

CANDIDATE NAME

UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS International General Certificate of Secondary Education

Middle Con

 ٠
i
ı
ı
į
 i
ï
ı
 i
į
i
ï
ŀ
i
 ı
ı
į
 ۰

CENTRE NUMBER			CANDIDATE NUMBER			
				-		

PHYSICAL SCIENCE

0652/02

Paper 2 (Core)

October/November 2007

1 hour 15 minutes

Candidates answer on the Question Paper.

No Additional Materials are required.

READ THESE INSTRUCTIONS 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 soft pencil for any diagrams, graphs, tables or rough working.

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

DO **NOT** WRITE IN ANY BARCODES.

Answer all questions.

A copy of the Periodic Table is printed on page 16.

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.

For Examiner's Use		
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
Total		

This document consists of 15 printed pages and 1 blank page.



1 Fig. 1.1 shows the speed of a car as it moves along a straight, level track.

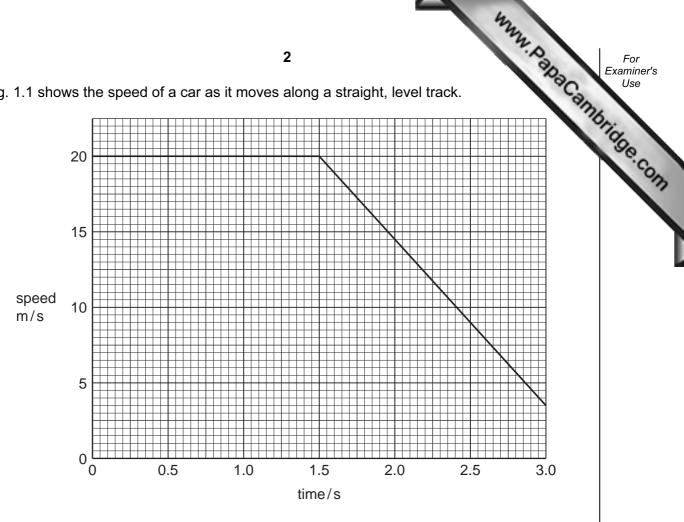


Fig. 1.1

(a)	What was the initial speed of the car? m/s	[1]
(b)	Describe the motion of the car during	
	(i) the first 1.5 s,	•••••
	(ii) from 1.5s to 3.0s.	
		[3]
(c)	Calculate the distance the car travelled in the first 1.5 s. Show your working.	

distance =	unit	[3]

(a) Balance this equation for the burning of methane in a limited supply of air. 2

(b) Explain why it is dangerous to release carbon monoxide into the air.

WWW.D	
3	For Examiner's
Balance this equation for the burning of methane in a limited supply of air.	Use
$CH_4 +O_2 \longrightarrowH_2O +CO$	Tide
Explain why it is dangerous to release carbon monoxide into the air.	Se.Com

(c) Name the compound of carbon formed when methane burns in a plentiful supply of air.

______[1]

3 Complete Table 3.1 by giving the formula of each of these pollutants, naming a source of each, and a problem caused by releasing each into the atmosphere.

Table 3.1

pollutant	formula	source	problem
sulphur dioxide			
nitrogen dioxide			

[6]

Fig. 4.1 shows a view from above as a set of ripples move out from a point when a thrown into a pond.

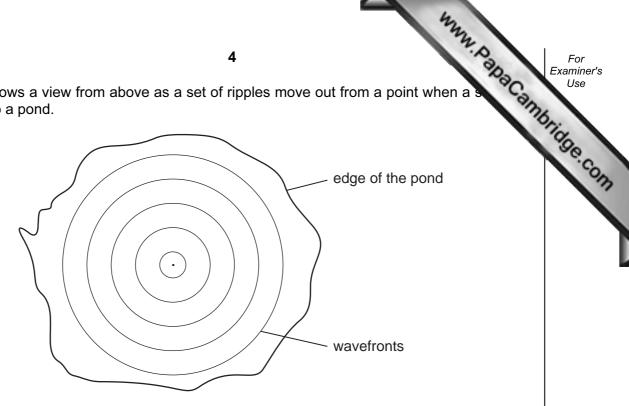


Fig. 4.1

- (a) (i) Mark on Fig. 4.1 one wavelength and label it λ .
 - (ii) A boy counts 12 waves hitting the bank in 5.0 s. Calculate the frequency of the waves. Show your working.

