Surname	Centre Number	Candidate Number
Other Names		0



# **GCSE**

4782/01

### SCIENCE B

# UNIT 2: Science and Life in the Modern World FOUNDATION TIER

P.M. MONDAY, 10 June 2013

1 hour

For Examiner's use only				
Question	Maximum mark	Mark Awarded		
1.	6			
2.	6			
3.	9			
4.	5			
5.	11			
6.	11			
7.	12			
Total	60			

### ADDITIONAL MATERIALS

In addition to this paper you may require a calculator and ruler.

### INSTRUCTIONS TO CANDIDATES

Use black ink or black ball-point pen.

Write your name, centre number and candidate number in the spaces at the top of this page.

Answer all questions.

Write your answers in the spaces provided in this booklet.

If you run out of space, use the continuation pages at the back of the booklet, taking care to number the question(s) correctly.

### INFORMATION FOR CANDIDATES

The number of marks is given in brackets at the end of each question or part-question.

You are reminded that assessment will take into account the quality of written communication used in your answer to question 7(c).

A periodic table is printed on page 16.

[4]

### Answer all questions.

1. The diagram below shows chromosomes from a human liver cell.



(a) Use the information in the box below to complete the following sentences.

singles pairs 46 nucleus 96

DNA triplets 22 cytoplasm

(i)	Chromosomes are found in the	part of a cell called the	
(1)	emomosomes are round in the	part of a cent canca the	

(b)	Describe <b>two</b> differences between the chromosomes in a human liver cell and a human sperm cell.	1n 2]

				d by the recessive	f a person has the e allele (gene) <b>b</b> .	Schot, pe DD
(i)	Brian (Bb) fibrosis.	) and Anwen (I	Bb) are both carr	riers of this disea	se but do not suff	er from cystic
	Complete	the Punnett sq	uare below to s	how the cross be	tween Brian and	Anwen. [3]
			ı	ı	ı	
			-	-		
ii)	What is th	ne genotype of	a cystic fibrosis	sufferer?		[1]
ii)	Circle the	correct answer	ſ <b>.</b>			[1]
	The chance	ce of Brian and	Anwen produc	ing a baby with o	cystic fibrosis is:	
	0%	25%	50%	100%		
v)	State the t	term to describ	e a change to ex	xisting genes.		[1]
						11

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- 3. A trainee metal worker has researched the properties of some metals.
  - (a) Complete the table by naming the missing metal and symbol.

[2]

(b) Use the information in the table to answer the following questions.

Metal	aluminium		titanium	iron
Symbol		Cu	Ti	Fe
Melting point (°C)	661	1084	1668	1538
Density (g/cm <sup>3</sup> )	3	9	5	8
Electrical Conductivity (units)	4	6	1	1
Strength (units)	11	70	434	10
Thermal conductivity (units)	237	401	22	10

(i)	Which is the best metal for electrical wiring?	[2]
	Metal	
	Reason	
(ii)	Which is the best metal to make the body of an aircraft?	[2]
	Metal	
	Reason	

(iii)	Which is the best meta	al to make the bottom of a saucepan?	[2]
	Metal		
	Reason		
List	the metals in order of in	creasing strength.	[1]
		weakest	

Examiner

**4.** Charlotte is pregnant and has just had her 20 week scan. The image of her baby is shown below.



(a) The sentences below describe how the image was formed. **Underline** the correct word in each bracket in the following paragraph. [2]

The image of the baby is formed using ultrasound. This technique uses (high / low / light) frequency (ripple / sound / light) waves for the safe monitoring of the baby during development.

(b)	(i)	Explain why ultrasound is used for this type of scan instead of x-rays.	[2]

(ii) Name **one** *other* medical use of ultrasound. [1]

Identify the hazard symbol found on a bottle of concentrated hydrochloric acid using the correct word from the box below. 5. (a)

biohazard	irritant	corrosive	radioactive



*(b)* David investigated the neutralisation reaction between hydrochloric acid and sodium hydroxide.

Complete the word equation for this neutralisation reaction below.

