

* Choose the correct alternative from those given below each questions [29]

1. A solution turns the red litmus paper to blue. Excess addition of which of the following solution would reverse the change?

Lime water

Baking soda

Vinegar

Common salt solution

Ans. : C. Vinegar.

Red litmus turning blue indicates a basic solution. To reverse this, an acidic solution is needed. Vinegar is acidic.

2. You are provided with three unknown solutions labelled A, B, and C, but you do not know which of these are acidic, basic, or neutral. Upon adding a few drops of red litmus solution to solution A, it turns blue. When a few drops of turmeric solution are added to solution B, it turns red. Finally, after adding a few drops of red rose extract to solution C, it turns green. Based on the observations, which of the following is the correct sequence for the nature of solutions A, B, and C?

Acidic, acidic and acidic

Neutral, basic and basic

Basic, basic and acidic

Basic, basic and basic

Ans. : D. Basic, basic and basic.

A turns red litmus blue Basic. B turns turmeric red Basic. C turns red rose extract green Basic.

3. A base is added slowly to an acid. The reaction will be?

A neutralisation reaction

Physical change

Corrosion

No reaction

Ans.: (A) A neutralisation reaction

4. The yellow colour of turmeric changes to red on addition of soap solution. When substance X is added to turmeric, there is no change in colour. Which of the following is definitely true about substance X ?

X is an acid

X is an alkali

X is a base

None of these

Ans.: (A) X is an acid

5. A neutralisation reaction is:

Endothermic

Reversible

Exothermic

Physical

Ans. : (C) Exothermic

6. In a neutralisation reaction,

Heat is released

Heat is absorbed

No change

Heat can be released or absorbed

Ans.: (A) Heat is released

7. Which is the correct pair?

\$ Acid - Bitter

%Base - Sour

&Base - Slippery

' Neutral - Red litmus to blue

Ans. : (C) Base - Slippery

8. The best indicator for olfactory test is:

\$ Red rose

%Onion

&Litmus

' Red cabbage

Ans. : (B) Onion

9. Which olfactory indicator works only for bases?

\$ Onion

%Turmeric

&Red rose

' Litmus

Ans. : (B) Turmeric

10. Dheeraj observed that the stain of curry on a white shirt becomes reddish-brown when soap is scrubbed on it, but it turns yellow again when the shirt is washed with plenty of water. What might be the reason for his observation?

(i) Soap is acidic in nature

(ii) Soap is basic in nature

(iii) Turmeric is a natural indicator which gives reddish tinge in bases

(iv) Turmeric is a natural indicator which gives reddish tinge in acids.

\$ (i) and (ii)

%(ii) and (iii)

&(i) and (iv)

' (ii) and (iv)

Ans. : (B) (ii) and (iii)

11. Which of the following turns blue litmus paper red?

\$ Soap solution

%Vinegar

&Baking soda

' Lime water

Ans. : (B) Vinegar

12. A substance that does not affect red or blue litmus is:

\$ Lemon juice

%Salt solution

&Vinegar

' Washing soda

Ans. : (B) Salt solution

13. Which natural indicator is obtained from lichens?

\$ Turmeric

%Red cabbage

&Litmus

' Rose petals

Ans. : (C) Litmus

14. Red rose extract turns green in the presence of:

\$ Acid

%Neutral substance

&Base

' Salt

Ans. : (C) Base

15. Which of these is an olfactory indicator?

\$ Turmeric

%Onion

&Red cabbage

' Vinegar



Ans. : (B) Onion

16. Which of these substances is acidic in nature?

- \$ Baking soda %Lemon juice & Soap solution ' Lime water

Ans. : (B) Lemon juice

17. What is the nature of soap solution?

- \$ Acidic %Basic &Neutral ' None of these

Ans. : (B) Basic

18. Which of these is used to neutralise acid in soil?

- \$ Vinegar %Baking soda &Lime ' Soap

Ans. : (C) Lime

19. The acidic substance injected by ants is:

- \$ Acetic acid %Citric acid &Formic acid ' Sulphuric acid

Ans. : (C) Formic acid

20. If a red litmus paper stays red after testing, the sample is:

- \$ Acidic %Basic &Neutral or acidic ' Basic or neutral

Ans. : (C) Neutral or acidic

21. Neutralisation is a:

- \$ Physical change %Reversible change
&Chemical change ' Natural change

Ans. : (C) Chemical change

22. The product of a neutralisation reaction is:

- \$ Salt %Salt + Water
&Salt + Heat ' Salt + Water + Heat

Ans. : (D) Salt + Water + Heat

23. Which of these substances is acidic in nature?

- \$ Quick lime %Tap water &Curd ' None of these

Ans. : (C) Curd

24. You are provided with three unknown solutions labelled A, B, and C, but you do not know which of these are acidic, basic, or neutral. Upon adding a few drops of red litmus solution to solution A, it turns blue. When a few drops of turmeric solution are added to solution B, it turns red. Finally, after adding a few drops of red rose extract to solution C, it turns green.

Based on the observations, which of the following is the correct sequence for the nature of solutions A, B, and C?

- \$ Acidic, acidic, and acidic %Neutral, basic, and basic

&Basic, basic, and acidic

' Basic, basic, and basic

Ans. : (D) Basic, basic, and basic

Solution A turns red litmus to blue – Basic in nature
Solution B turns turmeric solution to red – Basic in nature
Solution C turns rose extract to green – Basic nature
Thus, the correct sequence for the nature of solutions A, B and C is basic, basic and basic.

25. Turmeric is a natural indicator. On adding its paste to acid and base separately, which colours would be observed?

\$ Yellow in both acid and base

%Yellow in acid and red in base

&Pink in acid and yellow in base

' Red in acid and blue in base.

Ans. : (B) Yellow in acid and red in base

26. Common salt is

\$ acidic

%basic

&neutral

' none of these.

Ans. : (C) neutral

27. Neutralisation reactions form

\$ an acid and a base

%an acid and a salt

&a salt and water

' a salt and a base.

Ans. : (C) a salt and water

28. Sting of an ant contains

\$ vinegar

%common salt

&formic acid

' baking soda.

Ans. : (C) formic acid

29. Which of the following is an acid-base indicator?

\$ Vinegar

%Lime water

&Turmeric

' Baking soda

Ans. : (C) Turmeric

* a statement of Assertion (A) is followed by a statement of Reason (R). Choose [8]
the correct option.

30. Assertion (A): A neutralisation reaction produces salt and water.

Reason (R): It is a reaction between an acid and a base.

\$ Both Assertion (A) and Reason (R) are true, and (R) is the correct explanation of (A).

%Both Assertion (A) and Reason (R) are true, but (R) is not the correct explanation of (A).

&(A) is true, but (R) is false.

' (A) is false, but (R) is true.

Ans.: (A) Both Assertion (A) and Reason (R) are true, and (R) is the correct explanation of (A).



31. Assertion (A): Turmeric changes to red in bases.

Reason (R): Bases are sour in taste.

