comprehension Type

1. In the manufacture of sodium carbonate, following reactions are involved:

$$(A) \xrightarrow{\Delta} (B) + CO_2$$

$$(B) + H_2O \rightarrow (C) \xrightarrow{+NH_4CI \rightarrow (D) \xrightarrow{+H_2O}} \underset{\text{Solution}}{E}$$

$$(E) + CO_2 \rightarrow (F)$$

$$(F) + NaCI \rightarrow (G) \xrightarrow{\text{Heat}} Na_2CO_3 + CO_2 + H_2O$$

(D) is a gas which is soluble in H_2O

The name of the process is

A. Solvay

B. salt cake

C. haber

D. chlor -alkali .

Answer: A

Watch Video Solution

2. In the manufacture of sodium carbonate, following reactions are involved:

$$(A) \xrightarrow{\Delta} (B) + CO_2$$

$$(B) + H_2O \rightarrow (C) \overset{+NH_4CI \rightarrow (D) \xrightarrow{+H_2O}}{} \underset{\text{Solution}}{E}$$

$$(E) + CO_2 \rightarrow (F)$$

$(F) + NaCI \rightarrow (G) \xrightarrow{\text{Heat}} Na_2CO_3 + CO_2 + H_2O$

(D) is a gas which is soluble in H_2O

(C) is

A. $Ca(HCO_3)_2$

B. $NaHCO_3$

C. $CaCO_3$

D. $Ca(OH)_2$

Answer: C

Watch Video Solution

3. In the manufacture of sodium carbonate, following reactions are involved:

$(A) \xrightarrow{\Delta} (B) + CO_2$

$(B) + H_2O \rightarrow (C) \xrightarrow{+NH_4CI \rightarrow (D)} \underset{\text{Solution}}{E}$

$(E) + CO_2 \rightarrow (F)$

$(F) + NaCI \rightarrow (G) \xrightarrow{\text{Heat}} Na_2CO_3 + CO_2 + H_2O$

(D) is a gas which is soluble in H_2O

(A) is

A. $Ca(OH)_2$

B. $NaOH$

C. CaO

D. $CaCO_3$

Answer: A

Watch Video Solution

4. In the manufacture of sodium carbonate, following reactions are involved:

$(A) \xrightarrow{\Delta} (B) + CO_2$

$(B) + H_2O \rightarrow (C) \overset{+NH_4CI \rightarrow (D)}{\xrightarrow{+H_2O}} \underset{\text{Solution}}{E}$

$(E) + CO_2 \rightarrow (F)$

$(F) + NaCI \rightarrow (G) \xrightarrow{\text{Heat}} Na_2CO_3 + CO_2 + H_2O$

(D) is a gas which is soluble in H_2O

(E) and (F) are

A. $NaOH$

B. $NaCl$

C. NH_4OH

D. NH_4Cl

Answer: C

Watch Video Solution

5. In the manufacture of sodium carbonate, following reactions are involved:

$(A) \xrightarrow{\Delta} (B) + CO_2$

$(B) + H_2O \to (C) \overset{+NH_4CI \to (D) \xrightarrow{+H_2O}}{} \underset{\text{Solution}}{E}$

$(E) + CO_2 \to (F)$

$(F) + NaCI \to (G) \xrightarrow{\text{Heat}} Na_2CO_3 + CO_2 + H_2O$

(D) is a gas which is soluble in H_2O

(C) is

A. NH_4HCO_3

B. Na_2CO_3

C. $NaHCO_3$

D. $(NH_4)_2CO_3$

Answer: A

Watch Video Solution

6. In the manufacture of sodium carbonate, following reactions are involved:

$$(A) \xrightarrow{\Delta} (B) + CO_2$$

$$(B) + H_2O \rightarrow (C) \overset{+NH_4CI \rightarrow (D)}{\xrightarrow{+H_2O}} \underset{\text{Solution}}{E}$$

