01 **A small piece of sodium was dropped into water. A vigorous reaction occurred and a colourless solution was formed.**

(a) Write a balanced equation to represent the reaction between sodium and water.

(b) Name the colourless solution.

(c) Describe what would happen when each of the following was added to the colourless solution.

(i) Litmus

(ii) Ammonium chloride and then the mixture was heated.

a) $2Na(s) + 2H_2O(l) \rightarrow 2NaOH(aq) + H_2(g)$

b) Sodium hydroxide solution

c) (i) Red litmus turned blue

(ii) Colourless gas evolved which turned red litmus paper blue and formed dense white fumes with concentrated hydrochloric acid.

02 **Magnesium dissolves with effervescence when dropped into dilute hydrochloric acid. On evaporating the resulting solution, a white solid compound P is obtained. Magnesium burns in oxygen to produce a white powder. This white powder also dissolves in dilute hydrochloric acid to produce the same compound P.**

(a) Why does magnesium dissolve in dilute acid ?

(b) Write a balanced equation for the reaction between

(i) magnesium and hydrochloric acid.

(ii) magnesium and oxygen.

(c) Name the white powder.

(d) What type of reaction takes place between the white powder and hydrochloric acid ?

(e) Name the compound P.

a) Magnesium reacts with the acid to form a soluble salt.

b) (i) $Mg(s) + 2HCl(aq) \rightarrow MgCl_2(aq) + H_2(g)$

(ii) $2Mg(s) + O_2(g) \rightarrow 2MgO(s)$

c) Magnesium oxide

d) Neutralisation reaction

e) Magnesium chloride

03 **(a)** **It is a set of numbers which ranges from 1 to 14 in different solutions. Name this set of numbers.**

(b) **What is a pH indicator ?**

(c) **The table given below shows the examples of common pH indicators used in the laboratory. Complete the table to name the type of indicators that correspond to each colour observation.**

	Types of indicator	Colour observation		
		Acid	Neutral	Alkali
(i)		Red (pH < 3)	Orange (pH 4 – 7)	Yellow (pH > 7)
(ii)		Red	–	Blue
(iii)		Colourless	Colourless	Pink

(d) **The diagram given below shows the colour change of an indicator.**

pH scale	0 – 2	3 – 4	4 – 6	7	8 – 11	12 – 14
Colour	Red	Orange	Yellow	Green	Blue	Violet

(i) **Name this type of indicator.**

(ii) **Explain how this type of indicator works.**

(a) pH scale

(b) It is a substance that shows different colours in different acidity or alkalinity of a solution.

(c) (i) Methyl orange

(ii) Litmus paper

(iii) Phenophthalein

(d) (i) Universal indicator

(ii) It is an indicator that contains a mixture of substances that give different colours in different pH values.

04 **The table given below shows the colours of two indicators, methyl orange and methyl red, commonly used in the laboratory at different pH values.**

pH	2	3	4	5	6
Methyl orange	Red		Yellow		
Methyl red	Red				Yellow

Four solutions of different pH values are given below.

Solution	P	Q	R	S
pH	2	3	5	6

In which solution(s) will both indicators be red ?

P and Q only

[For R, at pH 5, methyl orange has changed to yellow.

For S, both indicators are yellow at pH 6.]

05 **Complete the table given below and write the type of oxide formed based on the given descriptions.**

Type of oxide	How they form	Can react with acids/ bases	Three examples
Basic	**Metals combine with oxygen**	**Acids**	Sodium oxide/ Magnesium oxide Iron(II) oxide
Acidic	Non-metals combine with oxygen	**Bases**	Sulfur dioxide Carbon dioxide Nitrogen dioxide
Amphoteric	Metals combine with oxygen	**Acids and bases**	Zinc oxide Aluminium oxide Lead(II) oxide
Neutral	Non-metals combine with oxygen	**None**	Carbon monoxide Water Nitrogen monoxide