\$ Both Assertion (A) and Reason (R) are true, and (R) is the correct explanation of (A).

%Both Assertion (A) and Reason (R) are true, but (R) is not the correct explanation of (A).

&(A) is true, but (R) is false.

' (A) is false, but (R) is true.

Ans. : (C) (A) is true, but (R) is false.

32. Assertion (A): Onion can be used to detect acids.

Reason (R): It changes odour in basic medium.

\$ Both Assertion (A) and Reason (R) are true, and (R) is the correct explanation of (A).

%Both Assertion (A) and Reason (R) are true, but (R) is not the correct explanation of (A).

&(A) is true, but (R) is false.

' (A) is false, but (R) is true.

Ans. : (B) Both Assertion (A) and Reason (R) are true, but (R) is not the correct explanation of (A).

33. Assertion (A): Soap solution feels slippery.

Reason (R): It is acidic in nature.

\$ Both Assertion (A) and Reason (R) are true, and (R) is the correct explanation of (A).

%Both Assertion (A) and Reason (R) are true, but (R) is not the correct explanation of (A).

&(A) is true, but (R) is false.

' (A) is false, but (R) is true.

Ans. : (C) (A) is true, but (R) is false.

34. Assertion (A): Adding lime to acidic soil helps plants grow.

Reason (R): Lime neutralises excess acid in the soil.

\$ Both Assertion (A) and Reason (R) are true, and (R) is the correct explanation of (A).

%Both Assertion (A) and Reason (R) are true, but (R) is not the correct explanation of (A).

&(A) is true, but (R) is false.

' (A) is false, but (R) is true.

Ans.: (A) Both Assertion (A) and Reason (R) are true, and (R) is the correct explanation of (A).

35. Assertion (A): Neutralisation reaction is accompanied by the absorption of heat.

Reason (R): Neutralisation reaction is a reaction between an acid and a base to



form salt and water.

\$ Both A and R are true and R is the correct explanation of A.

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

&A is true but R is false.

' A is false but R is true.

Ans. : (D) A is false but R is true.

36. Assertion (A): Sugar is a neutral substance.

Reason (R): A sugar solution turns red litmus blue.

\$ Both A and R are true and R is the correct explanation of A.

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

&A is true but R is false.

' A is false but R is true.

Ans. : (C) A is true but R is false.

37. Assertion (A): Turmeric is a natural indicator.

Reason (R): Turmeric acquires an orange colour in basic solution.

\$ Both A and R are true and R is the correct explanation of A.

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

&A is true but R is false.

' A is false but R is true.

Ans. : (C) A is true but R is false.

*** State Whether The Following Sentences Are True Or False.[1 Marks Each]**

[14]

38. Turmeric turns red in acidic solutions.

Ans. : false

39. Litmus is a synthetic indicator.

Ans. : false

40. Acidic substances taste sour.

Ans. : true

41. A solution that turns blue litmus red is acidic.

Ans. : true

42. Sugar solution is neutral in nature.

Ans. : true

43. Onion is a natural indicator.

Ans. : false



44. Red rose extract turns green in acidic solution.

Ans. : false

45. A neutralisation reaction produces carbon dioxide.

Ans. : false

46. Orange juice turns blue litmus red.

Ans. : true

47. Acids are bitter in taste.

Ans. : false

48. All substances are either acidic or basic.

Ans. : false

49. Indicator is a substance which shows different colours in acidic and basic solutions.

Ans. : true

50. Common salt dissolved in water turns blue litmus red.

Ans. : false

51. Lime water turns red litmus blue.

Ans. : true

*** Fill In The Blanks With Correct Alternative.[1 Marks Each]**

[12]

52. Litmus is obtained from _____.

Ans. : lichens

53. A base reacts with an acid to form _____ and water.

Ans. : salt

54. Acidic substances turn _____ litmus red.

Ans. : blue

55. The extract of red rose turns green in the presence of a _____.

Ans. : base

56. Substances that do not change the colour of litmus are called _____.

Ans. : neutral

57. _____ soil produces blue coloured Hydrangea flowers.

Ans. : Acidic

58. Acetic acid is present in _____.

Ans. : vinegar

59. The reaction between an acid and base is _____ called reaction.



Ans. : neutralisation

60. Lime water converts _____ litmus into _____ litmus.

Ans. : red, blue

61. Lemon juice and vinegar taste _____ because they contain _____ .

Ans. : sour, acids

62. Turmeric and litmus are _____ acid-base indicators.

Ans. : natural

63. When an acidic solution is mixed with a basic solution, they _____ each other forming _____ and water.

Ans. : neutralise, salt

*** Answer The Following Questions In One Sentence.[1 Marks Each]**

[49]

64. What surprising thing happened with Ashwin and Keerthi at the science fair?

Ans. : Their white sheets showed the words "Welcome to the Wonderful World of Science" after being sprayed with a liquid. This made them very excited and curious.

65. What is litmus obtained from?

Ans. : Litmus is a natural substance obtained from lichens. It is available as a solution or as paper strips in two colours – blue and red.

66. What does a substance turning blue litmus paper red indicate?

Ans. : If a substance turns blue litmus paper red, it means the substance is acidic in nature.

67. What does a basic substance feel like when touched?

Ans. : Basic substances usually feel slippery or soapy when touched, like the baking soda solution.

68. What is an olfactory indicator?

Ans. : Olfactory indicators are substances that change their smell when mixed with an acidic or basic medium, like onion.

69. What is the colour of turmeric in acidic solution?

Ans. : The colour of turmeric in acidic solution is yellow.

70. Name a base that is safe to taste.

Ans. : baking soda is a safe to taste.

71. What is the nature of baking soda solution?

Ans. : Baking soda solution is basic in nature.

72. Name a substance used to neutralise ant bite.

Ans. : baking soda is a substance used to neutralise ant bite.



73. What is an olfactory indicator?

Ans. : Some substances whose odours change in an acidic or basic medium. These are called olfactory indicators.

74. What does a neutral solution do to litmus?

Ans. : A neutral solution does not change the color of either red or blue litmus paper.

75. Which acid is present in lemon juice?

Ans. : Lemon juice contains Citric acid.

76. What is the taste of most acids?

Ans. : Most acids taste is sour.

77. Give two examples of natural indicators.

Ans. : (1) **Litmus:**It is obtained from lichens.

(2) **Red rose:**Extracts from red rose petals can be used as an indicator.

78. Do you find lichens on trees in your neighbourhood?

Ans. : Yes, lichens can be found growing on trees, especially in areas with clean air and good rainfall.

79. If litmus is not available, are there some other natural substances that can serve as acid- base indicators?

Ans. : Yes, there are other natural substances that can be used as acid-base indicators, such as red cabbage juice, turmeric, and rose extract. These substances also change colour in the presence of acids or bases.