$$(E) + CO_2 \rightarrow (F)$$

$$(F) + NaCI \rightarrow (G) \xrightarrow{\text{Heat}} Na_2CO_3 + CO_2 + H_2O$$

(D) is a gas which is soluble in H_2O

(C) is

A. $NaCl$

B. NH_4Cl

C. NH_4OH

D. $NaHCO_3$

Answer: D

Watch Video Solution

7. A solid compound X on heating gives CO_2 gas and a residue. The residue mixed with water forms Y. On passing excess of CO_2 through Y in water, a clear

solution Z is obtained. On boiling Z, compound X is reformed. The compound X is

A. $CaCO_3$

B. Na_2CO_3

C. CaO

D. $Ca(OH)_2$

Answer: A

Watch Video Solution

8. A solid compound X on heating gives CO_2 gas and a residue. The residue mixed with water forms Y. On passing excess of CO_2 through Y in water, a clear

solution Z is obtained. On boiling Z, compound X is reformed. The compound X is

A. $CaCl_2$

B. CaO

C. $Ca(OH)_2$

D. CO_2

Answer: C

Watch Video Solution

9. A solid compound X on heating gives CO_2 gas and a residue. The residue mixed with water forms Y. On passing excess of CO_2 through Y in water, a clear

solution Z is obtained. On boiling Z, compound X is reformed. The compound X is

A. $Ca(HCO_3)_2$

B. $Ca(OH)_2$

C. $CaCO_3$

D. CaO

Answer: A

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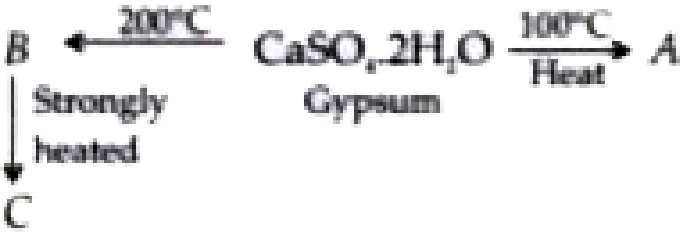

10.

A is

A. plaster of Paris

B. dead burn plaster

C. lime

D. lime water .

Answer: A

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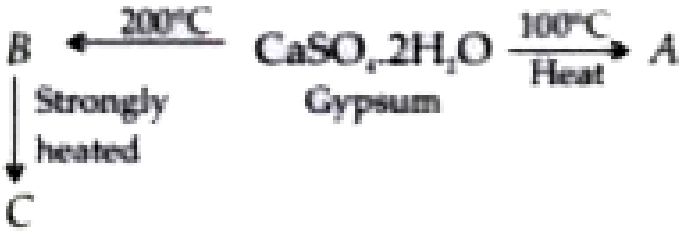

11.

B is

A. dead burnt plaster

B. lime

C. limestone

D. plaster of Paris .

Answer: A

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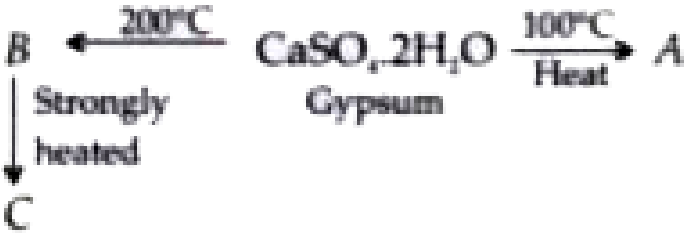
12.



C is

A. anhydrous calcium sulphate

B. lime

C. plaster of Paris

D. dead burnt plaster .

Answer: B

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13. A compound X of sodium forms a white powder .It is a consituent of baking powder and used in some antacids .when heated it gives a compound Y which is anhydrous and absorbs water to become hydrated salt .When this salt kept open in air looses water molecules in a process called efflorescence .When dissolved in water it forms a strong base and a weak acid Z.

What is Y ?

