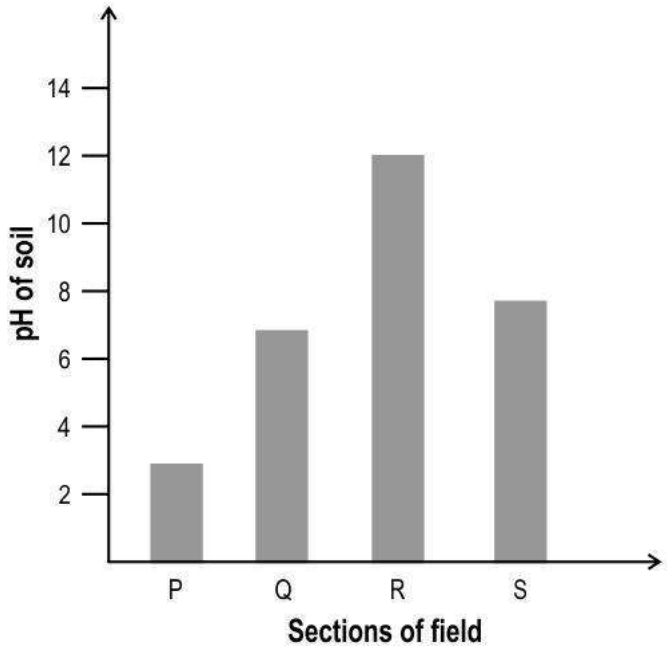
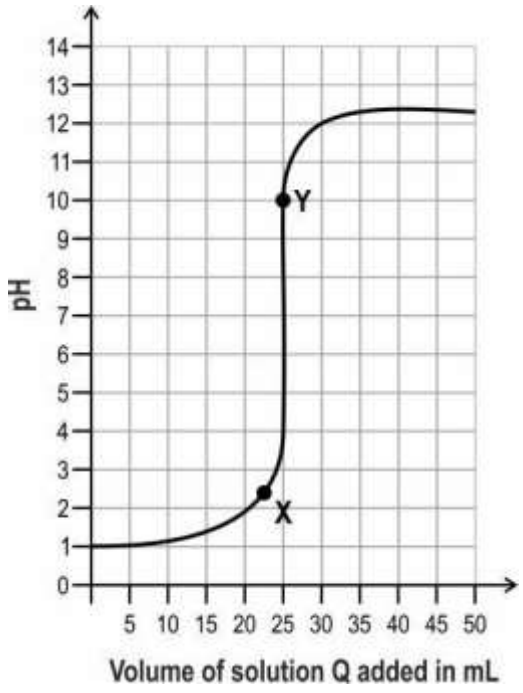
1. ACIDS, BASES AND SALTS

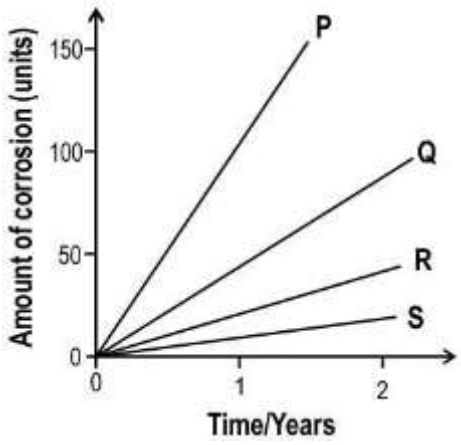
<table>
<tr><th>Q. No</th><th>Question</th><th>Marks</th></tr>
<tr><td colspan="3">Multiple Choice Question</td></tr>
<tr><td>Q.1</td><td>Hydrangea plants develop blue or pink flowers depending on the availability of aluminium from the soil. When the soil is acidic, aluminium is more available to the roots, resulting in blue flowers. When the soil is alkaline, the availability of aluminium decreases, resulting in pink flowers.
The graph below is of the pH of the soil at different sections of a field.
 