80. Are there any substances whose odours change on adding acidic or basic substances?

Ans. : Yes, there are substances like onion and vanilla extract whose odours change when exposed to acidic or basic substances are known as olfactory indicators.

81. What remedies do people use to treat ant bites in your region?

Ans. : People often use natural remedies like applying a paste of baking soda and water, using a cold compress to reduce pain and swelling caused by ant bites.

82. If the factory waste is acidic in nature, what could be done to save the fish in the lake?

Ans. : To save the fish in the lake, neutralising the acidic waste by adding a base like lime before releasing it into the water could help restore the neutral nature of water, making it safer for the fish.

83. Do you think that one possibility could be using a turmeric solution for the spraying liquid and a soap solution for writing on the paper?



Ans. : Yes, turmeric solution can be used as an indicator for spraying, as it changes colour from yellow to red in basic solutions, while a soap solution could be used for writing on the paper, since soap is basic in nature.

84. A liquid sample from the laboratory was tested using various indicators :

Indicator	Red litmus	Blue litmus	Turmeric
Change	No change	Turned red	No change in colour

Ans. : The given liquid sample is acidic in nature. It does not affect red litmus paper, but it turns blue litmus paper red, which is an indication of acidic nature. Also, there is no change in the turmeric indicator, confirming its acidic nature.

85. Table : Testing the nature of samples with red rose extract

Name of the Sample	The colour of the red rose extract after adding the sample	Nature of substance
Lemon juice	Red	Acidic
Soap solution	Green	Basic
Amla juice	Red	Acidic
Baking soda solution	Green	Basic
Vinegar	Red	Acidic

Ans. : Observation and conclusion: The rose extract gives a red colour in an acidic solution and a green colour in a basic solution.

86. Table : Testing the nature of samples with turmeric paper

Name of the Sample	The colour of the turmeric paper after putting a drop of sample
Lemon juice	Yellow
Soap solution	Red
Amla juice	Yellow
Baking, soda solution	Red
Sugar solution	Yellow

Ans. : Observation and conclusion: Turmeric paper changes colour from yellow to red in a basic solution but shows no change in acidic or neutral solutions.

87. What are acids?

Ans. : The substances which are sour in taste are called acids.

88. Name two substances that are acidic in nature.

Ans. : Lemon and tamarind

89. What are bases?

Ans. : The substances that feel soapy to touch and bitter in taste are called bases.

90. Which indicators change odour with different substances?

Ans. : Olfactory indicators

91. From which plant is litmus extracted?

Ans. : Lichens

92. What is the effect of acid and base on litmus?

Ans. : Acid converts blue litmus into red, while base converts red litmus into blue.

93. What are neutral substances?

Ans. : The substances which do not show any effect on litmus are called neutral substances.

94. Why does a turmeric stain red on a white shirt when it is washed with soap?

Ans. : It is because the soap solution is basic, and turmeric acts as a natural indicator that turns red in a basic solution.

95. Dip some crushed red rose petals in warm water to make the extract. Add a few drops of an acid and a base separately in two different containers. Write the effect of it on acid and base.

Ans. : Red rose petals extract turns red in an acidic solution and green in a basic solution.

96. Form a sentence using the following words - baking soda, ant bite, moist, effect, neutralised, rubbing.

Ans. : The effect of an ant bite can be neutralised by rubbing moist baking soda.

97. What is litmus? How is it prepared?

Ans. : The most commonly used natural indicator is litmus. It is extracted from lichens. It is available in the form of a solution or strips of paper.

98. How do you prepare lime water?

Ans. : To prepare lime water, dissolve some lime (calcium oxide, also known as chuna) in water. Stir the mixture and let it sit for a while. Afterward, filter the solution, and the liquid obtained is lime water.

99. How can you prepare turmeric paper?

Ans. : Take some turmeric powder and mix it in some water to make a paste. Deposit it on blotting paper or filter paper and dry it. Cut thin strips of the yellow paper obtained. These thin strips are turmeric paper.

100. Explain the use of rose petals as indicators.

Ans. : Rose petals, when added to warm water, form an extract which is used as an indicator. This indicator turns red in an acidic solution and green in a basic solution.

101. What is a neutralisation reaction? Explain with an example.



Ans. : The reaction between an acid and a base is known as a neutralisation reaction. Salt and water are produced in this process along with the evolution of heat.

Acid + Base : Salt + Water (Heat is evolved.)

102. While playing in a park, a child was stung by a wasp. Some elders suggested applying a paste of baking soda, and others lemon juice as a remedy. Which remedy do you think is appropriate and why?

Ans. : A wasp bite injects base into the body. The effect of the injected base can be nullified by applying acid to the infected area. Therefore, it is advisable to apply lemon juice to the affected area because it is an acid.

103. How can you identify the acids by their taste?

Ans. : Acids are sour in taste.

104. Name the reaction that takes place between an acid and a base.

Ans. : Neutralisation

105. What is the effect of neutral substances on the colour of litmus?

Ans. : Neutral substances do not affect the colour of litmus.

106. Which is the most common indicator?

Ans. : Litmus paper

107. Name the plant from which litmus is extracted.

Ans. : Lichens

108. Name three natural indicators.

Ans. : (i) Litmus

(ii) Turmeric

(iii) Beetroot

109. Give two examples of acidic substances.

Ans. : (i) Lemon

(ii) Vinegar

110. Name the acids present in lemon and tamarind.

Ans. : (i) Citric acid

(ii) Tartaric acid

111. A red litmus paper is dipped in a solution. The colour of litmus becomes blue. What is the nature of the solution?

Ans. : Basic

112. Which colour is given by the red rose extract in the basic solution?

Ans. : Green

* consists of questions of 2 marks each.

[88]



113. What do we learn by grouping samples into Group A, B, and C in the litmus test?

Ans. : Group A substances turn blue litmus red (acidic), Group B substances turn red litmus blue (basic) and Group C substances do not affect either (neutral). This helps classify substances easily.

114. How does red rose extract work as an indicator?

Ans. : Red rose extract gives a red shade in acidic solutions and a green shade in basic solutions. It remains unchanged with neutral substances, making it a natural acid-base indicator.

115. How is turmeric used as an indicator?

Ans. : Turmeric is made into a paste and applied on paper strips. In basic substances, turmeric paper changes from yellow to red, but it stays yellow with acidic and neutral substances.

116. What happens in a neutralisation reaction?

Ans. : When an acid reacts with a base, they neutralise each other to form salt and water, along with the release of heat.

117. Why did moist baking soda help Ashwin after an ant bite?

Ans. : The ant injects formic acid during a bite. Baking soda, being a base, neutralises the acid and relieves the stinging pain.

118. Explain how soil treatment helps plants grow better.

Ans. : If soil becomes too acidic, lime (a base) is added to neutralise it. If soil is too basic, organic matter like compost is added. Maintaining soil's pH balance is important for healthy plant growth and good nutrient availability.

119. How does neutralisation help in industrial waste treatment?

Ans. : Factories sometimes release acidic waste into lakes, harming aquatic life. Before releasing, the waste can be treated with basic substances to neutralise it. This protects fish and other organisms living in the water.

