

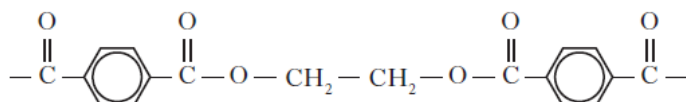
**N5 Chemistry**  
**Unit 3: Chemistry in Society**  
**Homework 3.7**

Name \_\_\_\_\_

Teacher \_\_\_\_\_

1. Polyethene terephthalate (PET) is used to make plastic bottles which can easily be recycled by heating and reshaping.

A section of the PET structure is shown.

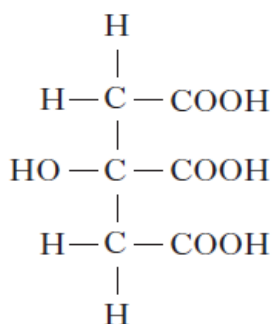


Which line in the table best describes PET?

|   | Type of polymer | Property      |
|---|-----------------|---------------|
| A | addition        | thermoplastic |
| B | condensation    | thermosetting |
| C | addition        | thermosetting |
| D | condensation    | thermoplastic |

Answer \_\_\_\_\_

2. The structure of citric acid is shown.



How many moles of sodium hydroxide would be required to exactly neutralise one mole of citric acid?

- A 1  
 B 2  
 C 3  
 D 4

Answer \_\_\_\_\_

3. Which of the following is a synthetic fibre?

- A Nylon  
 B Cotton  
 C Wool  
 D Silk

Answer \_\_\_\_\_

4. Atoms of an element form ions with a single positive charge and an electron arrangement of 2, 8.

The element is

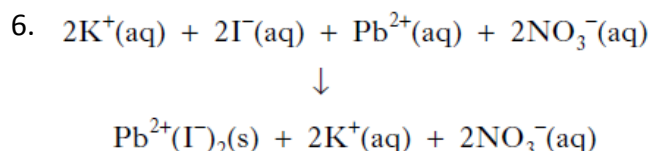
- A fluorine  
 B lithium  
 C sodium  
 D neon.

Answer \_\_\_\_\_

5. Which of the following substances does **not** have delocalised electrons?

- A Aluminium  
 B Poly(ethyne)  
 C Poly(ethenol)  
 D Carbon (graphite)

Answer \_\_\_\_\_

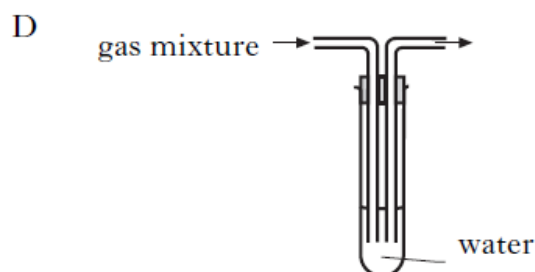
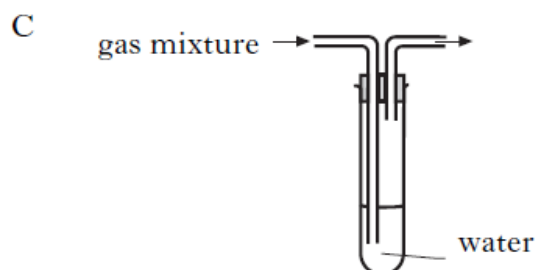
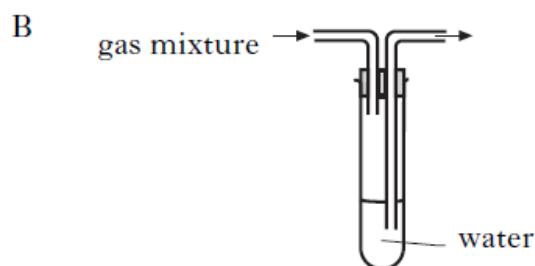
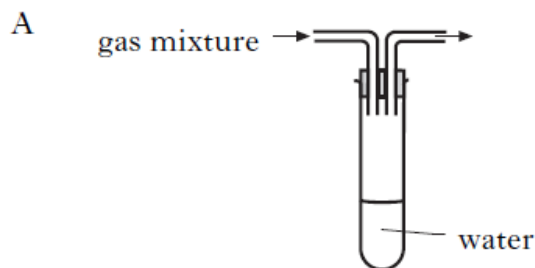


The type of reaction represented by the equation above is

- A addition  
 B neutralisation  
 C precipitation  
 D redox.