In which section of the field will the flowers on ALL the hydrangea plants definitely be blue in colour and in which section will the flowers on ALL the hydrangea plants definitely be pink in colour?
<table>
<tr><th>Option</th><th>Blue flowers</th><th>Pink flowers</th></tr>
<tr><td>W</td><td>Section P and Q</td><td>Section R and S</td></tr>
<tr><td>X</td><td>Section R and S</td><td>Section P and Q</td></tr>
<tr><td>Y</td><td>Section P, Q and S</td><td>Section R</td></tr>
<tr><td>Z</td><td>Section P</td><td>Section R</td></tr>
</table>
A. W</td><td>1</td></tr>
</table>

	B. X C. Y D. Z	
Free Response Question/ Subjective Question		
Q.2	An excess of carbon dioxide gas is bubbled through lime water. (a) Will the pH of lime water change? If yes, how? Explain your answer. (b) Write the balanced equation for the reaction.	3
Q.3	Tanu takes 500 mL milk each in two bowls P and Q. She adds curd to both the bowls and baking soda only to bowl Q as shown below. (a) Bowl P - 500 mL milk + 1 teaspoon curd (b) Bowl Q - 500 mL milk + 1 teaspoon curd + 1 teaspoon baking soda In which bowl will the milk form into curd faster? Explain your answer.	3
Q.4	A solution P is taken in a flask and two drops of phenolphthalein indicator is added to it. The graph below shows how the pH of the mixture changes as a solution Q is added dropwise to the flask with stirring.  (a) Identify the nature of solutions P and Q. (b) What will the colour of the solution in the flask be at points X and Y? (c) Identify the type of reaction taking place in the flask.	3
Q.5	Aditi adds 1 mole of dilute hydrochloric acid to an aqueous solution of 1 mole of sodium carbonate. (a) Write the balanced equation for the reaction that takes place.	5

	(b) How will the colour of a red litmus and a blue litmus paper change when dipped in this mixture? Explain why.	
Q.6	The presence of acidic gases in the air increases the rate of corrosion. Furthermore, an increase in temperature can also increase the rate of corrosion. The graph below is created under 4 different conditions (shown below in the table) of temperature and acidic nature of air. Which of the graphs represents condition 2? (a) P (b) Q (c) R (d) S	1

Condition	Temperature (in °C)	pH value
1	20	6
2	30	6
3	30	7
4	20	7



Answer Key & Marking Scheme

Q. No	Answers	Marks
Q.1	D. Z	1
Q.2	(a) - The pH of lime water will decrease. [0.5 marks] - Carbon dioxide, being an acidic oxide, will neutralise lime water which is basic. [1 mark] OR -The products formed, namely, calcium carbonate and Calcium hydrogen carbonate are basic salts but less basic than Calcium hydroxide so pH decreases. (b) 0.5 marks each for writing the formula of lime water and the product calcium bicarbonate; 0.5 marks for balancing the equation: $Ca(OH)_2 + 2\ CO_2$ ---> $Ca(HCO_3)_2$ OR $Ca(OH)_2 + CO_2$ ---> $CaCO_3 + H_2O$ $CaCO_3 + CO_2 + H_2O$ ---> $Ca(HCO_3)_2$	3
Q.3	The milk will form into curd faster in bowl P. - Curdling of milk takes place due to formation of lactic acid by bacteria. [1 mark] - In bowl Q, the lactic acid formed by bacteria has to first neutralise the baking soda, which is basic in nature, before the milk starts curdling. [1 mark]	3
Q.4	(a) 0.5 marks each for the following: - solution P: acidic - solution Q: basic (b) 0.5 marks for each of the following: - colour of solution at X: colourless - colour of solution at Y: pink (c) neutralisation	3
Q.5	(a) 0.5 marks each for writing the formula of each reactant and product: $HCl + Na_2CO_3$ ---> $NaCl + NaHCO_3$ (b) - Red litmus paper will turn blue. [0.5 marks] - There will be no effect on blue litmus paper. [0.5 marks]	5

	- The complete neutralisation of 1 mole of sodium carbonate requires 2 moles of hydrochloric acid. [1 mark] - Since only 1 mole of HCl is used, neutralisation is incomplete and the mixture will be basic. [1 mark]	
Q.6	Graph P	1