120. Why can't turmeric be used to test acidic substances?

Ans. : Turmeric changes colour only in the presence of a base (turning red). It doesn't show any change with acidic or neutral substances. Therefore, turmeric can only detect basicity, not acidity.

121. What does the hydrangea flower's colour tell about soil?

Ans. : Hydrangea flowers turn blue in acidic soil and pink or red in basic soil. Gardeners can adjust soil acidity or basicity to change the colour of the flowers.

122. Why should we not taste unknown substances during experiments?

Ans. : Unknown substances might be harmful or poisonous. To stay safe, students must avoid tasting anything unless clearly instructed by the teacher during science



experiments.

123. How could Ashwin's "secret greeting card" trick work?

Ans. : Ashwin coated paper with turmeric paste and used a soap solution to write the message. When sprayed with water or acid, the letters appeared in a different colour.

124. How can a gardener change the colour of hydrangea flowers?

Ans. : By changing the soil's pH. Making the soil more acidic by adding organic matter makes flowers blue; making it basic by adding lime turns flowers pink or red.

125. How can you identify vinegar, baking soda solution, and sugar solution using turmeric paper?

Ans. : Baking soda turns turmeric paper red (basic). Vinegar and sugar solution do not change turmeric paper colour. Among them, vinegar will taste sour (acidic) and sugar solution will taste sweet (neutral).

126. Why did bubbles form when Aman spilled vinegar on eggshells?

Ans. : Vinegar is acidic and reacts with the calcium carbonate in eggshells, producing carbon dioxide gas. This causes the bubbles. Soap solution is basic and does not react.

127. Why is neutralisation useful in everyday life?

Ans. : Neutralisation helps in treating ant bites, balancing soil for farming, treating factory waste and even controlling acidity problems in the stomach with antacids. It protects both living beings and the environment.

128. What is a neutralisation reaction? Give an example.

Ans. : It is a reaction where an acid and a base mix to form salt and water. The resulting solution is neither acidic nor basic.

Example: When an ant bites, it injects an acidic liquid (formic acid) into the skin. Rubbing moist baking soda (a base) neutralises the effect of the acid, relieving the pain.

129. Name three natural indicators and how they work.

Ans. : (1) **Litmus:** It is obtained from lichens.

(2) **Red Rose:** Extract gives red colour in acidic solutions.

(3) **Turmeric:** The yellow colour of turmeric turns red in basic solutions.

130. Why does turmeric not work as an acid indicator?

Ans. :

Turmeric changes colour only in basic solutions, turning from yellow to red. In acidic and neutral solutions, turmeric does not change colour; it remains yellow.

131. How does red rose extract act as an indicator?



Ans. : In acidic solutions, red rose extract gives a red colour. In basic solutions, red rose extract gives a green colour.

132. What precautions should be taken while testing substances with indicators?

Ans. :

Do not taste anything unless you are specifically instructed to do so. Many chemicals can be harmful if swallowed. Always perform experiments under the supervision of an adult, especially when using heat or sharp objects.

133. How does baking soda help in relieving ant sting?

Ans. : When an ant bites, it injects an acidic liquid called formic acid into the skin, which causes pain and irritation. Baking soda is a base, and when it is applied to the affected area, it neutralizes the formic acid. This neutralisation reaction reduces the pain and provides relief.

134. Name two substances that do not change the colour of red or blue litmus paper.

Ans. : (1) Sugar solution
(2) Salt solution

135. Differentiate between acidic and basic substances based on litmus test.

Ans. : (1) **Acidic substances:** Turn blue litmus paper red.
(2) **Basic substances:** Turn red litmus paper blue.

136. A bitter-tasting fruit is not necessarily a base. Explain why.

Ans. : The presence of a bitter taste doesn't automatically classify a substance as a base. Bitterness can arise from various chemical compounds that are not necessarily alkaline or basic in nature.

Example: bitter gourd (karela) has a distinctly bitter taste due to compounds present in it, but it is not basic.

137. If you do not have litmus paper, how will you test the nature of a substance using kitchen materials?

Ans. : When we don't have litmus paper, we can use turmeric or red rose petals from our kitchen to test if something is an acid or a base.

Example: we can make turmeric paper by mixing turmeric powder with water and applying it to paper. If we put a drop of a substance on the paper and it turns red, the substance is basic.

These kitchen materials act as natural indicators to identify acids and bases.

138. What products are formed when an acid reacts with a base in a neutralisation reaction?

Ans. : When an acid reacts with a base in a neutralization reaction, the primary products formed are salt and water.

The reaction also releases heat, indicating an energy change as the acid and base combine to form new substances with different properties.



139. How can you identify the nature of an unknown solution using turmeric, litmus, and red rose extract?

Ans. : Use litmus paper: Red indicates acid, blue indicates base.

Turmeric turns red in bases.

Red rose extract turns red in acids and green in bases.

140. A gardener wants to grow blue hydrangea flowers. What kind of soil should they use?

Ans. : The gardener should use acidic soil.

141. Suggest three eco-friendly natural indicators and their preparation.

Ans. : (1) **Red Cabbage:** Chop red cabbage and boil in water.

(2) **Turmeric:** Mix turmeric powder with a little water to make a paste.

(3) **Red Rose Petals:** Collect red rose petals and soak them in hot water.

142. Why should factory waste be treated before release?

Ans. : Factory waste can be acidic and harm the environment, especially aquatic life. Treating the waste neutralizes it, making it safer to release into the environment.

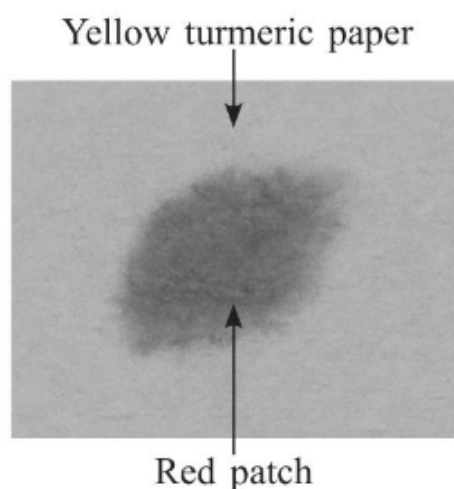
143. A message written with soap appears red when turmeric is sprayed. Why?

Ans. : Turmeric acts as an indicator, changing color in response to acids or bases. Soap is basic, so when turmeric is sprayed on a soap message, the turmeric turns red due to the basic nature of the soap, revealing the message.

144. The image shows a turmeric indicator paper with a red patch formed on it. The paper is yellow in colour, and the patch indicates a reaction with a substance.

(a) Identify the sample used that caused the red discoloration of the turmeric paper. Explain why this reaction occurs with turmeric paper.

(b) What is the nature of the substance that caused the red discoloration? How can you confirm this using other indicators like litmus or red rose extract?



