Rewarding Learning

Centre Number

71	

Candidate Number

General Certificate of Secondary Education
2012–2013

Science: Single Award

Unit 2 (Chemistry)

Foundation Tier

[GSS21]

GSS21

MONDAY 20 MAY 2013, AFTERNOON

TIME

1 hour.

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)** Below are some hazard symbols. Using lines, match each symbol to its correct meaning.

The first one has been done for you.

Hazard symbol	Meaning
	corrosive
	toxic
	radioactive
	explosive
	flammable

[3]

(b) Suggest why hazard symbols are 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

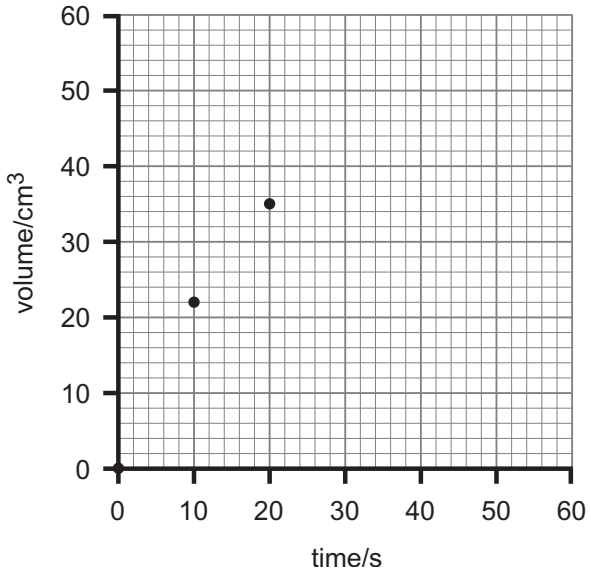
Examiner Only	
Marks	Remark

3 Ashley carried out an investigation into 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) On the grid below plot the rest of the points and draw a curve of best fit.



[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 and include the result you would expect.

_____

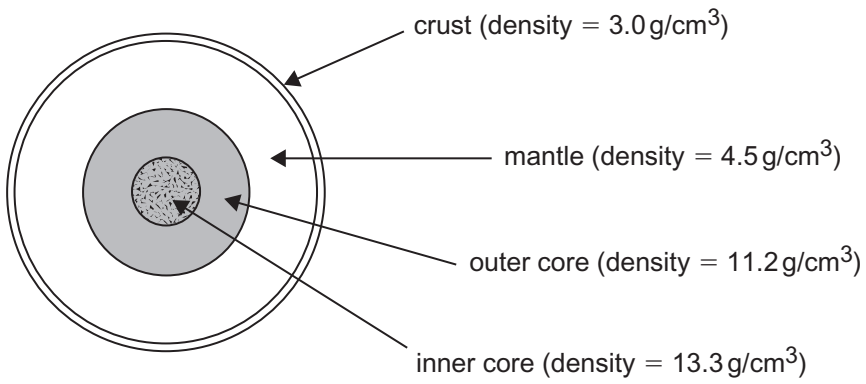
_____

_____ [2]

Examiner Only	
Marks	Remark

4 The table and the diagram below give 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?

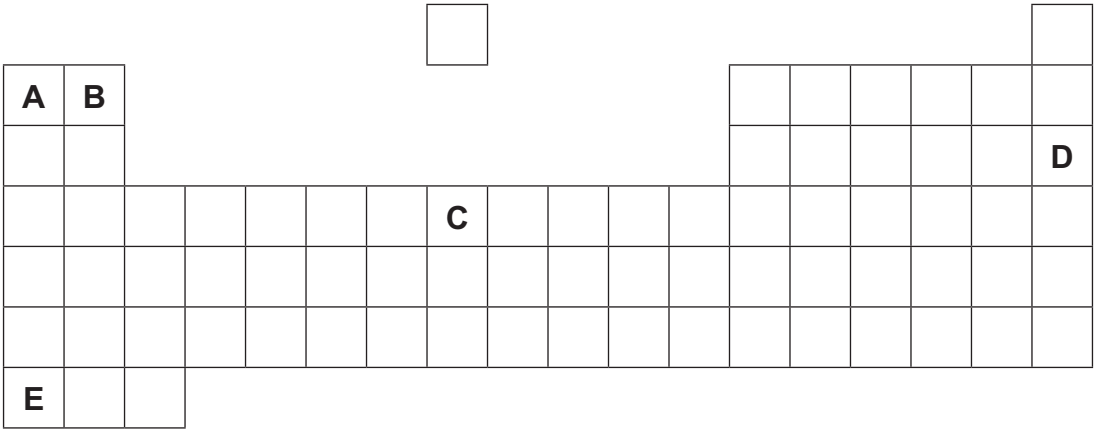
_____ [1]

(c) Which is the thinnest layer?

