Rewarding Learning

Centre Number

71	

Candidate Number

General Certificate of Secondary Education
2012–2013

Science: Single Award

Unit 2 (Chemistry)

Foundation Tier

[GSS21]

ML

MONDAY 20 MAY 2013, AFTERNOON

TIME

1 hour, plus your additional time allowance.

INSTRUCTIONS TO CANDIDATES

Write your Centre Number and Candidate Number in the spaces provided at the top of this page.
Write your answers in the spaces provided in this question paper.
Answer **all ten** questions.

INFORMATION FOR CANDIDATES

The total mark for this paper is 60.
Quality of written communication will be assessed in Question **9**.
Figures in brackets printed down the right-hand side of pages indicate the marks awarded to each question or part question.
A Data Leaflet, which includes a Periodic Table of the Elements, is included in this question paper.

For Examiner's use only	
Question Number	Marks
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
Total Marks	

Examiner Only	
Marks	Remark

1 **(a)** Look at the hazard symbols below. Match each symbol to its correct meaning. Use lines to do this.

The first one has been done for you.

Hazard symbol	Meaning
	corrosive
	toxic
	radioactive
	explosive
	flammable

[3]

(b) Why are hazard symbols better than words to warn people of dangers?

_____

_____ [1]

2 Complete the following sentences.

Choose from:

Richter **boundary** **tectonic** **seismometer** **tidal**

Volcanoes and earthquakes are caused by movement at the edge of _____ plates. Earthquakes are recorded on an instrument called a _____. The size of earthquakes is measured on the _____ scale. [3]

Examiner Only	
Marks	Remark

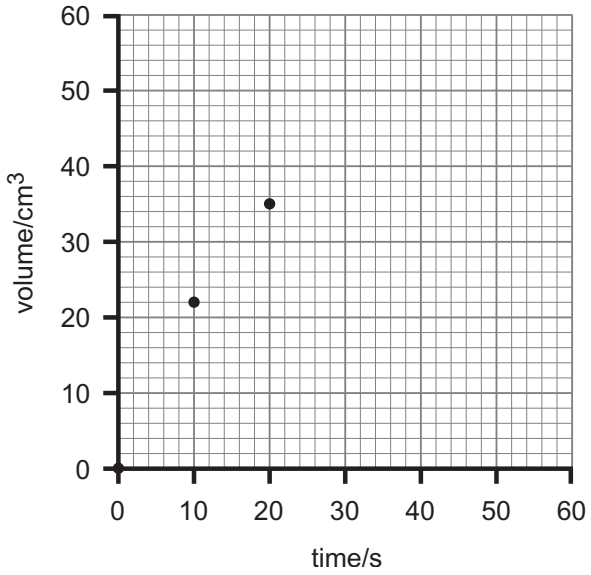
Examiner Only	
Marks	Remark

3 Jane did an investigation. She wanted to find out about the volume of carbon dioxide given off when baking powder is added to acid.

Her results are shown below.

Time/s	0	10	20	30	40	50	60
Volume/cm^3	0	22	35	42	48	50	50

(a) Plot the rest of the points and draw a curve of best fit. Do this on the grid below.



[2]

(b) Use your graph to find how long it took to produce 30 cm^3 of gas.

_____ s [1]

(c) Describe the chemical test used to identify carbon dioxide. Include the result you would expect to get.

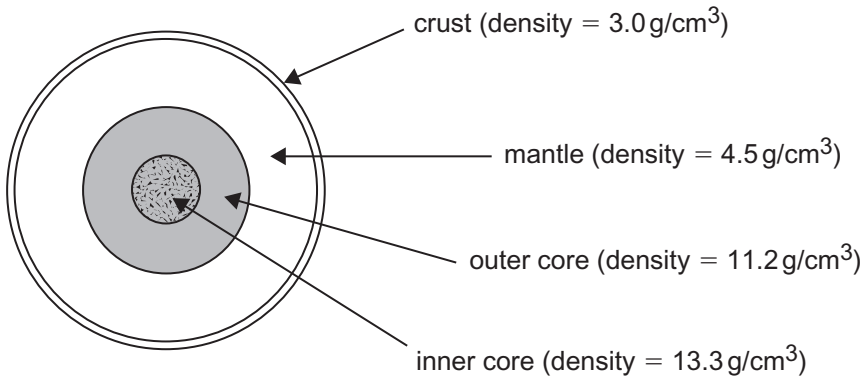
_____

_____

_____ [2]

4 Look at the table and the diagram below. They show information about the structure of the Earth.

Layer	Volume/%	Depth from Earth's surface/km
crust	1.5	40
mantle	82.3	2900
outer core	15.4	5150
inner core	0.8	6370



(a) Which layer has the smallest volume?