Ans. : (a) The substance used is a base (alkaline substance)

Explanation: Turmeric paper is yellow in neutral or acidic solutions, but it turns red in the presence of a base. This red discoloration shows that the substance is **basic in**



nature.

(b) The substance is basic (alkaline).

This can be confirmed using other indicators:

Litmus paper: turns **blue** in a base.

Red rose extract: changes colour in a basic solution.

145. Look at the given image of a fruit basket. Identify the common acids present in the fruits given in the basket.



Ans. : The common acids present in the fruits in the basket are:

Citric acid – found in **oranges, lemons, and other citrus fruits**

Tartaric acid – found in grapes

Malic acid – found in apples

146. What are these red and blue litmus paper strips made of? Why do they change colour when drops of some samples are put on them?

Ans. : Red and blue litmus paper strips are made from paper soaked in an extract of lichens. They change colour when they come in contact with acidic or basic substances. Acidic substances turn blue litmus to red, and basic substances turn red litmus to blue.

147. Manya is blindfolded. She is given two unknown solutions to test and determine whether they are acidic or basic. Which indicator should Manya use to test the solutions and why?

Ans. : Manya should use an olfactory indicator to test the solutions. Olfactory indicators change their smell in acidic or basic solutions. For example, substances like onion produce a strong smell in a basic solution and a mild smell in an acidic solution.

148. Grape juice was mixed with red rose extract; the mixture got a tint of red colour. What will happen if baking soda is added to this mixture? Justify your answer.

Ans. : When baking soda (a base) is added to the mixture of grape juice and red rose extract, the basicity increases. In basic conditions, red rose extract turns green. So, after adding baking soda, the mixture will turn green.



149. Keerthi wrote a secret message to her grandmother on her birthday using orange juice. Can you assist her grandmother in revealing the message? Which indicator would you use to make it visible?

Ans. : Keerthi's grandmother can reveal the secret message by using acid-base indicators, as orange juice is acidic in nature. She can use rose extract or beetroot juice (which will turn red) or Indian blackberry extract (which will turn pink) to make the message visible.

150. How can natural indicators be prepared? Explain by giving an example.

Ans. : Natural indicators can be made using plant materials with pigments that change colour with acid or base. For example, to make red rose extract :

1. Wash and crush rose petals.
2. Place them in a glass tumbler and add hot water.
3. Let it sit for 5-10 minutes, then filter the mixture.

The resulting liquid is a natural indicator that turns red in acids and green in bases.

151. Three liquids are given to you. One is vinegar, another is a baking soda solution, and the third is a sugar solution. Can you identify them only using turmeric paper? Explain.

Ans. : Using turmeric paper, we can identify a basic solution but not an acidic or neutral solution. When baking soda solution (basic) is tested, the turmeric paper will turn red. However, both vinegar (acidic) and sugar solution (neutral) will leave the paper yellow, as turmeric paper does not change colour in acidic or neutral solutions. Therefore, turmeric paper can only identify a basic solution.

152. The extract of red rose turns the liquid X to green. What will the nature of liquid X be? What will happen when excess of amla juice is added to liquid X?

Ans. : If the extract of red rose turns the liquid X to green, it indicates that liquid X is basic. Red rose extract acts as an indicator, turning red in acidic solutions and green in basic solutions. When excess amla juice (which is acidic) is added to liquid X, it will neutralise the base. The green colour of the liquid will turn to red as the solution becomes more acidic due to the addition of the acidic amla juice.

153. What are indicators? Classify them and give one example of each.

Ans. : The substances which are used to test whether a substance is acidic or basic are called indicators.

There are two types of indicators:

- (i) Natural indicators : Litmus paper, turmeric, etc.
- (ii) Synthetic indicators : Phenolphthalein

154. Blue litmus paper is dipped in a solution. It remains blue. What is the nature of the solution? Explain.



Ans. : (i) It can be identified on the basis of the following observations: Bases change the colour of Red litmus paper to blue. As the colour of blue litmus paper is not affected, the solution must be basic.

(ii) If the solution is neutral, even then the colour of litmus will not change. Hence, the solution may be basic or neutral.

155. What are acids and bases? Explain their properties with examples.

Ans. : Acids and bases are two types of substances with different properties. Acids are substances that taste sour and turn blue litmus paper red. They can be strong or weak. Some common acids are lemon juice (contains citric acid), vinegar (contains acetic acid), curd (contains lactic acid), and tamarind (contains tartaric acid). Bases are substances that taste bitter and feel soapy to touch. They turn red litmus paper blue. Bases can also be strong or weak. Some common bases are soap, baking soda, and lime water.

156. A solution turns the red litmus paper to blue. Excess addition of which of the following solution would reverse the change?

- (i) Lime water
- (ii) Baking soda
- (iii) Vinegar
- (iv) Common salt solution

Ans. : (iii) The solution turns from red to blue, it means it is basic. To reverse this, an acid is needed. Lime water and baking soda are basic, and the common salt solution is neutral, so they will not reverse the change. Vinegar is acidic, so it will change the colour back to red.

* consists of questions of 3 marks each.

[39]

157. Manya is blindfolded. She is given two unknown solutions to test and determine whether they are acidic or basic. Which indicator should Manya use to test the solutions and why?

Ans. : Manya should use an olfactory indicator, such as onion strips. Because she is blindfolded, she cannot rely on visual color changes. Olfactory indicators change their smell in acidic or basic media, which she can detect.

158. Could you suggest various materials which can be used for writing the message on the white sheet of paper (given at the beginning of the chapter) and what could be in the spray bottle? Make a table of various possible combinations and the colour of the writing obtained.

Ans. : The effect uses an acid-base indicator reaction.

Writing Solution (Nature)	Spraying Liquid (Indicator)	Color Obtained
Soap Solution (Basic)	Turmeric Solution	Red
Lime Water (Basic)	Turmeric Solution	Red



Baking Soda Soln (Basic)	Turmeric Solution	Red
Soap Solution (Basic)	Red Rose Extract	Green
Lemon Juice (Acidic)	Red Rose Extract	Red
Vinegar (Acidic)	Red Rose Extract	Red
Lemon Juice (Acidic)	Blue Litmus Solution	Red

159. Grape juice was mixed with red rose extract; the mixture got a tint of red colour. What will happen if baking soda is added to this mixture? Justify your answer.

Ans. : The mixture will likely turn green.

Justification: Grape juice turning the red rose extract red indicates it's acidic. Baking soda is basic. Adding a base (baking soda) neutralizes the acid. If enough baking soda is added to make the solution basic, the red rose extract indicator will turn green.

160. Keerthi wrote a secret message to her grandmother on her birthday using orange juice. Can you assist her grandmother in revealing the message? Which indicator would you use to make it visible?

Ans. : Use an indicator that changes color in acidic conditions, as orange juice is acidic (contains citric acid). Suitable indicators are Blue litmus solution (will turn red) or Red rose extract (will turn red). Apply the indicator solution to the paper.