Answer \_\_\_\_\_

7. Which of the following diagrams shows the apparatus which would allow a soluble gas to be removed from a mixture of gases?



Answer \_\_\_\_\_

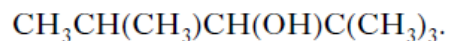
8. Which oxide, when shaken with water, would leave the pH unchanged?

(You may wish to refer to the data booklet.)

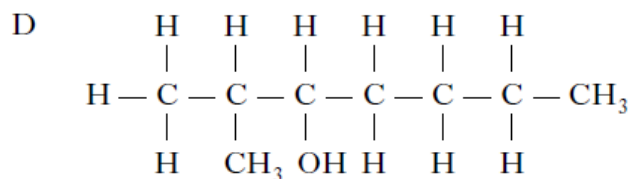
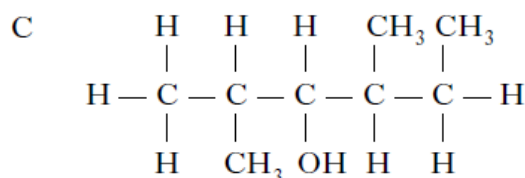
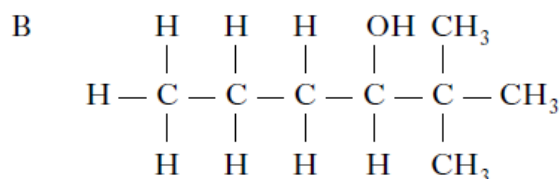
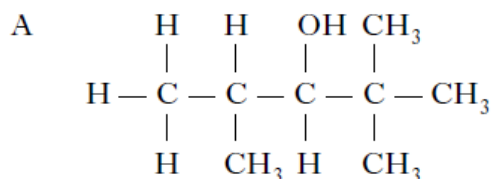
- A Calcium oxide  
 B Carbon dioxide  
 C Sulphur dioxide  
 D Zinc oxide

Answer \_\_\_\_\_

9. The shortened structural formula for an organic compound is



Which of the following is another way of representing this structure?



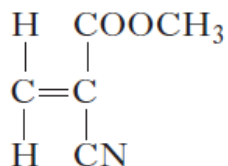
Answer \_\_\_\_\_

10. An atom is neutral because

- A the number of electrons equals the total number of protons plus neutrons  
 B the number of neutrons equals the total number of electrons plus protons  
 C the number of protons equals the number of neutrons  
 D the number of electrons equals the number of protons.

Answer \_\_\_\_\_

11. The monomer in superglue has the following structure.



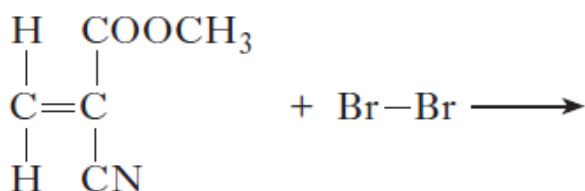
a) Draw a section of the polymer, showing **three** monomer units joined together.

1

b) The polymer does **not** change shape on heating.  
What term is used to describe this type of polymer?

1

c) Bromine reacts with the monomer to produce a saturated compound.



i) Draw the structural formula for this compound.

1

ii) Name the type of reaction which occurs when the monomer reacts with bromine.

1

12. Equations are used to represent chemical reactions.

|   |   |
|---|---|
| A | $\text{Zn(s)} \longrightarrow \text{Zn}^{2+}(\text{aq}) + 2\text{e}^-$  |
| B | $\text{C}_2\text{H}_5\text{OH}(\ell) + 3\text{O}_2(\text{g}) \longrightarrow 2\text{CO}_2(\text{g}) + 3\text{H}_2\text{O}(\ell)$            |
| C | $\text{SO}_2(\text{g}) + \text{H}_2\text{O}(\ell) \longrightarrow 2\text{H}^+(\text{aq}) + \text{SO}_3^{2-}(\text{aq})$                     |
| D | $\text{H}^+(\text{aq}) + \text{OH}^-(\text{aq}) \longrightarrow \text{H}_2\text{O}(\ell)$   |
| E | $\text{SO}_4^{2-}(\text{aq}) + 2\text{H}^+(\text{aq}) + 2\text{e}^- \longrightarrow \text{SO}_3^{2-}(\text{aq}) + \text{H}_2\text{O}(\ell)$ |