A. $NaHCO_3$

B. Na_2CO_3

C. $Na_2CO_3.10H_2O$

D. $NaCl$

Answer: B

Watch Video Solution

14. A compound X of sodium forms a white powder .It is a consituent of baking powder and used in some antacids .when heated it gives a compound Y which is anhydrous and absorbs water to become hydrated salt .When this salt kept open in air looses water molecules in a process called efflorescence .When dissolved in water it forms a strong base and a weak acid Z.

What happens when sodium carbonate hydrate is exposed to air ?

A. It loses one molecule of water .

B. It loses ten molecules of water .

C. It loses nine molecules of water .

D. It dissociates to give CO_2 .

Answer: C

Watch Video Solution

15. A compound X of sodium forms a white powder .It is a consituent of baking powder and used in some antacids .when heated it gives a compound Y which is anhydrous and absorbs water to become hydrated salt .When this salt kept open in air looses water molecules in a process called efflorescence .When dissolved in water it forms a

strong base and a weak acid Z.

What is the nature of the solution formed by dissolving Y in water ?

A. Alkaline

B. Acidic

C. neutral

D. It remains insoluble

Answer: A

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16. A compound X of sodium forms a white powder .It is a consituent of baking powder and used in some antacids

.when heated it gives a compound Y which is anhydrous and absorbs water to become hydrated salt .When this salt kept open in air looses water molecules in a process called efflorescence .When dissolved in water it forms a strong base and a weak acid Z.

Identify Z .

A. CO_2

B. H_2CO_3

C. $NaOH$

D. H_2O

Answer: B

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Exercise Subjective Problems Very Short Answer Type

1. Name two substances from daily life which contain acid and two substances which contain base .

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2. Name one antacid commonly used .

Watch Video Solution

3. Can we use NaOH as antacid ?

Watch Video Solution

4. What are olfactory indicators ? Give one example .

Watch Video Solution

5. What is the colour of phenolphthalein in NaOH ?

Watch Video Solution

6. Which gas burns with pop sound ?

A. CARBON

B. NITROGEN

C. HYDROGEN

D. OXYGEN

Answer: 3

Watch Video Solution

7. Which gas is evolved when metal carbonates or metal hydrogencarbonate reacts with dilute acids ?

Watch Video Solution

8. Why does CO_2 turn lime water milky ?

Watch Video Solution

9. What is lime water ?

Watch Video Solution

10. What is the pH of our stomach ?

Watch Video Solution

11. Which of the following is gypsum and which one is plaster or Paris ?

(i) $CaSO_4 \cdot \frac{1}{2}H_2O$

(ii) $CaSO_4 \cdot 2H_2O$

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12. What do you call the property of loosing water of crystallisation ?

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13. (a) Define a universal indicator . Mention its one use.

(b) Solution A gives pink colour when a drop of phenolphthalein indicator is added to it. Solution B gives red colour when a drop of methyl orange is added to it. What type of solutions are A and B which one of the solutions A and B will have a higher pH value ?

(c) Name one salt whose solutions has pH more than 7 and one salt whose solution has pH less than 7.

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14. Name the gas evolved when dilute HCl reacts with sodium hydrogencarbonate. How is it recognised?

Watch Video Solution

15. What is dead burnt plaster ? How is it obtained ?

Watch Video Solution

Exercise Subjective Problems Short Answer Type

1. What happnes when : (a) CO_2 is passed through lime water in limited amount .

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2. CO_2 is passed through lime water in excess .

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3. What precaution must be taken while diluting a concentrated acid ?

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4. Crystals of copper sulphate are heated in a test tube fore some time.

(a) What is the colour of copper sulphate crystal (i) before heating (ii) after heating ?

(b) What is the source of liquid droplets seen on the inner upper side of the test tube during the heating process ?

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5. Crystals of copper sulphate are heated in a test tube fore some time.

(a) What is the colour of copper sulphate crystal (i) before heating (ii) after heating ?

(b) What is the source of liquid droplets seen on the

inner upper side of the test tube during the heating process ?

