

UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS International General Certificate of Secondary Education

	CANDIDATE NAME			
	CENTRE NUMBER		CANDIDATE NUMBER	
* 9 2	PHYSICAL SCI	ENCE	0652/22	2
7 2	Paper 2 (Core)		October/November 2013	3
2 5			1 hour 15 minutes	5
~	Candidates ans	wer on the Question Paper.		
4 3	No Additional M	aterials are required.		
*				_
	READ THESE I	NSTRUCTIONS FIRST		

Write your Centre number, candidate number and name on all the work you hand in.

Write in dark blue or black pen.

You may use a pencil for any diagrams or graphs.

Do not use staples, paper clips, glue or correction fluid.

DO NOT WRITE IN ANY BARCODES.

Answer all questions.

Electronic calculators may be used.

You may lose marks if you do not show your working or if you do not use appropriate units. A copy of the Periodic Table is printed on page 24.

At the end of the examination, fasten all your work securely together. The number of marks is given in brackets [] at the end of each question or part question.

This document consists of 24 printed pages.



1 A student investigates the composition of four different inks using paper chromatography.

Fig. 1.1 shows the results of his experiment after one hour.

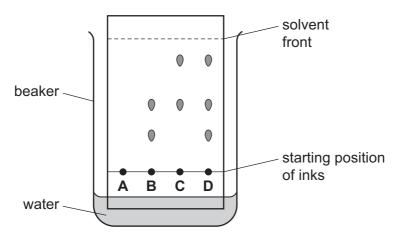


Fig. 1.1

(a) Explain why the water level in the beaker must be below the ink dots at the start of the experiment.[1] (b) Suggest why ink A did not move during the experiment. [1] (c) (i) State how many different components ink D contains. [1] (ii) State one similarity and one difference in the compositions of inks B and C. similarity difference _____ [2]

Please turn over for Question 2.

ramp 100 90 80 70 60 50 40 30 20 10 0 metre ruler Fig. 2.1 The ramp is tilted and a toy car is held at the top of the ramp. • The car is given a gentle push and it moves down the ramp.

A metre rule is clamped to a ramp. Fig. 2.1 shows the experimental set up.

- The positions of the car after successive time intervals of 0.20 s are shown.
- (a) (i) Read off the positions of the front of the car after each time interval.

Record the values, to the nearest centimetre, in Table 2.1.

Table 2.1

time/s	0.0	0.20	0.40	0.60	0.80
position / cm	99				

(ii) Describe the pattern in the data in Table 2.1 which suggests that the car is travelling at constant speed.

[2]

(iii) Calculate the speed of the car as it moves down the ramp.

Show your working in the box.

https://xtremepape.rs/

2

unit

speed =

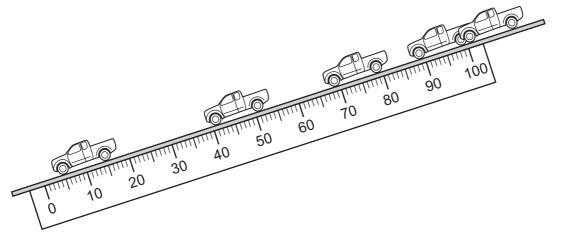


[1]

[3]

For Examiner's

- (b) In a separate experiment the angle of the ramp is increased.
 - The car is given a gentle push and it moves down the ramp.
 - Fig. 2.2 shows the positions of the car in successive 0.20 s intervals.





Describe the motion of the car in this experiment.

 [1]

https://xtremepape.rs/

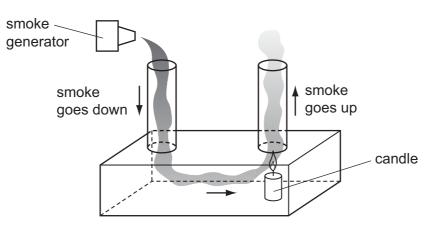
For Examiner's Use

(a)	Potassium nitrate can be made by reacting an acid with an alkali.	For Examiner's
	Name these reagents.	Use
	acid	
	alkali [2]	
(b)	State the name given to the reaction of an acid with an alkali.	
	[1]	
(c)	The potassium nitrate formed is in aqueous solution.	
	Describe how you could obtain dry crystals of potassium nitrate from this solution.	
	[2]	

Please turn over for Question 4.

