UNIQUE STUDY POINT (USP)

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COMPETENCY-BASED TEST | CLASS VII | SCIENCE

Chapter 2: Exploring Substances: Acidic, Basic, and Neutral

Name: _____ **Class: VII** **Roll No:** _____ **Date:** _____ **Max. Marks: 40** **Time: 1.5 hrs**

General Instructions: All questions are compulsory. Read each question carefully before answering. Show your reasoning wherever asked.

SECTION A: MULTIPLE CHOICE QUESTIONS

(10 Questions × 1 Mark = 10 Marks)

1. Riya spills some lemon juice on blue litmus paper. The colour she will observe is:

(a) Blue
(b) Red
(c) Green
(d) Yellow

2. A vegetable vendor notices that the water used to wash vegetables leaves a soapy, slippery feeling on hands. This water is most likely:

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

3. Priya's mother puts turmeric paste on the kitchen counter. When she cleans it with a detergent solution, the yellow patch turns red. This change indicates that the detergent is:

(a) Neutral
(b) Acidic
(c) Basic
(d) Cannot be determined

4. A gardener notices his soil is making the hydrangea flowers turn blue. To make them turn pink, he should treat the soil with:

(a) Vinegar
(b) Lemon juice
(c) Lime (calcium oxide)
(d) Tamarind water

5. During a science exhibition, a student prepares an extract from purple cabbage. She adds an unknown liquid to it and observes a red colour. The unknown liquid is:

(a) Baking soda solution
(b) Lime water
(c) Soap solution
(d) Vinegar

6. In a neutralisation reaction: Acid + Base $\rightarrow$?

(a) Only water
(b) Only salt
(c) Salt + Water + Heat
(d) Salt + Acid

7. A bee sting (acidic) can be relieved by applying:

(a) Lemon juice
(b) Vinegar
(c) Baking soda paste
(d) Tamarind water

8. Turmeric paper changes to red when a drop of an unknown solution is placed on it. This means the solution is:

(a) Acidic
(b) Neutral
(c) Basic
(d) Distilled water

9. Which of the following is NOT an example of a natural acid-base indicator?

(a) Red rose extract
(b) Turmeric
(c) Common salt
(d) Red hibiscus

10. A student tests four liquids using red litmus paper. Liquid P turns red litmus blue. Liquid Q shows no change with red litmus. Liquid R turns blue litmus red. Liquid S shows no change with both litmus papers. Which liquids are basic?

(a) P and R
(b) P only
(c) Q and S
(d) R and S

SECTION B: SHORT ANSWER QUESTIONS

(4 Questions × 2 Marks = 8 Marks)

11. Ashwin's mother always rubs moist baking soda on the spot when any family member gets a red ant bite. She also keeps calamine lotion (a zinc-based basic lotion) for bee stings. Explain why a base is used to treat both ant and bee stings. Are these exactly the same type of acid?

12. Keerthi used the red rose extract as an indicator. She noticed that when she added lemon juice, the extract turned reddish, but when she added baking soda solution, it turned greenish. Predict the colour the extract would turn if she added plain tap water. Justify your answer.

13. A farmer is told his soil is very acidic due to excess chemical fertiliser use. His neighbour is told his soil is too basic. What should each farmer do to restore healthy soil? Name the substances they should use.

14. Manya was blindfolded and given two bottles — one with vinegar and one with baking soda solution. She was asked to identify them without tasting. She asked for onion-soaked strips. Explain how she would identify which is which using only the smell test.

SECTION C: SHORT ANSWER QUESTIONS

(3 Questions × 3 Marks = 9 Marks)

15. A student collected three liquids — one from a lemon, one from a washing powder pack, and one from a tap. She had only litmus paper strips and turmeric paper available.

(a) Which combination of tests would help her identify all three liquids? (b) If she only had turmeric paper, could she identify all three? Why or why not? (c) What would be the colour of each liquid on turmeric paper?

16. Gurbir's neighbour lake is getting polluted by a factory releasing acidic waste. Fish populations are dying.

(a) Suggest a method to make the water safe for fish again. (b) Name the type of chemical reaction that would occur. (c) Write the general equation for this reaction.