_____ [1]

Examiner Only	
Marks	Remark

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



Which element **A**, **B**, **C, D** or **E** is:

(i) an alkaline earth metal? _____ [1]

(ii) a gas? _____ [1]

(iii) the most reactive metal? _____ [1]

(b) On the diagram above use the letter **X** to show **one** position 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 developed by

The Greeks : Newlands : Mendeleev [1]

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(Questions continue overleaf)

Examiner Only	
Marks	Remark

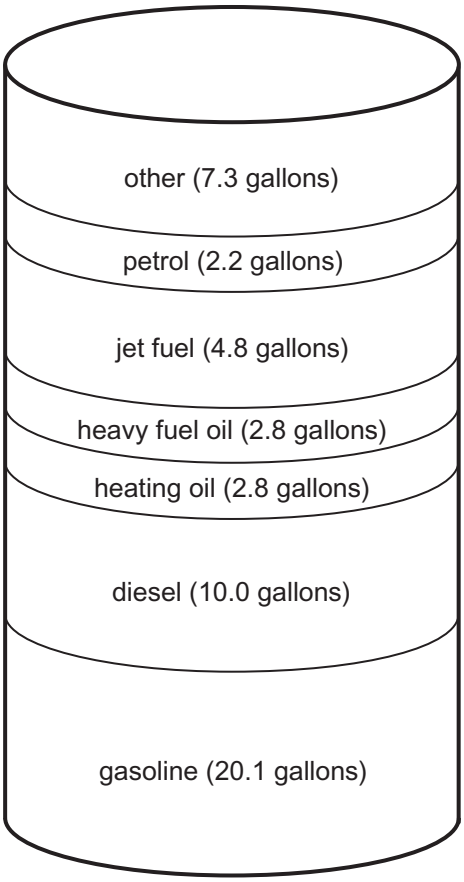
6 **(a)** Crude oil is a liquid fossil fuel. Describe fully what crude oil is.

_____

_____

_____ [2]

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



barrel of crude oil

(i) Name 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) Complete 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) Suggest why plastic **C** is **not** suitable to cover the copper wire in an electrical cable.

_____

_____ [1]

(b) A company has a large warehouse and wants to use plastic sheets to cover the items it stores. Explain why plastic **B** is a better choice than plastic **D**.

_____

_____ [1]

(c) Large plastic containers are needed to transport a corrosive alkali. The containers will be loaded on and off lorries.

Which plastic (**A**, **B**, **C** or **D**) would be most suitable? 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) Given below is the atomic number and mass number of sodium.

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

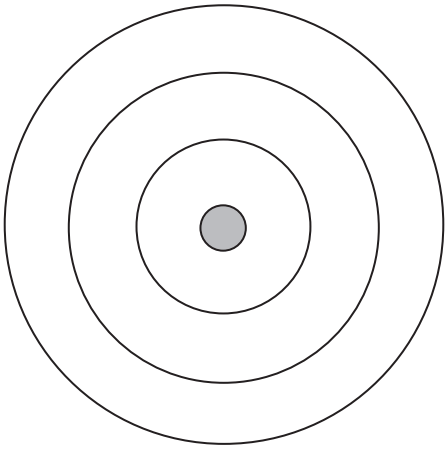
(i) How many protons does an atom of sodium have?

_____ [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

9 Potassium is a very reactive metal. Describe how a teacher could **safely** demonstrate its reaction with water to a class of pupils. Your answer should include what is observed 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]

Examiner Only	
Marks	Remark

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(Questions continue overleaf)

10 The table below gives 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) From the table above select the most suitable indicator for his experiment. Explain your choice.

_____

_____

_____ [2]

(c) The table shows chemical indicators. Suggest 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 obtain 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]

Examiner Only

Marks	Remark

THIS IS THE END OF THE QUESTION PAPER

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