GIRI SIR'S CLASSES

HATIGAON, GUWAHATI

ACIDS, BASES AND SALTS

Class 10 - Science

Time Allowed: 50 minutes **Maximum Marks: 90**

General Instructions:

ALL THE QUESTIONS ARE COMPULSORY.

Section A

1. What happens when dilute HCl is slowly added to copper oxide in a beaker? **[1]**

   a) solution turns blue - green
   b) solution turns green
   c) solution turns blue
   d) solution turns brown

2. The following pairs of substances are available in the laboratory: **[1]**

   A. Zinc and dilute hydrochloric acid
   B. Zinc and dilute sodium hydroxide solution
   C. Sodium bicarbonate and dilute hydrochloric acid

   Which of these can be used to produce a colourless and odourless gas which gives a pop sound on burning?

   a) A and B
   b) A and C
   c) A only
   d) B only

3. Which of the following is used for dissolution of gold? **[1]**

   a) Aqua regia
   b) Sulphuric acid
   c) Hydrochloric acid
   d) Nitric acid

4. Which among the following is not a base? **[1]**

   a) NaOH
   b) C_2H_5 OH
   c) KOH
   d) NH_4OH

5. Litmus is an example of **[1]**

   a) olfactory indicator
   b) artificial indicator
   c) natural indicator
   d) self indicator

6. Which of the following substance will not give carbon dioxide on treatment with dilute acid? **[1]**

   a) Marble
   b) Limestone
   c) Lime
   d) Baking soda

7. Given below are certain chemical properties of substances. **[1]**

   A. It turns blue litmus red.
   B. It turns red litmus blue.
   C. It reacts with zinc and a gas evolves.

D. It reacts with solid sodium carbonate to give brisk effervescence.

Which out of these properties are shown by dilute hydrochloric acid?

a) A, C and D only
b) A and C only
c) B, C and D only
d) A and B only

8. Dilute hydrochloric acid was added to solid sodium bicarbonate. It was observed that **[1]**

a) a gas evolved with a pop sound
b) brisk effervescence was produced
c) solution colour is yellow
d) a gas evolved and a black residue appeared at the bottom of the test tube

9. A liquid sample turned red litmus paper blue. This indicates that the liquid sample is that of **[1]**

a) an alcohol
b) distilled water
c) hydrochloric acid
d) sodium hydroxide solution

10. When a student added zinc granules to dilute HCl, a colourless and odourless gas was evolved, which was tested with a burning matchstick, it was observed that **[1]**

a) The matchstick continued to burn brilliantly.
b) The matchstick extinguished and the gas burnt with pop sound.
c) The matchstick burnt slowly with a blue flame.
d) The matchstick extinguished and the gas burnt with no sound.

11. Which is a base and not an alkali? **[1]**

a) $Fe(OH)_3$
b) NH_4OH
c) NaOH
d) KOH

12. HCl is a strong acid since in solution it gives **[1]**

a) more number of water molecules
b) less number of H^+ ions
c) more number of Cl^- ions
d) more number of H^+ ions

13. If a few drops of a concentrated acid accidentally spills over the hand of a student, what should be done? **[1]**

a) After washing with plenty of water apply solution of sodium hydroxide on the hand
b) Neutralise the acid with a strong alkali
c) Wash the hand with saline solution
d) Wash the hand immediately with plenty of water and apply a paste of sodium hydrogencarbonate

14. **Assertion (A):** An aqueous solution of acid conducts electricity. **[1]**
Reason (R): It is because in the solution it dissociates into ions.

a) Both A and R are true and R is the correct explanation of A.
b) Both A and R are true but R is not the correct explanation of A.
c) A is true but R is false.
d) A is false but R is true.

15. **Assertion (A):** Tap water conducts electricity but distill water does not conducts electricity. **[1]**
Reason (R): Tap water conducts electricity as it contains ions whereas distilled water does not contain ions.

a) Both A and R are true and R is the correct explanation of A.

b) Both A and R are true but R is not the correct explanation of A.

c) A is true but R is false.

d) A is false but R is true.

16. **Assertion (A):** Sodium hydroxide reacts with zinc to produce hydrogen gas. **[1]**

Reason (R): Acids react with active metals to produce hydrogen gas.

a) Both A and R are true and R is the correct explanation of A.

b) Both A and R are true but R is not the correct explanation of A.

c) A is true but R is false.

d) A is false but R is true.