	fr	equency =		unit	 [4]
(b)	The water is shallower near the b Suggest what effect that this will		ne waves slow dov	vn.	
	(i) the wavelength of the waves,				
((ii) the frequency of the waves.				
					[2]

5 Fig. 5.1 shows three test-tubes with pieces of different metal foil added to so containing metal ions.

The observations seen in each test-tube are also given.

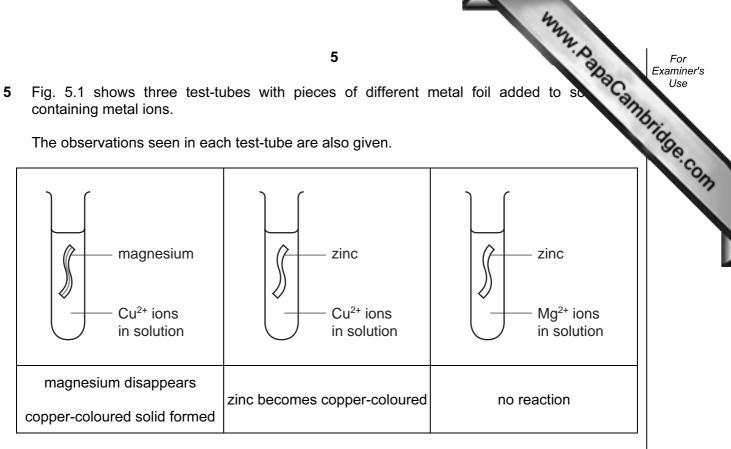
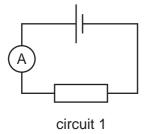
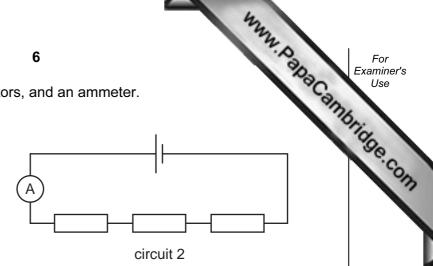


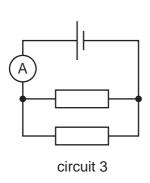
Fig. 5.1

(a)	Use the results to work out the order of reactivity of the three metals.			
	most reactive			
	least reactive	2]		
(b)	Complete this equation for the reaction when magnesium is added to aqueou $copper(\Pi)$ sulphate.	s		
	Mg + CuSO ₄ → + [1]		
(c)	What happens when a piece of copper foil is put into a solution containing magnesiur ions?	n		
	[1]		

6 A student has a cell, three identical resistors, and an ammeter. He builds the circuits shown in Fig. 6.1.







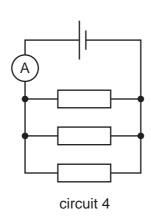


Fig. 6.1

(a) (i) In which circuit is the ammeter reading the highest?

(ii) Explain your answer.

	[3]

(b) The student now rebuilds circuit 2 as shown in Fig. 6.2.

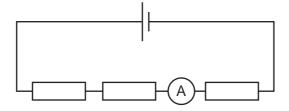


Fig. 6.2

Explain, giving a reason, how the ammeter reading compares with the reading in the original circuit 2.

(c) He now rebuilds circuit 3, as shown in Fig. 6.3.

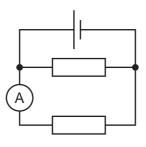


Fig. 6.3

Explain, giving a reason, how the ammeter reading compares with the reading in the original circuit 3.