161. How can natural indicators be prepared? Explain by giving an example.

Ans. : Natural indicators can be prepared from parts of plants like flowers or vegetables. Example (Red Rose Extract): Collect fallen red rose petals, wash them, crush them, place them in a beaker and add hot water. Let it stand until the water gets colored, then filter the liquid. The colored filtrate is the indicator.

162. Three liquids are given to you. One is vinegar, another is a baking soda solution, and the third is a sugar solution. Can you identify them only using turmeric paper? Explain.

Ans. : You can identify the baking soda solution, but not distinguish between vinegar and sugar solution. Explanation: Turmeric paper turns red in basic solutions. It shows no color change in acidic or neutral solutions.

Vinegar is acidic, baking soda solution is basic, and sugar solution is neutral. Only the basic baking soda solution will turn the yellow turmeric paper red. The other two will cause no change.

163. The extract of red rose turns the liquid X to green. What will the nature of liquid X be? What will happen when excess of amla juice is added to liquid X?

Ans. : Liquid X is basic (red rose extract turns green in basic solutions). Amla juice is acidic. Adding excess acidic amla juice will neutralize the base and make the solution acidic. In the resulting acidic solution, the red rose extract indicator will turn red.



164. Observe and analyse the information given in the following flowchart. Complete the missing information.

(Flowchart shows poor plant health due to soil condition)

Ans. : The soil can be Acidic in nature. : The acidic soil can be treated with bases like lime.

The soil can be Basic in nature. : The basic soil can be treated with organic matter (e.g., manure, compost).

Which indicator can be used to test the nature of the soil? : An acid-base indicator (like litmus used on a soil-water mixture, or a soil testing kit) can be used.

165. Read the passage and answer the questions :

Ashwin got an ant bite and applied baking soda.

Q.1. What is the nature of formic acid injected by ants?

(a) Neutral (b) Acidic (c) Basic (d) Salty

Q.2. Why is baking soda useful?

(a) It cools the skin (b) It neutralises the acid

(c) It prevents infection (d) It tastes bitter

Q.3. What is the product of this reaction?

(a) Water (b) Salt (c) Heat (d) All of these

Ans. : (b) Acidic

(b) It neutralises the acid

(d) All of these

166. Read the passage and answer the questions :

Keerthi tested various substances with red rose extract.

Q.1. Red rose extract turns green with:

(a) Vinegar (b) Baking soda

(c) Lemon juice (d) Sugar

Q.2. Which of the following would turn it red?

(a) Lime water (b) Soap

(c) Amla juice (d) Baking soda

Q.3. A solution that does not affect colour is:

(a) Vinegar (b) Lime water

(c) Baking soda (d) Soap

Ans. : (b) Baking soda

(c) Amla juice

(c) Baking soda.

167. DIY Natural Indicator from Red Cabbage} Prepare a red cabbage extract and test the following substances: lemon juice, soap solution, toothpaste, vinegar and black tea.

(a) What colour does the red cabbage extract change to in each case?



(b) Based on your observations, how can you classify the substances as acidic or basic?

substance	Colour Change in Red Cabbage	Nature of the Substance
1. Lemon Juice		
2. Soap Solution		
3. Toothpaste		
4. Vinegar		
5. Black tea		

Ans. : (a) Colour Change in Red Cabbage Extract

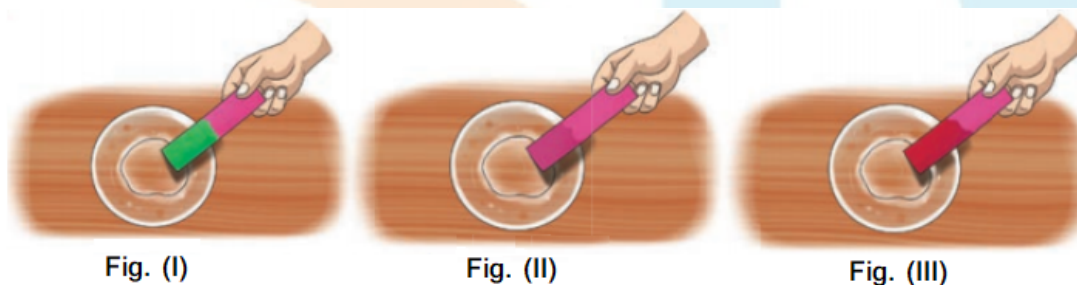
substance	Colour Change in Red Cabbage	Nature of the Substance
1. Lemon Juice	Reddish	Acidic
2. Soap Solution	Greenish-Yellowish	Basic
3. Toothpaste	Greenish-Blueish	Basic
4. Vinegar	Reddish	Acidic
5. Black tea	Reddish	Acidic

(b) Classifying Substances as Acidic or Basic

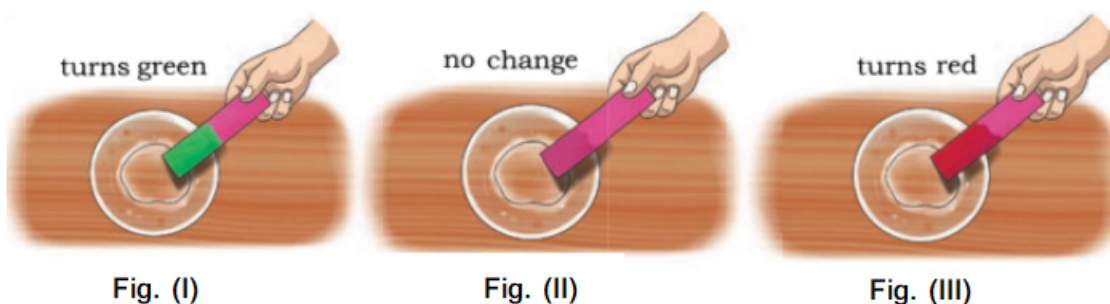
Acidic Substances: Turn red cabbage extract reddish. Examples are lemon juice, vinegar, and black tea.

Basic Substances: Turn red cabbage extract greenish-yellowish. Examples are soap solution and toothpaste.

168. Observe and analyse Figs. (I), (II) and (III), in which red rose extract paper strips are used. Label the nature of solutions present in each of the containers.



Ans. :



The red rose extract turns red in acidic solutions and green in basic solutions. In Fig. (I), the red rose extract paper strip turns green, indicating that the solution in this

container is basic in nature. In Fig. (II), there is no change in the colour of the strip, which shows that the solution is neutral. However, in Fig. (III), the strip turns red, indicating that the solution is acidic in nature.

169. What is neutralisation? Give examples of neutralisation in daily life.

Ans. : The reaction between an acid and a base is called neutralisation. In this reaction, a salt and water are formed, and heat is also released.