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6. why is ammonia termed as a base through it does not contain OH^- ions?

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7. Name the products formed when sodium hydrogencarbonate is heated .

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8. Write the chemical equation for the above reaction .

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9. Name the four chemicals which can be obtained from common salt.

Watch Video Solution

10. How is bleaching powder prepared ? Why does bleaching powder :

Smell strongly of chlorine ?

Watch Video Solution

11. Bleaching powder Not dissolve completely in water ?

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12. Write the chemical formula for washing soda . How can it be obtained from baking soda ? Describe a houshold application of washing soda .

Watch Video Solution

13. What is the chemical name of baking soda ? What happen when it is heated ? Write two uses of baking soda .

Watch Video Solution

Watch Video Solution

14. How is plaster of Paris prepared ? Why is plaster of Paris stored in an airtight container ?

Watch Video Solution

15. What is the role of acid in our stomach ? Why pain occurs in the stomach during indigestion What is done to get rid of this pain ?

Watch Video Solution

16. Why Na_2CO_3 is more soluble in cold drinks than in water ?

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Exercise Subjective Problems Long Answer Type

1. Write the chemical formula of hydrated copper sulphate and anhydrous copper sulphate . Giving an activity illustrate how these two are interconvertible .

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2. Write chemical names and formulae of plaster of Paris and gypsum .

Watch Video Solution

3. What is observed when

dilute sulphuric acid is added to solid sodium carbonate ?

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4. Hot concentrated sulphuric acid is added to sulphur ?

Watch Video Solution

5. Sulphur dioxide is passed through lime water ?

Watch Video Solution

6. sodium hydroxide reacts with Al .

Watch Video Solution

7. What happnes when bleaching powder is heated with dilute H_2SO_4 ? Give equation of the reaction.

Watch Video Solution

8. Illustrate any three chemical properties of acids. With examples.

Watch Video Solution

9. Complete the following equations :

$NaHCO_3 \xrightarrow{\text{heat}}$

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10. $CaSO_4 \cdot 2H_2O \xrightarrow[373K]{\text{heat}}$

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11. $Na_2CO_3 \cdot 10H_2O \xrightarrow{\text{air}}$

Watch Video Solution

12. $CuSO_4 \cdot 5H_2O \xrightarrow{\text{heat}}$

Watch Video Solution

13. $Ca(OH)_2 + Cl_2 \rightarrow$

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14. Identify two salts among the following whose solutions have a pH greater than 7 .

i K_2S

(ii) NH_4Cl

(iii) KNO_3

(iv) $CaCO_3$

(v) NH_4NO_3

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Exercise Integer Numberical Value Type

1. The basicity of phosphoric acid is _____ .

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2. Calculate the pH of 10^{-8} M HCl solution .

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3. Molecules of water present in gypsum is

Watch Video Solution

4. Among the given acids , strong acids are $H_2SO_4, H_2CrO_4, HCN, HCl$,Phenol , HNO_3

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5. When equal volumes of 0.5 N NaOH and 0.3 N KOH are mixed in an experiment then the pH of the resulting solution is

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Olympiad Hots Corner

1. What of the following options shows the correct arrangement of different substances with increasing pH values ?

A. Ammonium hydroxide , magnesium hydroxide, lactic acid and sulphuric acid

B. Sulphuric acid , lactic acid , sodium hydroxide and ammonium hydroxide

C. Potassium hydroxide , calcium hydroxide , acetic acid and hydrochloric acid

D. Hydrochloric acid , acetic acid , ammonium hydroxide and potassium hydroxide

Answer: D

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2. Four solutions labelled as P , Q , R and S have pH values 1 , 9,3 and 13 respectively . Which of the following statements about the given solutions is incorrect ?

