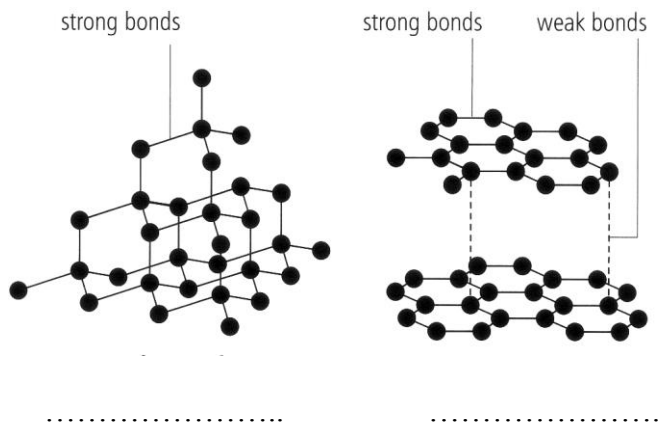


GCSE Questions: Chemistry

1 Look at the diagrams. They show two forms of carbon: diamond and graphite.



(a) On the diagram, write down which form is diamond and which is graphite. (1)

(b) Diamond tips are used on drills. What property of diamond makes it useful for this?

..... (1)

(c) Give another property of diamond and describe a related use.

.....
 (2)

(d) Give **two** physical properties of graphite. Explain why graphite has this property and give an associated use.

Property 1:

Explanation:

Associated Use:

Property 2:

Explanation:

Associated Use:

(6)

(e) There are strong bonds between the atoms of carbon in diamond. What name is given to this type of bond?

.....
(1)

Total Mark = 11

2 Limestone is an important raw material.

(a) Name the main chemical compound in limestone. Give the names of the elements present in this compound and write its chemical formula.

Name:

Elements:

Formula:

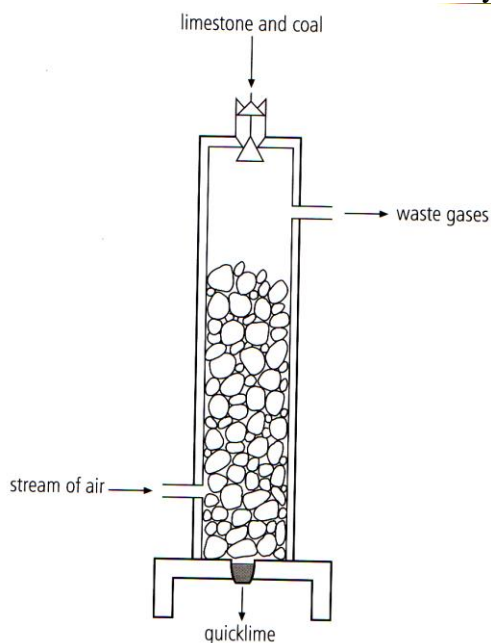
(3)

(b) Limestone has many uses. Select from the list below **two** important materials made from limestone. Underline your choices.

- cement diesel oil glass poly(ethene)
sodium hydroxide sulphuric acid

(2)

(c) The diagram shows a lime kiln. The limestone is heated by the burning coal.



(i) Suggest why hot air is blown into the lime kiln.

.....
(1)

(ii) Give **two** reasons why carbon dioxide is produced in the lime kiln.

.....
.....
(2)

(d) (i) Quicklime (calcium oxide) can be converted to slaked lime (calcium hydroxide) by adding water. Write a balanced formula equation for this reaction. (Calcium hydroxide is the only product.)

.....
(2)

(ii) Calculate the mass of slaked lime that could be produced from 280 tonnes of quicklime.

(iii) Why do farmers sometimes add slaked lime to acidic soil?
(3)

.....
(1)

Total Mark = 14

3 Ammonia is manufactured from hydrogen and nitrogen in the Haber process.

(a) (i) Write a balanced equation for the formation of ammonia in the Haber process.

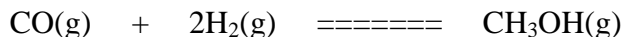
..... (2)

(ii) Draw a dot and cross diagram to show the bonding in a molecule of ammonia. Your diagram need only show the **outer** electron shells of all involved atoms.

(iii) Explain, in terms of bonds broken and bonds formed, why the formation of ammonia from nitrogen and hydrogen is exothermic. Include an energy level diagram if you think it will help to clarify your answer.