Acid + Base : Salt + Water + Heat Neutralisation in daily life:

The sting of an ant contains formic acid, which causes pain and irritation. When we apply moist baking soda (a base), it neutralises the acid and gives relief. When soil becomes too acidic, plants cannot grow well. Farmers add lime (calcium oxide), which is a base, to neutralise the acid in the soil. If the soil is too basic, they add organic matter (compost) to make it neutral. Wastes from factories are often acidic. If this acidic water is released into rivers or lakes, it can harm plants and animals. So, before releasing it, factories add basic substances to neutralise the acids.

* consists of questions of 5 marks each.

[55]

170. Describe an activity to test the nature of substances using litmus paper.

Ans. : To investigate the nature of common substances as acidic, basic, or neutral, an activity using litmus paper can be performed.

: First, gather the necessary materials, including red and blue litmus paper strips, small containers or clean tiles, droppers, and sample substances like lemon juice, soap solution, vinegar, baking soda solution, and tap water.

: Begin by placing a small amount of each substance in separate, labeled containers. : Then, take a strip of red litmus paper and, using a clean dropper, add a drop of the substance to the litmus paper. Observe and record any color change.

: Repeat this step for each substance, always using a fresh piece of red litmus paper. Next, repeat the procedure with blue litmus paper, placing a drop of each substance on separate strips of blue litmus paper and recording any color changes observed.

: By analyzing the results, one can classify each substance: acids turn blue litmus paper red, bases turn red litmus paper blue, and neutral substances have no effect on either red or blue litmus paper. It is crucial to avoid direct contact of the substances with skin and eyes and to wash hands thoroughly after the activity.

171. What is the role of natural indicators in identifying acidic and basic substances?

Ans. : Natural indicators play a crucial role in identifying acidic and basic substances by changing color depending on the acidity or basicity of the solution.

: These indicators are derived from natural sources like plants, flowers, and vegetables. For example, litmus, extracted from lichens, turns red in acidic solutions and blue in basic solutions.

: Similarly, red rose petals and turmeric can be used as indicators, changing color



in response to acids and bases.

: By observing these color changes, one can easily determine whether a substance is acidic or basic, making natural indicators a simple and accessible tool for acid-base identification.

172. Write about neutralisation in daily life with three examples.

Ans. : Ant Bites: When an ant bites, it injects formic acid into the skin, causing irritation and pain. Applying moist baking soda (a base) to the affected area neutralises the acid, providing relief.

Soil Treatment: Overuse of chemical fertilisers can make the soil acidic, hindering plant growth. Farmers often treat the soil with lime (a base) to neutralise the excess acid, creating a more favorable environment for plants.

Industrial Waste: Factory waste can be acidic and harmful to aquatic life if released into rivers or lakes. Treating the waste with basic substances before disposal neutralises the acid, preventing environmental damage and protecting aquatic ecosystems.

173. Explain how turmeric paper is made and used as an indicator.

Ans. : : Turmeric paper, a simple and natural indicator, is crafted by mixing turmeric powder with water to form a paste.

: which is then evenly spread on filter paper or paper towels and left to dry completely.

: Once dried, the turmeric-coated paper is cut into strips, ready for use as an indicator. To test a substance, a turmeric paper strip is dipped into the solution, and any color change is observed.

: In acidic solutions, the paper remains yellow or turns slightly lighter, while in basic solutions, it turns a distinct reddish-brown.

: This makes turmeric paper particularly useful for identifying basic substances due to its noticeable color change, though it is less effective for identifying acids, where the change is minimal.

174. Discuss the properties of acidic, basic, and neutral substances with 3 examples each.

Ans. : (1) Acidic Substances:

: Property: Acidic substances have a sour taste. They turn blue litmus paper red. They have a pH value less than 7.

Examples:

: Lemon Juice: Contains citric acid.

: Vinegar: Contains acetic acid.

: Hydrochloric Acid: A strong acid found in gastric juice in the stomach.

(2) Basic (Alkaline) Substances:

: Property: Basic substances often have a bitter taste. They turn red litmus paper blue. They have a soapy or slippery feel.



Examples:

- : Soap Solution: Used for cleaning, it contains bases that help remove dirt.
- : Baking Soda Solution: Used in baking and has alkaline properties.
- : Lime Water: A solution of calcium hydroxide.

(3) Neutral Substances:

: Property: Neutral substances do not have a distinct taste. They do not change the color of either red or blue litmus paper. They have a pH value of 7.

Examples:

- : Pure Water: Essential for life and has a neutral pH.
- : Sugar Solution: A solution of sugar in water, without acidic or basic properties.
- : Common Salt Solution: A solution of sodium chloride in water.

175. What are synthetic indicators? Name two and describe their use.

Ans. : Synthetic indicators are substances made in laboratories that show different colors in acidic or basic solutions. Unlike natural indicators, these are not extracted from plants or other natural sources.

synthetic indicators:

(1) Methyl Orange: This indicator is red in acidic solutions and yellow in basic solutions. It's often used in titrations to determine the endpoint of a reaction.

(2) Phenolphthalein: This is colorless in acidic solutions but turns pink in basic solutions. It's also commonly used in titrations and other experiments to observe changes in acidity or basicity.

These indicators provide clear and distinct color changes, making it easier to identify whether a solution is acidic, basic, or neutral.

176. How can you use onions as an olfactory indicator?

Ans. : To use onions as olfactory indicators, you first need to prepare onion-infused strips by finely chopping onions and storing them overnight in a closed container with strips of clean cloth or filter paper.

: The strips absorb the onion's distinct odor. When testing for acidity or basicity, place a few drops of an acidic solution, like lemon juice, on one strip and a basic solution, like baking soda, on another.

: Observe the changes in odor. In acidic conditions, the onion smell might intensify or remain unchanged, while in basic conditions, the onion smell typically diminishes or alters, indicating the presence of a base.

: This change in smell helps identify whether a substance is acidic or basic, making onions a simple olfactory indicator.

177. Explain the neutralisation reaction using lemon juice and lime water.

Ans. : Neutralization is a chemical reaction between an acid and a base, resulting in the formation of salt and water.

: Lemon juice contains citric acid (an acid), and lime water contains calcium hydroxide (a base). When these two are mixed in the right proportions, they



neutralize each other. Initially, the lemon juice is acidic.

: If we add an indicator like litmus, it will turn red. As lime water is gradually added, the acidic properties of the lemon juice are countered by the basic properties of the lime water.

: At the point of neutralization, the solution is neither acidic nor basic; it becomes neutral, and the litmus paper will show a neutral color (for litmus, it would be purplish).

: This reaction produces a salt (calcium citrate) and water, along with heat, illustrating how an acid and a base can cancel out each other's effects to form a neutral substance.

