7.4 TEST YOURSELF

SECTION A Multiple-choice Questions (Total 12 marks)

Select the correct response and write the corresponding letter (A, B, C or D) in the brackets provided.

1. Which of these agents would help to achieve a chemical change?

   I Electricity II Heat III Magnetism IV Light

   A. I, II and III **B.** I, II and IV **C.** I, III and IV **D.** All of these ( )

2. During which of these changes does a chemical reaction occur?

   A. An electric current is passed through copper wire.
   B. Crude oil (petroleum) is distilled at 400°C.
   C. Magnesium ribbon is dissolved in hydrochloric acid.
   D. Salt water is heated and made less concentrated. ( )

3. Combustion is described as an oxidation type of chemical reaction. This means that oxygen gas _____.

   A. catches alight and is used up
   B. combines with other elements
   C. decomposes to produce other elements
   D. is given off during the chemical reaction ( )

4. Which of these would **not** cause a chemical change to sugar?

   A. Adding concentrated sulfuric acid to sugar
   B. Burning sugar in a flame
   C. Decomposing sugar by heating
   D. Dissolving sugar in a solvent ( )

5. Which of these useful products does **not** require a chemical process in its manufacture?

   A. Cement **B.** Diamond **C.** Glass **D.** Steel ( )

6. In most chemical reactions, _____.

   I energy is changed from one form to another
   II it is easy to reverse the reaction and change products back to original reactants
   III new chemical substances are formed

   A. I and II **B.** I and III **C.** II and III **D.** All of these ( )

7. During the decomposition of acidified water by electrolysis two different colourless gases are given off at the electrodes. The gas from the negative electrode is explosive with a lighted splint, while the gas at the other electrode is not. Which key correctly identifies *both* these gases?

	Positive (red) electrode	Negative (black) electrode
A.	Chlorine	Oxygen
B.	Hydrogen	Oxygen
C.	Oxygen	Chlorine
D.	Oxygen	Hydrogen

( )

8. Which of these pollutant gases dissolves in water and is the main contributor to acid rain?

A. Carbon monoxide
B. Carbon dioxide
C. Ozone
D. Sulfur dioxide ( )

9. The element always present in acids is _____.

A. carbon **B.** hydrogen **C.** oxygen **D.** sulfur

( )

10. Use the table below to decide which of the statements is true.

pH	Vegetable (grow at this pH in soil)	Fish (live in water at this pH)
4.5—5.0	Potatoes	Trout
5.0—6.0	Parsley	Perch
6.0—7.0	Cabbage	Salmon

A. Cabbage grows better than parsley in acidic soil.
B. Potatoes grow well in alkaline soil.
C. Trout prefer chalky alkaline river streams.
D. Salmon prefers neutral water. ( )

11. The table shows the pH of various liquids.

Liquid	pH value
A	2
B	7
C	8
D	14

Which of these liquids, A, B, C or D, when added to magnesium ribbon would give off hydrogen gas? ( )

12. The table shows the pH of various solutions.

Solution	P	Q	R	S
pH	4	7	9	10

When *equal volumes* are mixed together, which two of these solutions will produce a neutral solution?

A. P and R
B. P and S
C. Q and R
D. R and S

( )

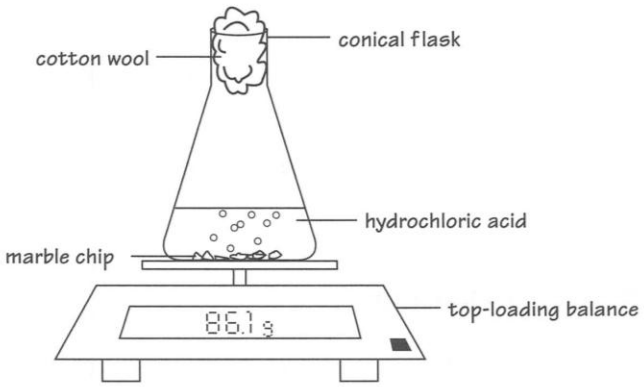
SECTION B **Structured Questions** **(Total 38 marks)**

13. Match these descriptions to the correct type of chemical reaction by drawing a line between them.

Chemical reaction to produce an insoluble solid	• Oxidation
Decomposing of chemicals by passage of electricity	• Thermal decomposition
Gain of oxygen by a chemical	• Combustion
Taking in energy to make simple foodstuffs	• Electrolysis
Chemical reaction with oxygen gas which gives out heat	• Precipitation
Breaking down of a chemical by heating	• Photosynthesis

(6 marks)

14. Lingling carried out an experiment to investigate the speed at which marble (calcium carbonate) dissolves in hydrochloric acid. A conical flask containing the marble chip and excess hydrochloric acid was placed on a top loading balance, as shown in the diagram. Mass was lost as carbon dioxide gas was given off.



Her records of the mass of the flask and contents are shown in the table.

Time/min	0	1	2	3	4	5	6	7	8
Mass of flask and contents (g)	87.6	86.1	85.1	84.5	84.2	84.0	83.9	83.9	83.9
Loss in mass (g)	0	1.5	2.5						

(a) Complete the table by working out the loss in mass of the flask. (2 marks)

(b) Plot a graph of loss in mass (*y* axis) against time (*x* axis).