[2]

hydrochloric acid + sodium hydroxide — + \_\_\_\_\_

Colour	red	orange	yellow	green	blue	navy	purple
pH Range	0-2	3-4	5-6	7	9-10	11-12	13-14

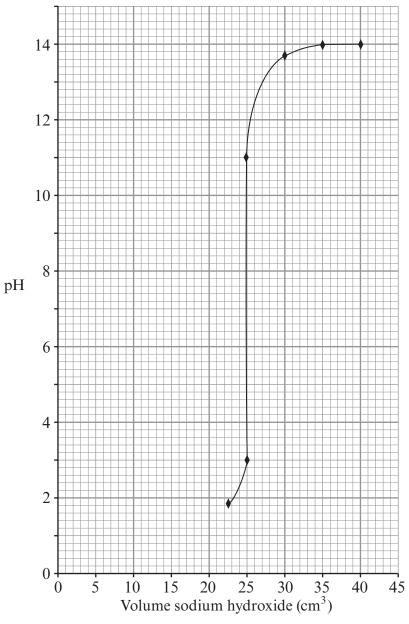
What **colour** is universal indicator in a **neutral** solution? (ii) [1]

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- (c) David measured the pH as he added sodium hydroxide solution to dilute hydrochloric acid from a burette. He has started to plot a graph of his results.
  - (i) The table below shows some of the results that David has not yet plotted in his graph. Use these results to complete his graph. Join the points. [3]

Volume of sodium hydroxide (cm <sup>3</sup> )	pH reading
0	1.0
5	1.0
10	1.1
15	1.2
20	1.5

## David's graph showing pH against volume of sodium hydroxide



(ii)	Use the graph to find the volume of the sodium hydroxide solution required to neutralise the dilute hydrochloric acid. [1]
	cm <sup>3</sup>
	Is and alkalis react to form a salt and water. In an experiment to make a salt, David wed the method below.
Metl	hod:
1.	Pipette 25 cm <sup>3</sup> of dilute acid into a conical flask.
2.	Add a few drops of universal indicator.
3.	Add 40 cm <sup>3</sup> of sodium hydroxide solution to a burette.
4.	Add 2 cm <sup>3</sup> of sodium hydroxide solution to the dilute acid from the burette.
5.	Record the pH using a colour chart.
6.	Repeat steps 4 and 5 until all the sodium hydroxide solution is added.
Sugg	gest <b>three</b> changes to this method which will allow David to make a <b>pure</b> salt. [3]
•••••	
• • • • • • • • • • • • • • • • • • • •	
***********	

6.	(a)		information below is an outline or ergoes a gamma camera scan using r.									
		Place the statements below in the correct order using the boxes provide has been done for you.										
		A. The patient is injected with radio-isotope.										
		B.	A drug is labelled with radio-isotop									
		C.	A gamma camera detects the radio	gamma camera detects the radio-isotope.								
		D.										
		E.	The drug moves through blood stre	eam to the tar	get organ.							
		Correct order:										
		В										
			Radio-isotope  carbon-14  cobalt-57  technetium-99  oxygen-15	57Co  99Tc  15O	Half-life 5730 years 271 years 6 hours 2 minutes							
		(i)	(i) State what is meant by the term <i>half-life</i> .									
		(ii)	Explain which of these radio-isotop gamma camera images.	most suitable fo	or use in producing [2]							

(c)	(i)	Iodine-131 is used in internal radiotherapy. What is meant by the term <i>internal radiotherapy</i> ? [2]	Examin
	(ii)	Iodine-131 has a half-life of 8 days. Calculate the <b>fraction</b> of the original amount of iodine-131 that would be left in the body after 24 days. [2]	
		Fraction =	11

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7. The table below shows information from two packets of crisps.