A. Solution P has higher concentration of hydrogen ions than solution R .

B. Solution Q has lower concentration of hydroxyl ions than solution S .

C. Solutions P and Q will turn red litmus solution blue .

D. Solution P is highly acidic while solution Q is weakly basic .

Answer: C

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3. An element which reacts with water to form a solution which turns phenolphthalein solution pink is

A. S

B. Ca

C. C

D. Ag

Answer: B

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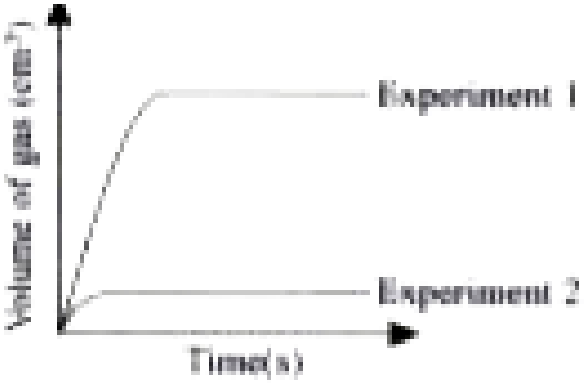
4. Daivik , a class 10 student studied the reaction between a carbonate and an acid in the lab .His results

are shown in the given graph :



Which of the following experimental condition did he use ?

	Experiment 1	Experiment 2
(a)	Excess acid, 5 g carbonate, 20°C	Excess acid, 5 g carbonate, 40°C
(b)	Excess acid, 4 g carbonate	Excess acid, 1 g carbonate
(c)	200 cm^3 of 0.5 mol/dm^3 acid, excess carbonate	100 cm^3 of 1 mol/dm^3 acid, excess carbonate
(d)	150 cm^3 of 0.1 mol/dm^3 acid, excess carbonate	50 cm^3 of 0.5 mol/dm^3 acid, excess carbonate

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5. The atmosphere of venus is made up of thick white and yellowish clouds of

A. acetic acid

B. sulphuric acid

C. nitric acid

D. hydrochloric acid .

Answer: B

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6. 0.1 mol of a basic substance (X) requires $25cm^3$ of 8.0 $mol\,/\,dm^3$ hydrochloric acid for complete neutralisation

.X could be

1. $Al(OH)_3$

2. CuO

3 . K_2O

4 . $NaOH$

A. 1 and 2

B. 2 and 3

C. 1 and 4

D. 2 and 4

Answer: B

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7. Identify the wrong statement .

A. Higher the hydrogen ion concentration lower is the pH value.

B. Universal indicator is used to judge how strong a given acid or base is .

C. As the pH value increases from 7 to 14 , it represents increase in H^+ ion concentration in the solution .

D. Values less than 7 on the pH scale represent an acidic solution .

Answer: C

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8. The discomform caused by indigestion due to overeasting can be cured by taking:

A. vinegar

B. lemon juice

C. baking soda

D. caustic soda.

Answer: C

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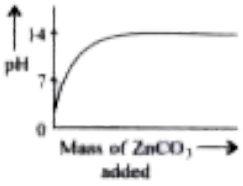
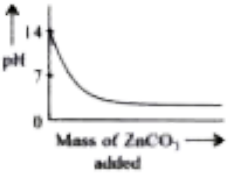
9. Which of the following graphs shows the change in pH when zinc carbonate is added to hydrochloric acid until it is excess ?

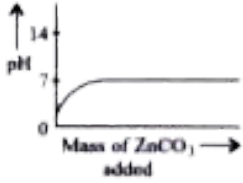
A.



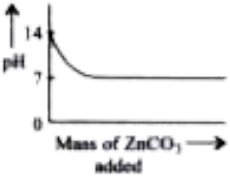
B.



C.



D.