a) Identify the equation which represents combustion. Answer \_\_\_\_\_

1

b) Identify the equation which represents reduction. Answer \_\_\_\_\_

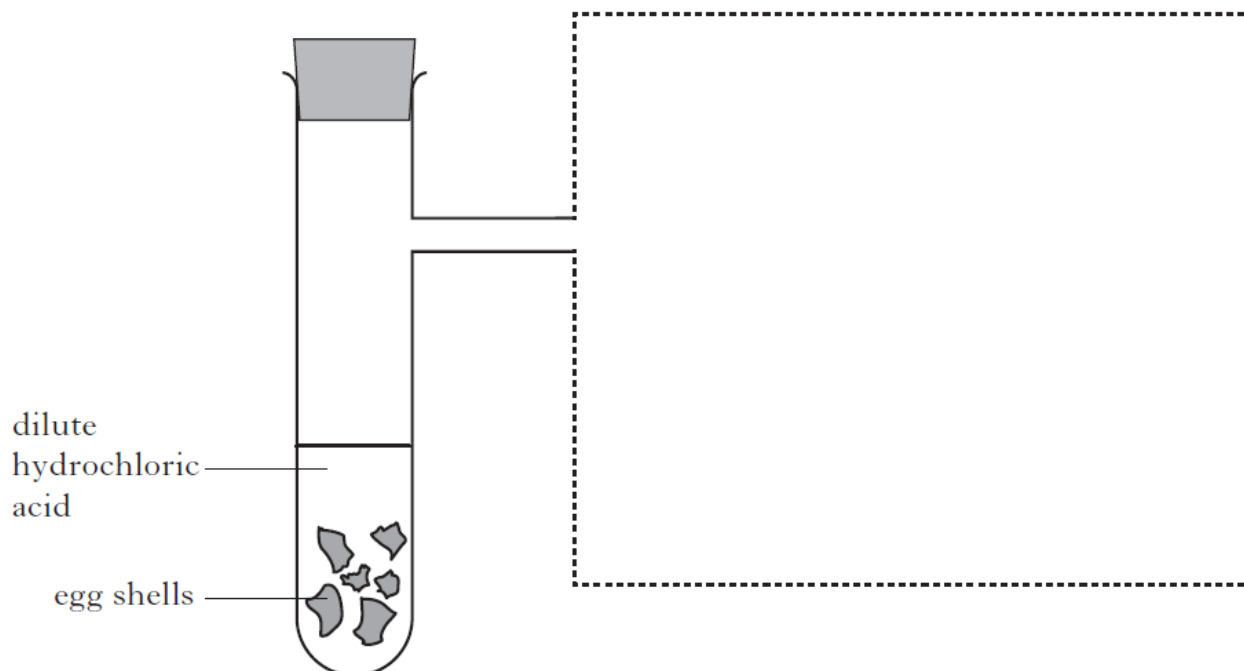
1

c) Identify the equation which represents neutralisation. Answer \_\_\_\_\_

1

13. Egg shells are made up mainly of calcium carbonate. A pupil carried out an experiment to react egg shells with dilute hydrochloric acid. A gas was produced.

- a) Complete the diagram to show the apparatus which could have been used to measure the volume of gas produced.



1

- b) Name the salt produced in this reaction. \_\_\_\_\_

1

- c) The volume of gas produced during the reaction was measured.

| Time (min) | Volume of gas (cm <sup>3</sup> ) |
|------------|----------------------------------|
| 0          | 0                                |
| 2          | 47                               |
| 4          | 92                               |
| 6          | 114                              |
| 8          | 118                              |
| 10         | 118                              |