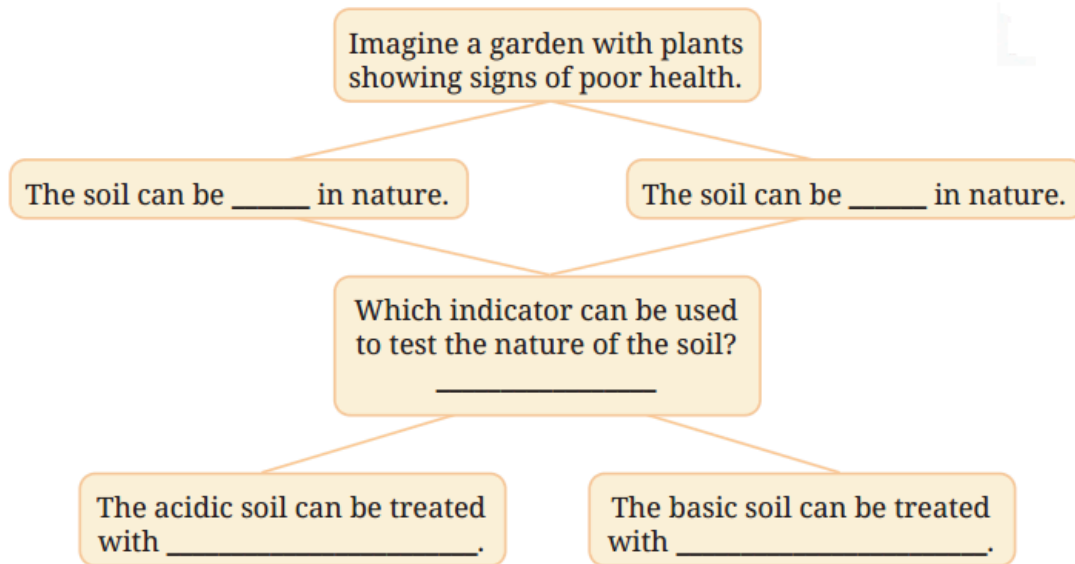
178. Could you suggest various materials which can be used for writing the message on the white sheet of paper (given at the beginning of the chapter) and what could be in the spray bottle? Make a table of various possible combinations and the colour of the writing obtained.

Ans. : The colour of the writing will depend on the nature of the writing material (acidic or basic) and the solution in the spray bottle (acidic or basic). Below is the table of possible combinations.

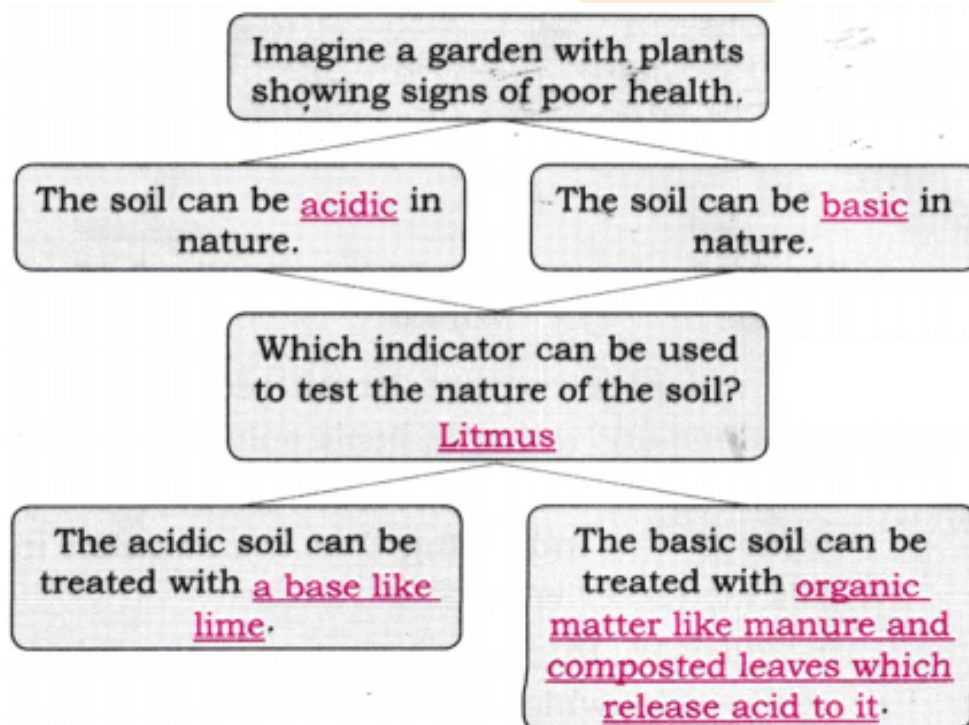
Writing Material	Substance in Spray Bottle	Colour of Writing (on paper)
Lemon juice	Blue litmus solution	Red
Baking soda solution	Red litmus solution	Blue
Baking soda solution	Rose extract	Green
Vinegar	Rose extract	Red
Soap solution	Turmeric solution	Red
Amla juice	Indian blackberry juice	Pink
Lime water	Indian blackberry juice	Purple
Grapes juice	Beetroot extract	Red
Washing powder solution	Beetroot extract	Blue
Tamarind water	Red hibiscus extract	Pink
Soap solution	Red hibiscus extract	Green

179. Observe and analyse the information given in the following flowchart. Complete the missing information.





Ans. : The complete flowchart is as follows :



180. Table : Testing the nature of samples with blue and red litmus papers

Name of the Sample	Colour of blue litmus paper after putting a drop of sample	Colour of red litmus paper after putting a drop of sample
Lemon juice	Red	Red
Soap solution	Blue	Blue
Amla juice	Red	Red
Tamarind water	Red	Red

Vinegar	Red	Red
Baking soda solution	Blue	Blue
Lime water	Blue	Blue
Tap water	Blue	Red
Washing powder solution	Blue	Blue
Sugar solution	Blue	Red
Salt solution	Blue	Red
Orange juice	Red	Red

Ans. : Table : Grouping of samples tested in Table

Group A	Group B	Group C
Lemon juice, Amla juice, Tamarind water, Vinegar, Orange juice	Soap solution, Baking soda solution, Lime water, Washing powder solution	Tap water, Sugar solution, Salt solution

Observation and conclusion: Substances in Group A, like lemon juice and vinegar, are acidic as they turn blue litmus paper red. Group B substances, like soap and baking soda, are basic as they turn red litmus paper blue. Group C substances, like tap water and sugar solution, are neutral because they do not change the litmus paper colour.

* Match the Following.

[8]

Column A	Column B
181. Litmus	A. Bitter and slippery to touch
182. Vinegar	B. Natural indicator from lichens
183. Basc	C. Used to treat acidic soil
184. Quick lime	D. Olfactory indicator
	E. Acetic acid

Ans. : (1-B,2-E,3-C,4-D)

Column A	Column B
185. Turmeric	A. Changes colour
186. Acid + Base red rose	B. Natural indicator from
187. Hydrangea flower substances	C. Becomes red in basic
188. Red rose extract	D. Salt + Water + Heat

Ans. :

Column A	Column B

1. Turmeric	C. Becomes red in basic
2. Acid + Base red rose	D. Salt + Water + Heat
3. Hydrangea flower substances	A. Changes colour
4. Red rose extract	B. Natural indicator from