- Sodium is an element in Group I of the Periodic Table. 7
- www.PapaCambridge.com (a) Complete Table 7.1 for an atom of sodium by reference to the Periodic Table shown page 16.

Table 7.1

proton (atomic) number	
relative atomic mass	
number of neutrons in the nucleus	
arrangement of electrons in shells	

[4]

(b) Write down the name and symbol of a Group I element which is less reactive than sodium.

name	
symbol	[2]

8 Fig. 8.1 shows the apparatus used to compare the penetration of different radioactive emissions.

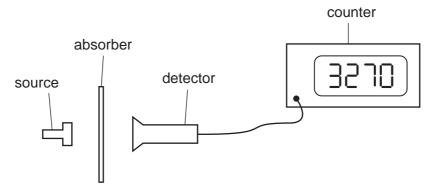


Fig. 8.1

Table 8.1 shows the count obtained in 2 minutes using different sources, with different absorbers.

Table 8.1

source	count with no absorber	count with paper absorber	count with aluminium absorber	count with lead absorber	
krypton-85	3270	3268	14	12	
americium-240	5854	1649	1644	103	

		*	
		9 State, with reasons, the type or types of radiation emitted by the krypton	For Examin
(a)	(i)	State, with reasons, the type or types of radiation emitted by the krypton source.	Use
			26.
	(ii)	State, with reasons, the type or types of radiation emitted by the americium-240 source.	
		[6]	
(b)	Car	re must be taken when handling or storing radioactive materials.	
	(i)	State one precaution which must be used when handling radioactive materials.	
	(::\		
	(ii)	State one precaution which must be used when storing radioactive materials.	
		[2]	

9

www.PapaCambridge.com Ethane and ethene are gases which can be obtained from crude oil. (a) State the formula of ethene. (b) Describe the difference in the structures of ethane and ethene. **(c)** Describe a test to distinguish between ethane and ethene. test result with ethene result with ethane [3] (d) What do we call the process of making poly(ethene) from ethene? [1]

[3]

10 Fig. 10.1 shows the structure of a cathode ray tube.

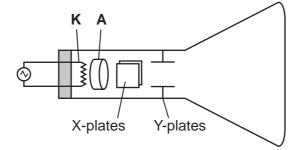


Fig. 10.1

(a)	Explain how parts K and A produce	cathode rays.	
			••
			••
		[4	+J
(b)	Fig. 10.2a and Fig. 10.2b show oscilloscope. The settings of the oscilloscope are	two waveforms displayed on the cathode ray	у
	Fig. 10.2a	Fig. 10.2b	
	(i) State, giving a reason, which o	f the waves has the greater amplitude.	
	,		
	4D 01 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		
	(ii) State, giving a reason, which o	f the waves has the greater frequency.	•••

11 Limestone is an important raw material.

		*	
		ne is an important raw material. e the name and formula of the main calcium compound present in limestone. ne	1
Lim	estoi	ne is an important raw material.	Car
(a)	Give	e the name and formula of the main calcium compound present in limestone.	13
	nam	ne	•
	form	nula	[2]
(b)	(i)	How can calcium oxide (lime) be made from limestone?	
			[1]
	(ii)	What needs to be added to calcium oxide to make calcium hydroxide (slat lime)?	ked
			[1]
	(iii)	The reaction to make calcium hydroxide is exothermic. What does <i>exothermic</i> mean?	
			[1]
(c)	Why	y do farmers sometimes spread calcium hydroxide on the soil in their fields?	
			[1]

12 Fig. 12.1 shows a ray of light incident on a parallel sided glass block.

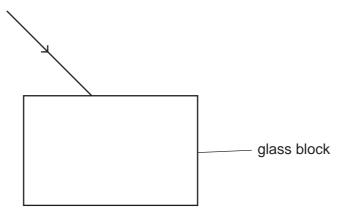


Fig. 12.1

- (a) Complete the path of the light as it passes through and leaves the block.
- [3]

- (b) Mark on Fig. 12.1
 - (i) the angle of incidence and label it i,
 - (ii) the angle of refraction and label it r.