.....
.....
.....
.....
.....

(b) The manufacture of methanol from carbon monoxide and hydrogen requires similar conditions to those used in the Haber process. The equation for the manufacture of methanol is



The reaction is exothermic.

The reaction conditions are a pressure of 200 atmos. and a temperature of 400 °C

(i) State **one** advantage of using a pressure higher than 200 atmos. .

..... (1)

Explain your answer.

.....

.....

(2)

(ii) State **one** disadvantage of using a pressure higher than 1 atmos.

.....

(1)

(iii) State **one** advantage of using a temperature lower than 400 °C.

.....

(1)

Explain your answer.

.....

.....

(2)

(iv) State one disadvantage of using a temperature lower than 400 °C.

.....

Explain your answer.

.....

.....

(2)

Total = 16 marks

- 4 The electrolysis of sodium chloride solution is an important industrial process. Three useful substances are produced.

Two of these substances are gases evolved at the electrodes. The third is an alkaline solution remaining in the electrolyte chamber.

- (i) Name the two gases and state at which electrode they are formed.

Gas 1: Formed at:

Gas 2: Formed at:

(3)

- (ii) Write the ionic equations to show how each gas is produced.

Gas 1:

Gas 2:

(4)

- (iii) State which of these reactions is oxidation and which is reduction giving a reason for each answer.

Oxidation:

Reduction:

(4)

- (iv) Name the alkaline solution that remains and give its formula.

.....

(2)

- (v) Calculate the mass of chlorine gas produced when 10 kg of hydrogen are made.
(Relative atomic masses: H = 1; Cl = 35.5)

(3)

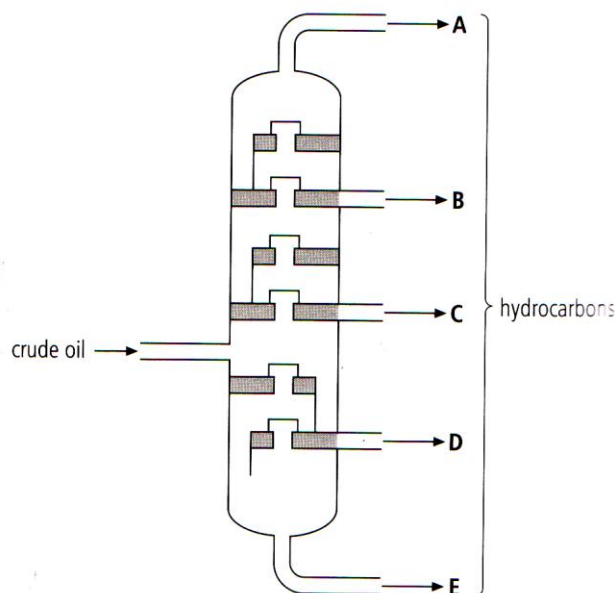
Total marks = 16

5 Crude oil is mixture of chemicals called hydrocarbons.

(a) Explain what you understand by the term 'hydrocarbon'.

.....
(2)

(b) The diagram shows part of an oil refinery where hydrocarbons are separated from each other.



(i) What is the name of the process used to separate the hydrocarbons?

.....
(1)

(ii) **A, B, C, D** and **E** are hydrocarbons produced in this process.

Which of these hydrocarbons is most likely to be a **gas** at room temperature and which is most likely to be a **solid**?

Gas:
(1)

Solid:
(1)

Explain your answers.

.....
.....

(c) Some of the hydrocarbons, such as propane gas (C_3H_8), are used as fuels. Some houses which do not have natural gas use propane. (2)

(i) Propane gas tanks have the following symbol on them.



What do you think this symbol means?

..... (1)

(ii) Propane gas tanks should be outside the house in a shady place. Explain why.

.....
..... (2)

(iii) For safety, a substance with a strong smell is added to the propane gas. Explain why this is a good idea.

..... (1)

(iv) When propane gas burns in air it may undergo either complete or incomplete combustion. Write balanced equations for the complete and incomplete combustion of propane.

Complete combustion:

Incomplete combustion: (4)

(v) Explain why each of these forms of combustion can have a harmful effect on the environment.

Complete combustion:

..... (2)

Incomplete combustion:

..... (2)

(d) Name **two** other fractions (not gases) produced in the refining of crude oil and give one use for each.

Name:

Use:

Name:

Use:

(4)

Total Marks = 23