	Typical Nutritional Values					
	Ready Salted Crisps Original Ready Salted Cri 'Better Living'					
	per 25 g pack	per 100g	per 25 g pack	per 100g		
Energy (kJ)	552	2200	420	1680		
Protein (g)	1.6	6.5	1.7	6.8		
Carbohydrate (g)	12.3	49.0	14.6	58.4		
of which sugars (g)	0.1	0.4	0.1	0.4		
Fat (g)	8.5		5.0	20.0		
of which saturates	0.7	2.8	0.4	1.6		
monounsaturated	6.8	27.2	4.3	17.2		
polyunsaturated	1.0	4.0		1.2		
Fibre (g)	1.0	4.0	1.2	4.8		
Salt (g)	0.5	2.0	0.3	1.0		

(a)	(i)	Explain why all values on food labels are quoted per 100 g.	[2]			
	(ii)	Complete the table by inserting the <b>two</b> missing values.	[2]			

(b)	The information	below	shows	the	guideline	daily	amounts	(GDA)	of salt	for	children
	and adults.										

	Guideline daily amounts of salt (g)
Men	6.0
Women	6.0
Children (5-10)	4.0

Mandy, a ten year old girl, eats **one** packet of **'Original'** ready salted crisps for her school lunch. What percentage of her daily amount of salt do these crisps provide? [2]

	Percentage of daily allowance of salt =							
(c)	The manufacturer of the <b>'Better Living'</b> brand claims they are healthier for you. Use the information in the table, and your understanding of lifestyle choices, to assess this claim.  [6 QWC]							

**END OF PAPER** 

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For continuation only	

# Periodic Table of the Elements

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(4782-01)

	0	helium 2 He	neon 10 Ne	18 Ar	krypton 36 <b>Kr</b>	xenon 54 Xe	radon 86 Rn	
	7		fluorine 9	chlorine 17 CI	bromine 35 <b>Br</b>	iodine 53	85 At	
	9		oxygen 8	sulfur 16 S	selenium 34 Se	tellurium 52 Te	polonium 84 <b>Po</b>	
	S		nitrogen 7	phosphorus 15 <b>P</b>	arsenic 33 AS	antimony tellurium s1 s2 Sb Te	bismuth polonium 83 84 Bi Po	
	4		ر ک	silicon 14 Si	germanium 32 <b>Ge</b>	tin 50 Sn	lead <b>82</b> <b>Pb</b>	
	8		boron 5 <b>B</b>	13 Al	gallium 31 Ga	Indium 49 In	mercury thallium  80 81  Hg Tl	
					zinc 30 <b>Zn</b>	Cadmium 48	mercury 80 Hg	
					29 Cu	47 <b>Ag</b>		
			1		nickel 28 <b>Ni</b>	palladium 46 Pd	platinum 78 Pt	
		hydrogen 1 H			27 Co	rhodium 45 Rh	77 <b>Ir</b>	
					iron 26 Fe	ruthenium 44 <b>Ru</b>	osmium 76 <b>Os</b>	
name umber bol					scandium titanium vanadium chromium manganese 21 22 23 24 25 SC Ti V Cr Mn	technetium 43 Tc	barium lutetium hafnium tantalum tungsten rhenium osmium 56 71 72 73 74 75 76 Ba Lu Hf Ta W Re Os	
element name atomic number Symbol					chromium 24 Cr	molybdenum 42 IMo	tungsten 74 W	
	J				vanadium 23	niobium 41 Nb	tantalum 73 <b>Ta</b>	
					titanium 22 <b>Ti</b>	zirconium 40 Zr	hafnium 72 <b>Hf</b>	
					scandium 21 Sc	yttrium 39 Y	lutetium 71 Lu	
	7		lithium beryllium 3 4 Li Be	sodium magnesium 12 Na Mg	20 C <b>a</b>	rubidium strontium yttrium zirconium niobium molybdenum technetium ruthenium rhodium palladium 37 38 39 40 41 42 43 44 45 46 46 Rb Sr Y Zr Nb Mo Tc Ru Rh Pd		radium 88 Ra
	П		lithium 3 Li	sodium 11 Na	potassium 19 K	rubidium 37 <b>Rb</b>	caesium 55 Cs	francium radium 87 88 Fr Ra
		$\vdash$	7	$\kappa$	4	5	9	7