17. **Assertion (A):** The acidity of $Mg(OH)_2$ is two. **[1]**

Reason (R): The acidity of a base is equal to the number of hydroxyl ions.

a) Both A and R are true and R is the correct explanation of A.

b) Both A and R are true but R is not the correct explanation of A.

c) A is true but R is false.

d) A is false but R is true.

18. **Assertion (A):** HCl gas does not change the color of dry blue litmus paper. **[1]**

Reason (R): HCl gas dissolves in the water present in wet litmus paper to form H^+ ions.

a) Both A and R are true and R is the correct explanation of A.

b) Both A and R are true but R is not the correct explanation of A.

c) A is true but R is false.

d) A is false but R is true.

19. **Assertion (A):** HCl produces hydronium ions (H_3O^+) and chloride ions (Cl^-) in aqueous solution. **[1]**

Reason (R): In presence of water, basic give H^+ ions.

a) Both A and R are true and R is the correct explanation of A.

b) Both A and R are true but R is not the correct explanation of A.

c) A is true but R is false.

d) A is false but R is true.

20. **Assertion (A):** H_3PO_4 and H_2SO_4 are known as polybasic acids. **[1]**

Reason (R): They have two or more than two protons per molecule of the acid.

a) Both A and R are true and R is the correct explanation of A.

b) Both A and R are true but R is not the correct explanation of A.

c) A is true but R is false.

d) A is false but R is true.

21. **Assertion (A):** Pure water is neither acidic nor basic. **[1]**

Reason (R): The pH of a solution is inversely proportional to the concentration of hydrogen ions in it.

a) Both A and R are true and R is the correct explanation of A.

b) Both A and R are true but R is not the correct explanation of A.

c) A is true but R is false.

d) A is false but R is true.

22. **Assertion (A):** If the pH inside the mouth decreases below 5.5, the decay of tooth enamel begins. **[1]**

Reason(R): The bacteria present in mouth degrades the sugar and leftover food particles and produce acids that remains in the mouth after eating.

a) Both A and R are true and R is the correct

b) Both A and R are true but R is not the

explanation of A.

correct explanation of A.

c) A is true but R is false.

d) A is false but R is true.

23. **Assertion (A):** Dry HCl gas does not change the colour of the dry litmus paper. **[1]**

Reason (R): It is because dry HCl does not contain the OH^- ions.

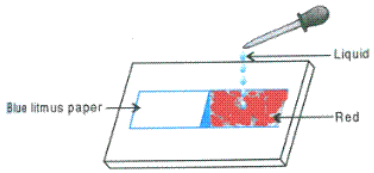
a) Both A and R are true and R is the correct explanation of A.

b) Both A and R are true but R is not the correct explanation of A.

c) A is true but R is false.

d) A is false but R is true.

24. A student placed a few drops of a liquid over a portion of the blue litmus paper as shown here. He observed that the blue litmus paper turned red. The liquid could be **[1]**



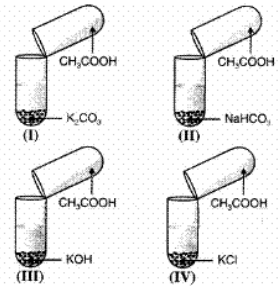
a) dilute sodium hydroxide

b) dilute sodium bicarbonate solution

c) dilute hydrochloric acid

d) water

25. If burning candle is brought near each of the following test tube, in which of the following candle will get extinguished? **[1]**



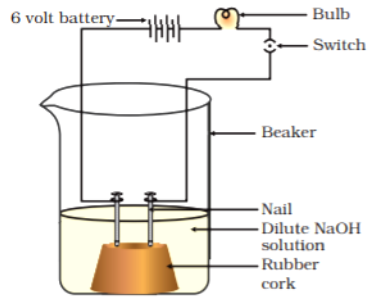
a) I and III

b) II and III

c) III and IV

d) I and II

26. In an attempt to demonstrate electrical conductivity through an electrolyte, the following apparatus was set up Which among the following statement(s) is(are) correct? **[1]**



i. Bulb will not glow because electrolyte is not acidic

ii. Bulb will glow because NaOH is a strong base and furnishes ions for conduction

iii. Bulb will not glow because circuit is incomplete

iv. Bulb will not glow because it depends upon the type of electrolytic solution

a) (iv) only

b) (ii) and (iv)

c) (ii) only

d) (i) and (iii)