Answer: C

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10. Plaster of Paris is

A. calcium sulphate $(CaSO_4)$

B. calcium sulphate hemihydrate$(CaSO_4.1/2H_2O)$

C. barium sulphate $(BaSO_4)$

D. none of these .

Answer: B

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11. The shining finish to the walls is given by

A. calcium oxide

B. calcium carbonate

C. calcium hydroxide

D. carbon dioxide .

Answer: B

Watch Video Solution

12. Which of the following compounds is alkaline in aqueous medium ?

A. Na_2CO_3

B. $NaCl$

C. $NaCO_3$

D. $CuSO_4$

Answer: A

Watch Video Solution

13. This does not possess water of crystallization

A. potassium nitrate

B. gypsum

C. copper sulphate

D. cobalt chloride .

Answer: A

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14. A is an aqueous solution of Acid and B is an aqueous solution of base. These are diluted separately. Then

A. pH of P increases while that of Q decreases till neutralisation .

B. pH of P decreases while that of Q increases till neutralisation .

C. pH of both P and Q decrease.

D. pH of both P and Q increase .

Answer: A

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15. Which of the following solutions has the lowest pH value ?

A. 0 . 1 Molar NaCl solution

B. 0 .01 Molar $NaHCO_3$ solution

C. 0 . 00 1 Molar Na_2CO_3 solution

D. 0.01 Molar $NaOH$ solution

Answer: A

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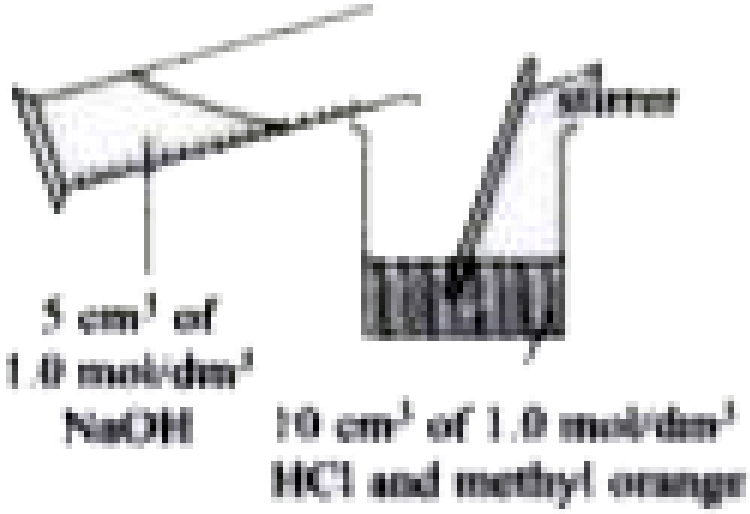
16. In an experiment , 5 cm^3 of 1.0 mol/dm^3 NaOH solution is gradually added to $10cm^3$ of $1.0mol/dm^3$ HCl solution containing methyl organge indicator . Which of the following changes will occur in the mixture ?



A. pH of the resultant solution increases .

B. The methly organge indicator changes colour from red to yellow .

C. Number of moles of water decreases and beaker gets warmed up .

D. A precipitate is formed .

Answer: A

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17. pH of different solutions are given in the table

Solution	pH
P	2.2–2.4
Q	13.8–14.0
R	6.5–7.5
S	8.0–9.0

Arrange these solutions in the increasing order of OH^- ion concentration .

A. $S < R < Q < P$

B. $P < R < S < Q$

C. $R < S < Q < P$

D. $Q < S < R < P$

Answer: B

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18. If a few drops of a concentrated acid accidentally spill over the hand of a student, what should be done ?

A. wash the hand with saline water .

B. Wash the hand immediately with plenty of water and apply paste of sodium hydrogen carbonate .

C. After washing with plenty of water apply solution of sodium hydroxide on the hand.

D. Neutralise the acid with a strong alkali .

Answer: B

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19. On passing CO_2 gas in excess in aqueous solution of sodium carbonate , the substance obtained is

A. $NaOH$

B. $NaHCO_3$

C. $Na_2CO_3.10H_2O$

D. $Na_2CO_3.\ H_2O$

Answer: B

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20. Which of the following is acidic in nature ?

A. Lime jiuce

B. Human blood

C. Lime water

D. Antacid

Answer: A

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