For Examiner's Use

4 Fig. 4.1 shows apparatus used to demonstrate one method of transfer of thermal energy.



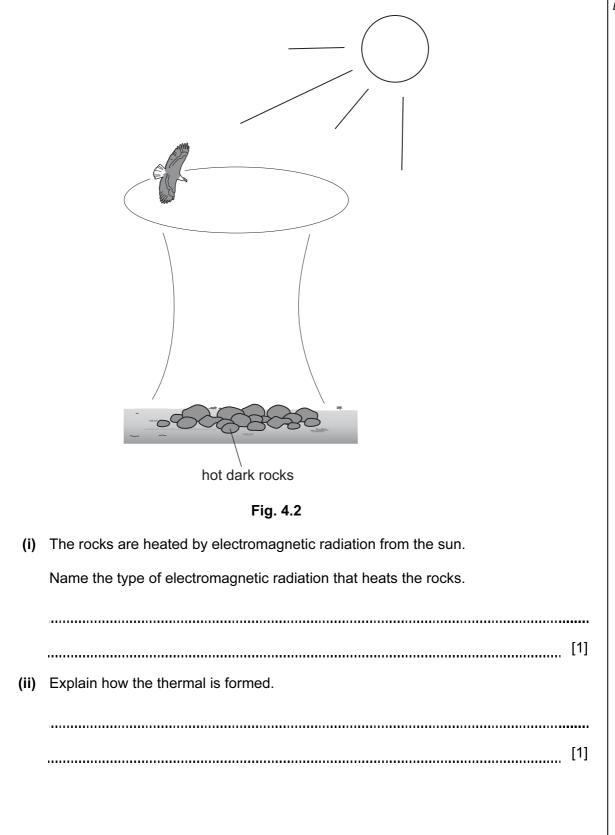


(a) (i) Name the method of thermal energy transfer this experiment demonstrates.

(ii) Explain how the candle makes the smoke rise up the right hand tube.
[1]
[1]
[3]

(b) Fig. 4.2 shows an eagle gliding round a thermal. A thermal is a column of rising hot air.

For Examiner's Use



5	Hydrogen has been described as 'a clean fuel which produces no pollution'.	For
	(a) Write a balanced equation for the burning of hydrogen in air.	Examiner's Use
		2]
	(b) State why the burning of hydrogen is an oxidation reaction.	
	[[1]
	(c) Explain why the burning of hydrogen does not produce pollution.	
]	[1]
	(d) Give one disadvantage of using hydrogen as a fuel instead of petrol.	
	[1]

shallow water deep water wavefront Fig. 6.1 (a) Name the wave behaviour this experiment demonstrates. [1] (b) State the change, if any, to these properties as the waves enter shallow water. (i) wavelength (ii) frequency (iii) speed [3] (c) Fig. 6.2 shows the electromagnetic spectrum. visible microradio waves infra-red Υ X-rays γ-rays waves

11



(i) Name the type of radiation found in region Y. [1] (ii) When the Sun moves from behind a cloud we feel an increase in warmth and see an increase in brightness at the same time. State what this suggests about the speeds of different types of electromagnetic radiation.[1]

https://xtremepape.rs/

6

the shallow water.

Fig. 6.1 shows water waves in a ripple tank. The wavefronts pass from the deep water to For Examiner's

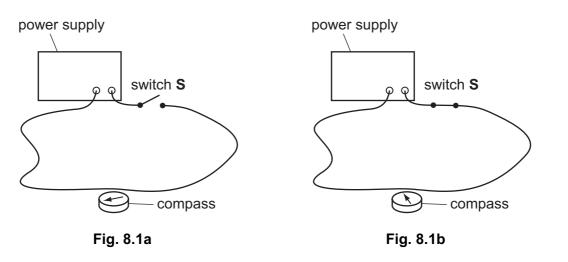
Use

Chlorine is a member of Group VII of the Periodic Table.
(a) Use the electron configuration of chlorine to explain why it is in Group VII.
[1]
(b) Chlorine is a gas at room temperature.
Name another element in Group VII that is a gas at room temperature.
[1]
(c) Name an element in Group VII that is less reactive than chlorine.
[1]
(d) (i) Name the compound formed when chlorine reacts with sodium.
[1]
(ii) Name the type of bonding in this compound.
[1]
(e) Name a metal in the same period as chlorine.
[1]

For Examiner's Use

Please turn over for Question 8.

8 Fig. 8.1a shows a long conducting wire connected to a switch and power supply. A small plotting compass is placed near the wire.



Switch ${f S}$ is closed and the plotting compass needle moves to the position shown in Fig. 8.1b.

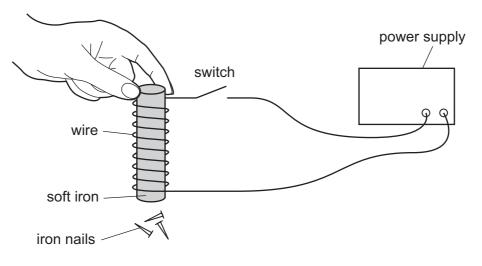
(a) State the conclusion that can be made from this experiment.