27. Equal volumes of hydrochloric acid and sodium hydroxide solutions of same concentration are mixed and the pH of the resulting solution is checked with a pH paper. What would be the colour obtained? (You may use colour guide given in Figure **[1]**

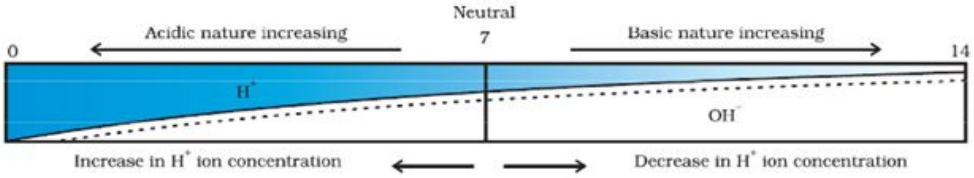
a) Red

b) Blue

c) Yellowish green

d) Yellow

28. **[1]**



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

a) 5

b) 9

c) 10

d) 8

29. What is the change in pH value of milk when it changes into curd? Explain. **[1]**

30. An aqueous solution turns red litmus solution blue. Excess addition of which solution would reverse the change? **[1]**

31. What is the colour of phenolphthalein indicator with **[1]**

i. acids

ii. Bases and

iii. Neutral solution?

32. What happens when a solution of an acid is mixed with a solution of a base in a test tube? **[1]**

33. What is the action of calcium oxide with dil HCl ? **[1]**

34. How is the neutralisation of a carbonate with an acid different from the neutralisation of an oxide or a hydroxide? **[1]**

35. How is an acid or base diluted ? **[1]**

36. What is common in all the water-soluble bases (or alkalis)? **[1]**

37. Fresh milk has a pH of 6. What will be the PH value if milk changes into a curd. Justify. **[1]**

38. When a solution is added to a cloth strip treated with onion extract, then the smell of onion cannot be detected. State whether the given solution contains an acid or a base. **[1]**

39. The pH of a sample of vegetable soup was found to be 6.5. How is this soup likely to taste? **[1]**

Section B

40. 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. **[2]**

41. Soham adds a spoon full of powdered sodium hydrogen carbonate to a flask containing ethanoic acid. **[2]**

i. List two main observations that he/she must note in his/her notebook about the reaction that takes place.

ii. Write chemical equation for the reaction.

42. What happens when zinc granules are added to dil NaOH solution? Also write the chemical equation for the reaction. **[2]**

43. You have been provided with two test tubes. One of them contains distilled water and the other contain acid **[2]**

solution. How will you find out which of the test tube contains water without testing the contents of the test tube?

44. What do you understand by basic oxide ? Give two examples **[2]**

45. A Student prepared solution of (i) an acid and (ii) a base in two separate beakers. She forgot to label the solutions and litmus paper is not available in the laboratory. Since both the solutions are colourless, how will she distinguish between the two? **[2]**

46. What is the action of zinc with dilute sulphuric acid ? **[2]**

47. Define neutralization reaction. Give two examples. **[2]**

48. What is a neutralization reaction? Give two examples. **[2]**

49. State reason for the following: **[2]**

i. Dry HCl gas does not change the colour of the dry blue litmus paper.

ii. Alcohol and glucose also contain hydrogen, but do not conduct electricity.

iii. Concentration of H_3O^+ ions is affected when a solution of an acid is diluted.

50. Explain why an aqueous solution of sodium sulphate is neutral while an aqueous solution of sodium carbonate is basic in nature. **[2]**

51. Why does distilled water not conduct electricity, whereas rainwater does? **[2]**

52. When a drop of orange juice is added to pure water, how the pH value will vary for water? If a drop of lemon juice is also added, will there be any more change in the pH value? **[2]**

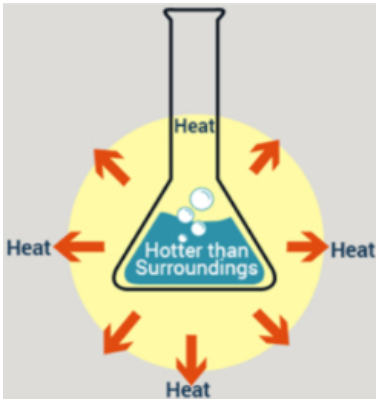
53. How will you compare the strength of weak bases ? **[2]**