17. Priya added a few drops of blue litmus solution to a glass of lemon juice. She then slowly added lime water drop by drop while stirring, and noticed the colour of the solution gradually changed. After adding enough lime water, the colour changed from red to blue. She got curious and added one more drop of lemon juice to this final solution.

(a) Why did the solution turn red when blue litmus was added to lemon juice? What does this tell about lemon juice? (b) Why did the colour eventually change from red to blue on adding lime water? Name the type of reaction that took place and write its general equation. (c) Predict and explain what would happen to the colour of the solution when Priya added that one extra drop of lemon juice at the end.

SECTION D: LONG ANSWER QUESTION

(1 Question × 5 Marks = 5 Marks)

18. At a science fair, a student set up a stall called 'Secret Messages'. She used turmeric paste on white paper and let it dry. Visitors would write messages using different solutions from the stall — soap solution, baking soda solution, lemon juice, and plain water. When she sprayed a liquid on the paper, some messages became visible while others did not.

(a) Which solutions used for writing would make the message visible when the paper is sprayed with plain water? Why?

(b) Explain why some messages become visible and others do not, using your knowledge of turmeric as an indicator.

(c) If she sprays the paper with lemon juice instead of plain water, would the messages written in soap solution become visible? Justify.

(d) Name TWO other natural substances she could use instead of turmeric to make invisible ink indicators for this activity.

(e) One visitor suggested using turmeric to distinguish between all three types of substances: acidic, basic, and neutral. Another student said turmeric cannot do this alone. Who is correct and why?

SECTION E: CASE STUDY QUESTIONS (2 Case Studies × 4 Marks = 8 Marks)

Case Study 1: Aman is a student who loves science. One day, he accidentally spilled vinegar on a piece of marble (calcium carbonate). He noticed bubbles forming. Excited, he then poured soap solution on another piece of marble — but no bubbles appeared. His science teacher told him that marble is made of calcium carbonate, which reacts with acids to release carbon dioxide gas (the bubbles), but bases do not cause this reaction. Later, in class, Aman also learned that stomach acidity is caused by excess hydrochloric acid in the stomach, and antacids contain bases like magnesium hydroxide to relieve it.

19(a). Vinegar caused bubbles on marble but soap solution did not. What does this tell you about the nature of vinegar and soap solution? [1]

19(b). Antacids are used to treat acidity. Identify the type of chemical reaction involved when an antacid neutralises stomach acid. Write the general form of this reaction. [1]

19(c). Aman tested the marble with lemon juice and noticed slower but similar bubbling. He then added baking soda to the lemon juice first, then put it on marble — no bubbles. Explain why. [1]

19(d). Why is it harmful to release acidic factory waste directly into rivers? How can it be treated before release? Name the process and substance used. [1]

Case Study 2: Nandini is a Class VII student who loves plants. She read that Hydrangea flowers change colour depending on the soil's nature — blue in acidic soil and pink/red in basic soil. She also read that some plants prefer acidic soil (like tea, blueberries) while others prefer basic or neutral soil (like lavender, asparagus). Nandini decided to test the soil in her garden using red rose extract and turmeric paper. The rose extract turned green and the turmeric paper turned red. Her father suggested adding lime (calcium oxide) to treat the soil. Nandini realised this is the same principle used in neutralisation reactions.

20(a). Based on the indicator results (red rose extract turned green, turmeric turned red), what is the nature of Nandini's garden soil? Give a reason for each. [1]

20(b). Her father adds lime to the soil. What type of reaction occurs? Will Nandini's hydrangea flowers be blue or pink after this treatment? Explain. [1]

20(c). Nandini wants to grow tea plants, which need acidic soil. Should she add lime or an organic substance like manure? Why? [1]

20(d). Nandini uses turmeric paper to test four soil samples. Sample P: no colour change. Sample Q: turns red. Sample R: no colour change. Sample S: turns red. She says all four samples are basic. Is she correct? Justify your answer. [1]

****** All the Best! Explore, Think, and Conquer! ******