_____ [1]

(b) Which layer has the highest density?

_____ [1]

(c) Which is the thinnest layer?

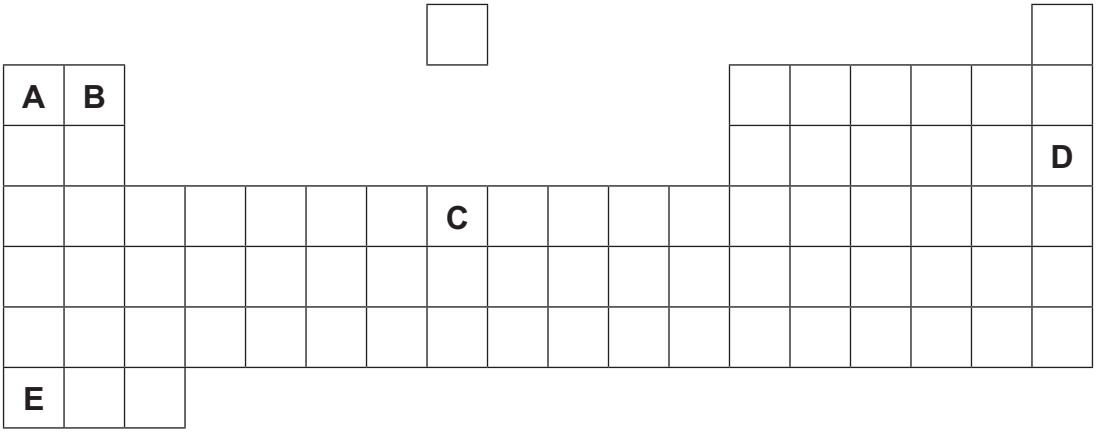
_____ [1]

Examiner Only

Marks	Remark

Examiner Only	
Marks	Remark

5 **(a)** Look at the diagram below. It shows an outline of the Periodic Table. The letters **A**, **B**, **C, D** and **E** show the position of some elements.



(i) Which element **A**, **B**, **C, D** or **E** is an alkaline earth metal?

_____ [1]

(ii) Which element **A**, **B**, **C, D** or **E** is a gas?

_____ [1]

(iii) Which element **A**, **B**, **C, D** or **E** is the most reactive metal?

_____ [1]

(b) Put the letter **X** in **one** position on the diagram above to show where you would find a halogen. [1]

(c) Complete the following sentences by circling the correct answer.

(i) Lithium, sodium and potassium are all

noble gases : **alkali metals** : **halogens** [1]

(ii) The formula for sodium chloride is

$NaCl_2$: **NaCl** : **Na_2Cl** [1]

(iii) The modern Periodic Table was invented by

The Greeks : **Newlands** : **Mendeleev** [1]

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(Questions continue overleaf)

Examiner Only	
Marks	Remark

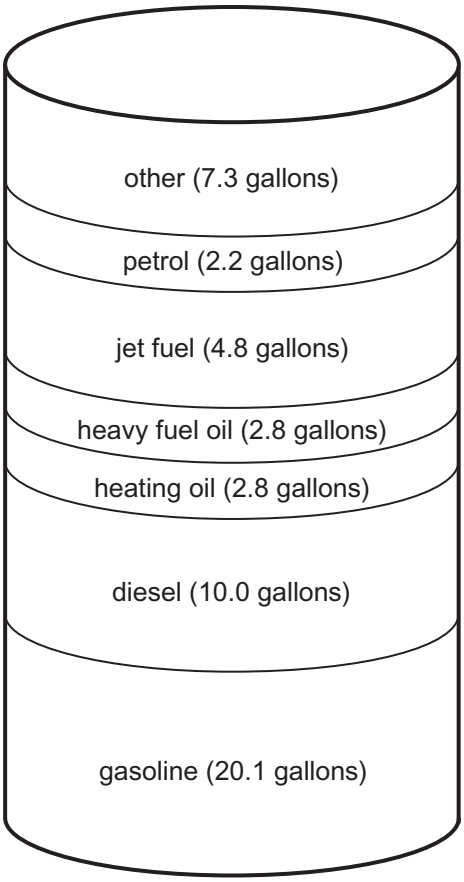
6 **(a)** Crude oil is a liquid fossil fuel. Describe what crude oil is.

_____

_____

_____ [2]

(b) Look at the diagram below. It shows the chemicals that can be made from **one** barrel of crude oil.



barrel of crude oil

(i) Write down the name of the process used to separate crude oil into these different chemicals.

_____ [2]

(ii) A car uses 250 gallons of diesel in one year. Calculate how many barrels of crude oil will be needed to produce the car's fuel for one year.
Show your working out.