54. Farmers are using a large number of pesticides and fertilisers in their fields to increase crop production and to enhance their profits. But by doing so, they are causing damage to the soil as well as to the environment. Do you agree with this statement? Why should we avoid eating fruits and vegetables without washing them properly? **[2]**

Section C

Question No. 55 to 58 are based on the given text. Read the text carefully and answer the questions: **[4]**

The dissolving of an acid or a base in water is a highly exothermic reaction. Care must be taken while mixing concentrated nitric acid or sulphuric acid with water. The acid must always be added slowly to water with constant stirring. If water is added to a concentrated acid, the heat generated may cause the mixture to splash out and cause burns. The glass container may also break due to excessive local heating. Look out for the warning sign on the can of concentrated sulphuric acid and on the bottle of sodium hydroxide pellets.



55. What is the exothermic reaction?

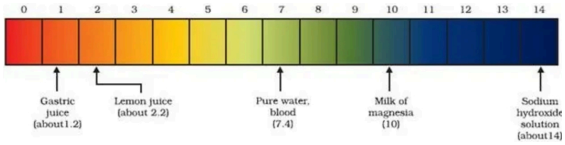
56. Write an example of an exothermic reaction.

57. How will you obtain sulphuric acid from an acidic oxide?

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

Question No. 59 to 62 are based on the given text. Read the text carefully and answer the questions: **[4]**

The strength of acid and base depends on the number of H^+ and the number of OH^- respectively. If we take hydrochloric acid and acetic acid of the same concentration, say one molar, then these produce different amounts of hydrogen ions. Acids that give rise to more H^+ ions are said to be strong acids, and acids that give less H^+ ions are said to be weak acids. Can you now say what weak and strong bases are?



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

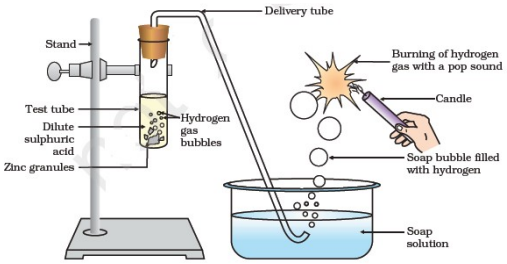
60. Is Gastric juice a weak acid?

61. Milk of magnesia is an acid or base? For what purpose it can be used?

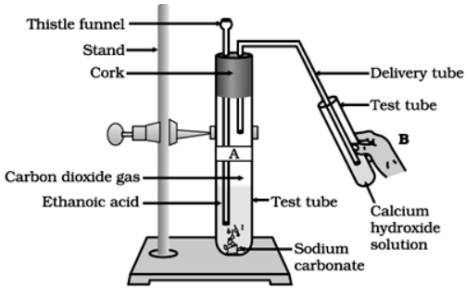
62. What is the pH value of saliva after the meal?

63. **Read the following and answer any four questions:** **[4]**

Experiment-1 to show the reaction of dilute sulphuric acid with zinc a few pieces of zinc granules in the boiling tube is taken and 5ml of dil. H_2SO_4 added to it and the gas bubble is formed.



Experiment-2 of passing CO_2 gas through calcium hydroxide solution. On passing the carbon dioxide gas evolved through lime water.



i. In **experiment 1** which gas evolved which produce the pop sound:

a. Oxygen

b. Hydrogen

c. Nitrogen

d. CO_2

ii. The reaction that takes place in experiment 2 is:

a. $2NaOH + Zn \rightarrow Na_2ZnO_2 + H_2$

b. $2NaOH + Fe \rightarrow Na_2FeO_2 + H_2$

c. $2KOH + Zn \rightarrow K_2ZnO_2 + H_2$

d. $2NaOH + Sn \rightarrow Na_2SnO_2 + H_2$

iii. In experiment-2 neutralization reaction can be written as:

a. Base + Acid $\rightarrow$ salt + water

b. Base + Base $\rightarrow$ Strong base

c. Acid + Acid $\rightarrow$ Strong acid

d. None of the above

iv. The chemical formula of sodium zincate:

a. Na_2ZnO_2

b. Na_3ZnO_3

c. Na_6ZnO_3

d. Na_4ZnO_3

v. In experiment - 2 the product which is formed on passing excess of CO_2 in $CaCO_3$:

a. $Ca(CO_3)$

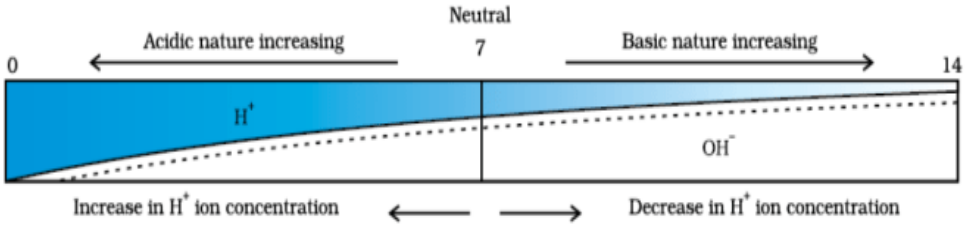
b. $Ca_2(HCO_3)$

c. Ca_2CO_3

d. $Ca(HCO_3)_2$

64. **Read the following and answer any four questions:** **[4]**

A scale for measuring hydronium ion in a solution called the pH scale. The pH of a neutral solution is 7. A value of less than 7 on the pH scale represents an acidic solution. As the pH value, increases from 7 to 14 it represents OH- ion concentration in solution i.e a basic solution.



i. Human Body works within the pH range of

a. 7.4 to 8

b. 4.4 to 5.4

c. 7 to 7.8

d. 6.1 to 7

ii. The strength of acid and bases depend on the _____

a. number of H^+ ion produce

b. number of OH^- ion produce

c. both (a) and (b)

d. none of the above

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

a. 1

b. 4

c. 5

d. 10

iv. Tooth decay starts when the pH of the mouth lower than

a. 7.5

b. 5.5

c. 6.7

d. 8.4

v. The higher the hydronium ion concentration _____ is the pH value.

a. lower

b. greater

c. same

d. zero

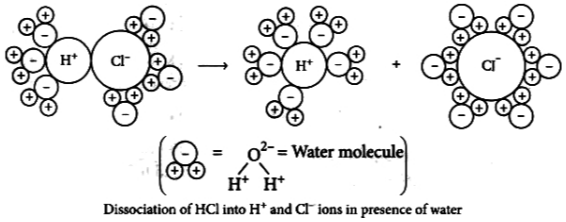
Section D

Question No. 65 to 69 are based on the given text. Read the text carefully and answer the questions: **[5]**

The acidic behaviour of acids is due to the presence of hydrogen(H^+) ions in them. They produce hydrogen ions in the presence of water. Water is a polar solvent and this property of water helps in weakening the bond between the ions and makes them soluble.

Hence, acids and bases produce ions in aqueous solutions. It may be noted that a dry HCl gas or a solution of hydrogen chloride in organic, non-polar solvents like toluene or benzene do not show acidic properties. This is because hydrogen chloride does not undergo ionization in toluene.

The reason why HCl splits into H^+ and Cl^- ions in presence of water lies in the fact that water molecules, being polar, pull the H^+ and Cl^- ions apart and thus, the bond in HCl is broken.



Dissociation of HCl into H^+ and Cl^- ions in presence of water

65. Identify the wrong statement.

i. Higher the hydronium ion concentration, lower is the pH value.

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

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

iv. Value less than 7 on the pH scale represents an acidic solution.

a) Option (ii)

b) Option (i)

c) Option (iv)

d) Option (iii)

66. If the pH of a solution is 8, then its $[H^+]$ ion is

a) $\log 10^{-8}$

b) 10^8

c) 10^{-8}

d) 8

67. In terms of acidic strength, which one of the following is in the correct increasing order?

a) Hydrochloric acid < Water < Acetic acid

b) Water < Hydrochloric acid < Acetic acid

c) Acetic acid < Water < Hydrochloric acid

d) Water < Acetic acid < Hydrochloric acid

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

a) CH_3COOH

b) H_2CO_3

c) H_3PO_4

d) C_2H_5OH

69. 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 Q has lower concentration of hydroxide ions than solution S.

b) Solutions P and Q will turn red litmus solution blue.

c) Solution P is highly acidic while solution Q is weakly basic.

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