(3 marks)

(c) When was the reaction fastest? _____

(1 mark)

(d) When did the chemical reaction stop? _____

(1 mark)

15. This question is about inferring information from chemical equations.

I. $C + O_2 \rightarrow CO_2$

II. $CaCO_3 \rightarrow CaO + CO_2$

III. $S + O_2 \rightarrow SO_2$

IV. $2H_2 + O_2 \rightarrow 2H_2O$

(a) Write word equations for all four equations shown above.

I. _____

II. _____

III. _____

IV. _____

(4 marks)

(b) Which three equations involve oxidation?

_____

_____

_____

(2 marks)

(c) Which equation involves thermal decomposition? _____

(1 mark)

(d) Which two equations produce a gas which causes the greenhouse effect or global warming?

_____

(1 mark)

(e) Which equation produces a gas which contributes towards acid rain?

_____

(1 mark)

16.

Indicator	When colour changes	Acid colour	Alkaline colour
Litmus	pH 7	Red	Blue
Methyl red	pH 3	Red	Yellow
Phenolphthalein	pH 9	Colourless	Pink

Using the table, decide on the colour a particular indicator would go in the following situations:

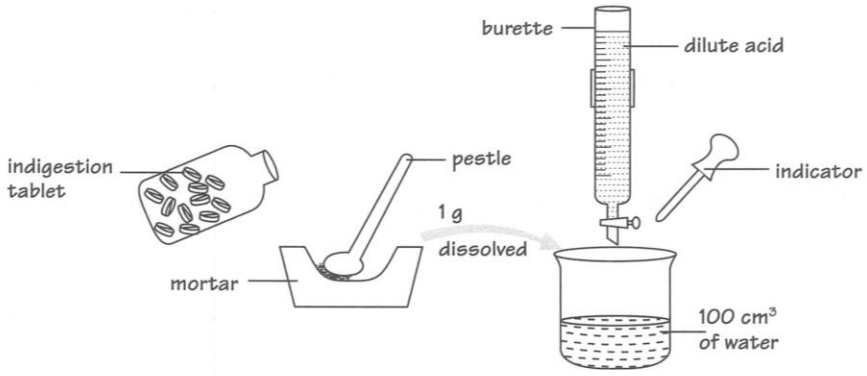
(a) Baking powder (pH = 8) in phenolphthalein solution _____

(b) Lemon juice (pH = 3) in litmus solution _____

(c) Toothpaste (pH = 11) in methyl red solution _____

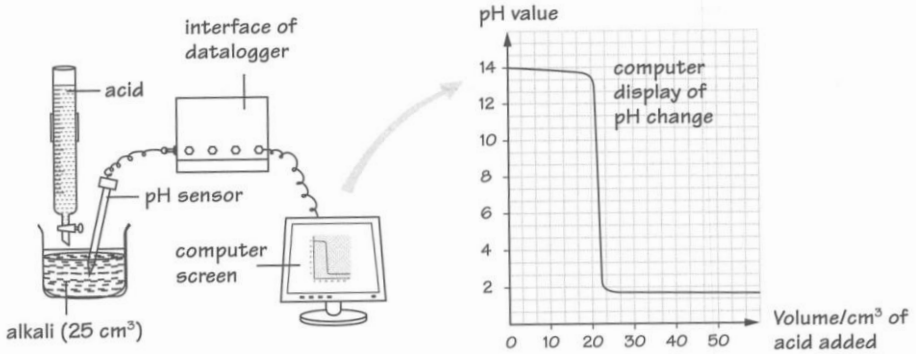
(d) Dilute hydrochloric acid (pH = 2) in litmus solution _____ (4 marks)

17. Veloo's local pharmacy sold two types of indigestion tablets called Indigo and Neutralo. He decided to carry out a scientific experiment to decide which one was most effective at neutralising acid (excess acid in the stomach causes indigestion). With the help of the diagrams below, devise an experiment to compare the 'strength' of these indigestion tablets.



(4 marks)

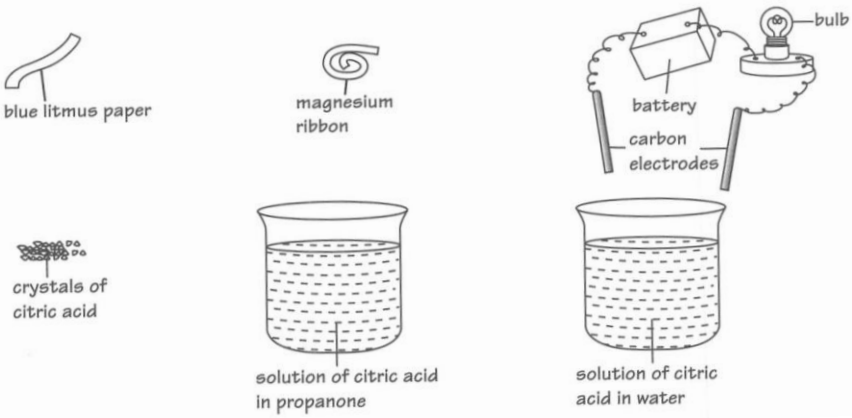
18. Neutralisation of an alkali and an acid can be followed using a data logger and pH sensor (see diagram). A computer can then display the changes in pH in the form of a graph, as shown.



Explain the shape of the graph.

(3 marks)

19. You have been given the following materials:



Design an experiment to test the following hypothesis: 'Water is needed for an acid to exhibit acidic properties'.

(5 marks)