[2]

				4	2
			1	14	A. Day
3	Chl	orine is	a reactive element in Group VII of t	the Periodic Table.	SaCa.
	(a)	Why is	chlorine often added to drinking wa	ater supplies?	MM. PapaCanne
	(b)	Comple substar		type of bonding present in eac	
			Table	e 13.1	
			substance	type of bonding present	
			chlorine		
			hydrogen chloride		
			sodium chloride		
					[2]
	(c)	(i) Wh	nat is the symbol for a chloride ion?	?	
					[1]
		(ii) Ho	w many electrons are in the outer	shell of a chloride ion?	
		,,,,,			[1]
			w is the electron structure of Grouss such as a chloride ion?	up 0 elements such as neon simila	ar to that of
		••••			
					[2]

BLANK PAGE

www.PapaCambridge.com

	Elements
DATA SHEET	The Periodic Table of the

		an F	4		. 5		- -		<u>-</u> E
	0	4 He lium	9	40 Ar Argon	84 K rypto	131 Xenon Xenon	Radon 86		175 Lu Lutetium
	II/		19 Fluorine	35.5 C1 Chlorine	80 Br Bromine 35	127 I lodine			Yb Ytterbium
			16 Oxygen 8	32 Sulphur 16	79 Se Selenium 34	128 Te rellurium	Po Polonium 84		169 Tm Thulium
	>		14 N Nitrogen 7	31 P Phosphorus 15	75 AS Arsenic 33		209 Bis Bismuth		167 Er Erbium
	>		12 Carbon	28 Si icon	73 Ge Germanium	30 Sn Tin 50	207 Pb Lead 82		165 Ho Holmium
	≡		11 Boron 5	27 A1 Aluminium	70 Ga Gallium 31	115 In Indium	204 T 1 Thallium		162 Dy Dysprosium
					65 Zn Zinc 30	_			159 Tb
					64 Copper	108 Ag Silver	197 Au Gold		157 Gd Gadolinium
Group					59 X Nickel	106 Pd Palladium 46	195 Pt Platinum 78		152 Eu Europium
Gre					59 Co Cobatt	Rhodium 45	192 Ir Irdium		150 Sm Samarium
		1 Hydrogen			56 Fron Iron	Ruthenium	190 OS Osmium 76		Pm Promethium
					Mn Manganese	Tc Technetium 43	186 Re Rhenium 75		144 Neodymium
					Cr Chromium 24	96 Mo Molybdenum 42	184 W Tungsten 74		141 Pr Praseodymium
					51 V Vanadium 23	93 Niobium 41	181 Ta Tantalum 73		140 Ce
					48 T Titanium 22	2 r Zrconium 40	178 Hf Hatnium * 72		
					Scandium 21	89 < Yttrium 39	139 La Lanthanum 57 **	227 Ac Actinium 89	series eries
	=		Be Beryllium	24 Mg Magnesium	40 Ca Calcium	Sr Strontium	137 Ba Barium 56	226 Ra Radium 88	*58-71 Lanthanoid series
	_		7 L.i Lithium	23 Na Sodium	39 K Potassium 19	85 Rb Rubidium 37	133 Cs Caesium 55	Francium 87	*58-71 L ₂
									·

The volume of one mole of any gas is 24 dm³ at room temperature and pressure (r.t.p.).

www.papaCambridge.com

7

2

69

89

65

Samarium 62

Praseodymium 59

28

a = relative atomic mass X = atomic symbol

Key

Ø

Fm

Es

Californium 98 ರ

BKBerkelium
97

Curium

Am

PuPlutonium
94

Neptunium

Ра

232 **7** Thorium

90

b = proton (atomic) number

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.