 [1]

(b) A student takes a similar wire and wraps it around a cylindrical piece of soft ion. She connects it to a switch and a power supply.

For Examiner's Use

She holds the soft iron above some light iron nails which are on the work bench, as shown in Fig. 8.2.





(i) State what the student observes when the switch is closed. Give a reason for your answer.

	observation
	reason
	[2]
(ii)	State what the student observes when the switch is opened again. Give a reason for your answer.
	observation
	reason
	[2]
(iii)	She replaces the soft iron with a steel cylinder of the same size. Describe what she observes when she
	closes the switch,
	opens the switch.
	[2]

9	(a)	The treatment of water to make it safe for domestic use involves two main steps.	For Examiner's
		Name these steps.	Use
		step 1	
		step 2 [2]	
	(b)	Anhydrous copper(II) sulfate can be used to test for the presence of water.	
		Describe the change that shows water is present.	
		[1]	
	(c)	Describe how you could show that a liquid is pure water.	
		[2]	

Please turn over for Question 10.

10 Fig. 10.1 shows a circuit diagram with a battery of e.m.f. 6.0V, an ammeter, and two resistors of 4.0Ω and 8.0Ω .

18

For Examiner's Use

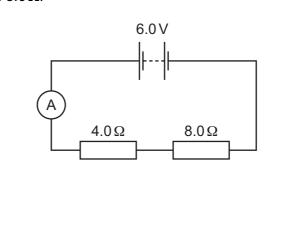


Fig. 10.1 (a) (i) Calculate the resistance in the circuit. resistance = Ω [1] (ii) Calculate the current in the circuit and give the unit. current = _____ unit ____ [2] (b) A teacher wants to show his students the potential difference across the 4.0Ω resistor. (i) Name the instrument that he should use. [1] (ii) On Fig. 10.1, show how the instrument should be connected. [1] (iii) Calculate the potential difference across the 4.0Ω resistor and give the unit. potential difference = _____ unit ____ [2]

https://xtremepape.rs/

- (c) The teacher rearranges the resistors so that they are in parallel.
 - (i) Complete Fig. 10.2 to show this circuit.



Fig. 10.2

(ii) State how the current from the battery in Fig. 10.2 compares with the current from the battery in Fig. 10.1.

Explain your answer.

[2]

Examiner's Use

[1]

For

20

(b) The alkanes are an homologous series.

Complete Table 11.1.

	1	
alkane	molecular formula	structural formula
methane		н Н-Сн Н
ethane	C ₂ H ₆	
propane		H H H HCCH H H H

Table 11.1

[3]

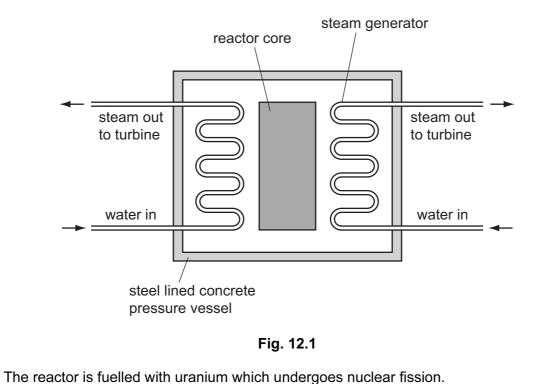
(c) State one use of methane.

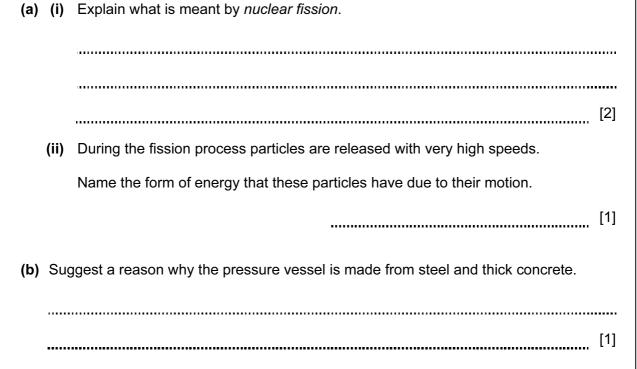
[1]

(d)	The	alkenes are another homologous series.	For
	(i)	Describe the difference in bonding between alkanes and alkenes.	Examiner's Use
		[2]	
	(ii)	Describe a chemical test to show that a compound is an alkene rather than an alkane.	
		test	
		result [2]	

https://xtremepape.rs/

12 Fig. 12.1 shows some of the principal parts of a nuclear reactor used to generate electricity.





https://xtremepape.rs/

For Examiner's Use

- **13** Potassium nitrate, KNO₃, and potassium phosphate, K₃PO₄, are both used as fertilizers.
 - (a) Calculate the relative molecular mass of potassium nitrate. [relative atomic masses, *A*_r: K, 39; N, 14; O, 16]

Write your working in the box.

answer [1]

(b) Show, by calculation, that potassium phosphate contains more than 50% potassium by mass.
 [relative atomic masses, A_r: K, 39; O, 16; P, 31;]

Write your working in the box.