_____ barrels [2]

(iii) Some of the other chemicals in crude oil can be changed into diesel. What effect, if any, will this have on the number of barrels needed to fuel the car for one year? Explain your answer.

_____

_____

_____

_____ [2]

(c) Fill in the word equation below for the complete combustion of diesel fuel.

diesel fuel + oxygen → [ ] + [ ]

[2]

Examiner Only	
Marks	Remark

7 The table below shows properties of some plastics.

Plastic	Melting point/°C	Resistance to alkali	Other properties	Cost per kg /£
A	20	highly resistant	strong and flexible	1.1
B	120	slowly reacts	strong and flexible	1.5
C	200	highly resistant	strong and shatters easily	0.5
D	160	highly resistant	strong and not very flexible	2.4

Use the information in the table and your knowledge to answer the questions below.

(a) Why is plastic **C not** suitable to cover the copper wire in an electrical cable?

_____

_____ [1]

(b) A shop owner has a large warehouse where he stores things. He wants to cover the things he stores with plastic sheets. Why is plastic **B** a better choice than plastic **D**?

_____

_____ [1]

(c) The shop owner needs large plastic containers to hold a corrosive alkali. The containers will be loaded on and off lorries.

Which plastic (**A**, **B**, **C** or **D**) would be the best one to use for the containers? Explain your answer fully.

_____

_____

_____

_____ [3]

Examiner Only

Marks	Remark

8 **(a)** Complete the table below about the particles in an atom.

Particle	Relative charge	Relative mass	Location in an atom
proton	+1		the nucleus
electron		$\frac{1}{1840}$	orbits the nucleus
neutron	0	1	

[3]

(b) Below is the atomic number and mass number of sodium.

$$^{23}_{11}\mathbf{Na}$$

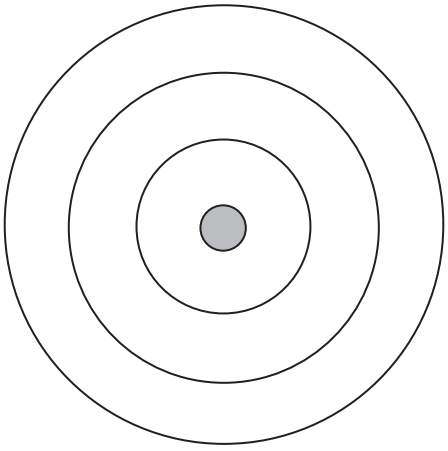
(i) How many protons does an atom of sodium have?

_____ [1]

(ii) Calculate the number of neutrons in an atom of sodium.

_____ [1]

(iii) An atom of sodium has 11 electrons. Complete the diagram below to show how all its electrons are arranged.



[1]

Examiner Only

Marks	Remark

Examiner Only	
Marks	Remark

9 Potassium is a very reactive metal. Describe how a teacher could **safely** show how potassium reacts with water to a class of pupils. You should describe what the pupils will see and the names of any products.

In this question you will be assessed on your written communication skills including the use of specialist scientific terms.

[6]

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(Questions continue overleaf)

10 Look at the table below. It shows the colour of four indicators at different pH values.

Indicator	pH value													
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**
Universal	R	R	O	O	Y	Y	G	B	B	I	I	I	V	V
Methyl Red	R	R	R	R	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Thymol Blue	Y	Y	Y	Y	Y	Y	Y	Y	B	B	B	B	B	B
Alizarin Yellow	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	R	R	R

Key
R=Red O=Orange Y=Yellow G=Green B=Blue I=Indigo V=Violet

Use the information above to answer the following questions.

Examiner Only	
Marks	**Remark**

(a) (i) What colour is Methyl Red indicator in a solution of pH 7?

_____ [1]

(ii) What colour is Alizarin Yellow indicator in strong alkali?

_____ [1]

(iii) What colour is Universal indicator in hydrochloric acid?

_____ [1]

(b) A scientist has some acid and is going to add an alkali to it. He needs to stop adding the alkali when the pH value is 7.

(i) What name is given to the reaction of an acid with an alkali?

_____ [1]

(ii) Choose the most suitable indicator from the table above for the scientist's experiment. Explain why you chose this indicator.

_____

_____

_____ [2]

Examiner Only	
Marks	Remark

(c) The table shows chemical indicators. Write down a more accurate way to follow the pH change when an alkali is added to an acid.

_____ [1]

(d) Most indicators are made from plants. Describe how you would get an indicator from red cabbage.

_____

_____

_____

_____

_____ [3]

(e) Complete the word equation below for the reaction of an acid with an alkali.

hydrochloric acid + magnesium hydroxide → [ ] + water

[1]

THIS IS THE END OF THE QUESTION PAPER

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