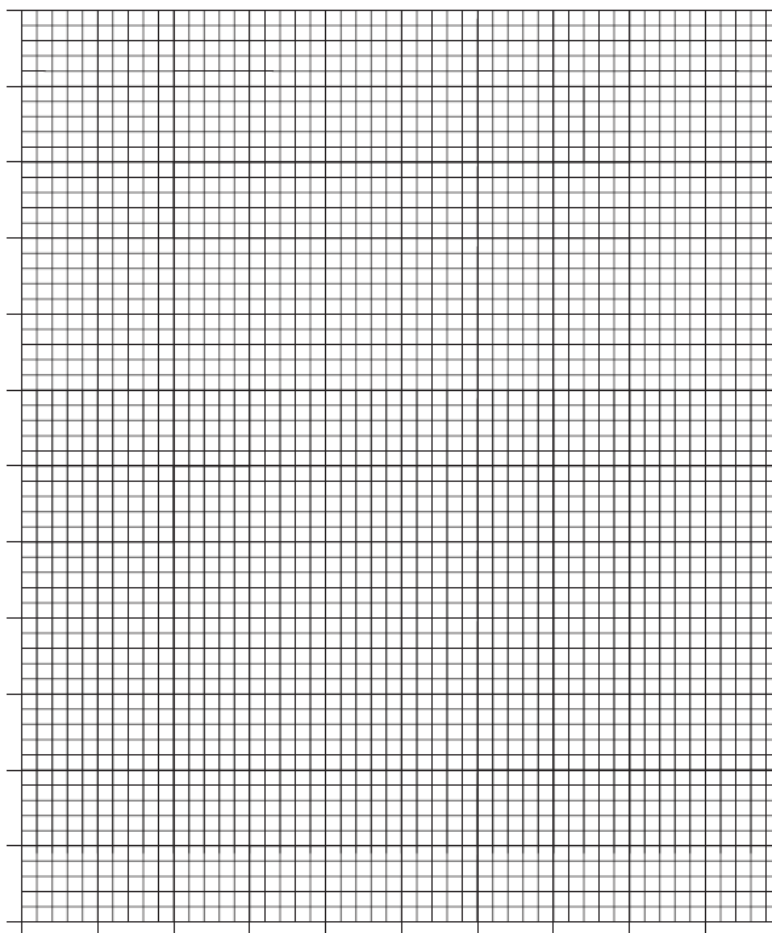
- i) Calculate the average rate of reaction, in cm<sup>3</sup> min<sup>-1</sup>, over the first 4 minutes.  
*Space for working and answer.*

\_\_\_\_\_ cm<sup>3</sup> min<sup>-1</sup>

2

13. (continued)

- c) ii) Plot the results as a line graph.



3

14. The names of some hydrocarbons are shown in the grid.

|         |              |             |
|---------|--------------|-------------|
| A       | B            | C           |
| ethane  | pentene      | cyclohexane |
| D       | E            | F           |
| pentane | cyclopentane | propene     |

- a) Identify the **two** isomers.

Answers \_\_\_\_\_ & \_\_\_\_\_

1

- b) Identify the hydrocarbon with the highest boiling point.

You may wish to refer to the data booklet.

Answer \_\_\_\_\_

1

- c) Identify the **two** hydrocarbons which can take part in an addition reaction.

Answers \_\_\_\_\_ & \_\_\_\_\_

1

15. Aluminium is extracted from the ore bauxite.

a) **Circle** the correct phrase to complete the sentence.

Aluminium is extracted from its ore  $\left\{ \begin{array}{l} \text{by heating with carbon} \\ \text{by heating alone} \\ \text{by electrolysis} \end{array} \right\}$ .

1

b) Bauxite contains aluminium hydroxide,  $\text{Al}(\text{OH})_3$ . Calculate the percentage composition by mass of aluminium in aluminium hydroxide.

*Space for working and answer.*

\_\_\_\_\_ %

3

c) Aluminium can be mixed with other metals to make a magnet. The composition of a 250 g magnet is shown.

| Metal     | aluminium | nickel | cobalt | copper | titanium | iron |
|-----------|-----------|--------|--------|--------|----------|------|
| % by mass | 10        | 25     | 20     | 4      | 1        | 40   |

i) Calculate the mass, in grams, of aluminium in the magnet.

*Show your working clearly.*

\_\_\_\_\_ g

2

ii) Using your answer to b) i), calculate the number of moles of aluminium in the magnet.

*Space for working and answer.*

\_\_\_\_\_ moles

2

Total Marks 35