[3]

For Examiner's Use

https://xtremepape.rs/

								Gr	Group								
	=											Ξ	2	>	N	١١٨	0
							- I										⁴ He
							Hydrogen 1										Helium 2
7	6											5	12	14	16	19	20
	Be											۵	ပ	z	0	L	Ne
Lithium 4	Beryllium											Boron 5	Carbon 6	Nitrogen 7	Oxygen 8	Fluorine 9	Neon 10
23	24	1										27	28	31	32	35.5	40
	Mg											٩ı	Si	₽.	S	10	Ar
Sodium 12	Magnesium 12											Aluminium 13	Silicon 14	Phosphorus 15	Sulfur 16	Chlorine 17	Argon 18
$\left \right $	40	45	48	51	52	55	56	59	26	64	65	70	73	75	79	80	84
×	Ca	Sc	i	>	ŗ	Mn	Fe	ပိ	ïZ	Cu	Zn	Ga	9 Ge	As	Se	Ъ	Kr
Potassium 20	Calcium 0	Scandium 21	Titanium 22	Vanadium 23	Chromium 24	Manganese 25	lron 26	Cobalt 27	Nickel 28	Copper 29	Zinc 30	Gallium 31	Germanium 32	Arsenic 33	Selenium 34	Bromine 35	Krypton 36
	88	89	91	93	96		101	103	106	108	112	115	119	122	128	127	131
	Sr		Zr	qN	Mo	Чc	Ru	Rh	Pd	Ag	ပိ	п	Sn	Sb	Te	н	Xe
Rubidium 36	Strontium 38	Attrium 39	Zirconium 40	Niobium 41	Molybdenum 42	Technetium 43	Ruthenium 44	Rhodium 45	Palladium 46	Silver 47	Cadmium 48	Indium 49	50 Tin	Antimony 51	Tellurium 52	lodine 53	Xenon 54
133	137	139	178	181	184	186	190	192	195	197	201	204	207	209			
Cs	Ba	La	Ηf	Та	≥	Re	0s	Ľ	Ł	Au	Hg	11	Ъb	Bi	Ро	At	Rn
Caesium 56	Barium 6	Lanthanum 57 *	Hafnium 72	Tantalum 73	Tungsten 74	Rhenium 75	Osmium 76	Iridium 77	Platinum 78	Gold 79	Mercury 80	Thallium 81	Lead 82	Bismuth 83	Polonium 84	Astatine 85	Radon 86
	226	227															
ŗ	Ra	Ac															
Francium 88	Radium 8	Actinium 89 †															
1 an	thanoid	*58-71 Lanthanoid series		140	141	144		150	152	157	159	162	165	167	169	173	175
	+ 00-103 Actinoid correction	ariae		မီ	Pr	Nd	Pm	Sm	Еu	gd	Tb	ð	Р	ш	Ta	٩۲	Lu
		001100		Cerium 58	Praseodymium 59	Neodymium 60	Promethium 61	Samarium 62	Europium 63	Gadolinium 64	Terbium 65	Dysprosium 66	Holmium 67	Erbium 68	Thulium 69	Ytterbium 70	Lutetium 71
S		a = relative atomic mass	c mass	232		238											
×		X = atomic symbol	ol	Th	Ра		Np		Am	CB		ç		Fm	Md	No	Ļ
q	- р	b = proton (atomic) number	c) number	Thorium	Protactinium 0.1	Uranium	Neptunium 03	Plutonium	Americium Q.5	Curium	Berkelium 07	Californium	Einsteinium	Fermium 100	Mendelevium 101	Nobelium	Lawrencium

Permission to reproduce items where third-party owned material protected by copyright is included has been sought and cleared where possible. Every reasonable effort has been made by the publisher (UCLES) to trace copyright holders, but if any items requiring clearance have unwittingly been included, the publisher will be pleased to make amends at the earliest possible opportunity.

University of Cambridge International Examinations is part of the Cambridge Assessment Group. Cambridge Assessment is the brand name of University of Cambridge Local Examinations Syndicate (UCLES), which is itself a department of the University of Cambridge.

0652/22/O/N/13

© UCLES 2013

https://xtremepape.rs/

DATA SHEET lic Table of the Elements