

UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS International General Certificate of Secondary Education

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CENTRE NUMBER	-	PHYSICA

NAME

CANDIDATE

CANDIDATE NUMBER

ICAL SCIENCE

Paper 2 (Core)

0652/02 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		
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Total		

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



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

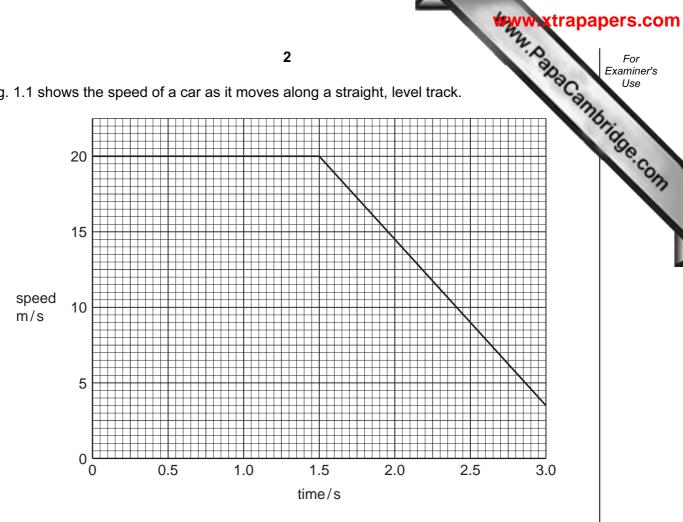


Fig. 1.1

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

[3] distance = unit

[2]

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

.....CH₄ +O₂
$$\longrightarrow$$
H₂O +CO

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

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 set of ripples move out from 4 thrown into a pond.

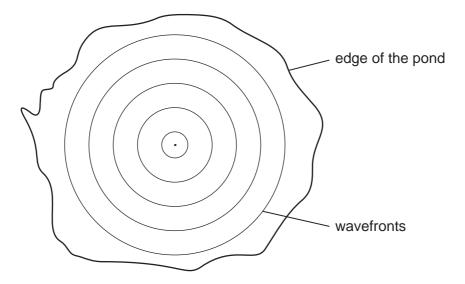


Fig. 4.1

- (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.

	Т	requency =		unit	 [4]
(b)	The water is shallower near the Suggest what effect that this will		ne waves slow dov	wn.	
	(i) the wavelength of the waves,				
	ii) the frequency of the waves.				
					1.71

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.

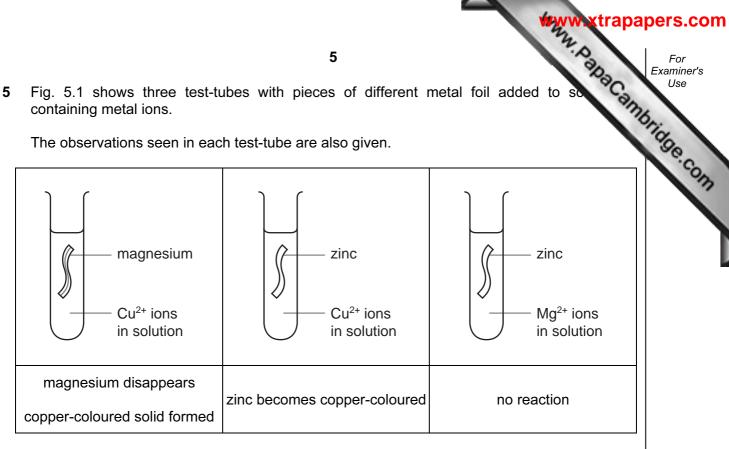
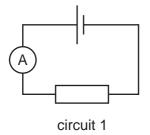
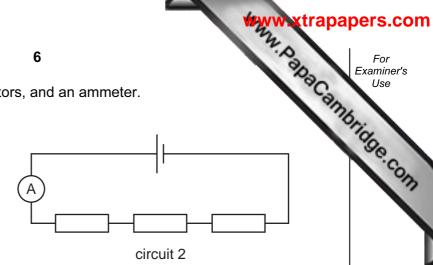


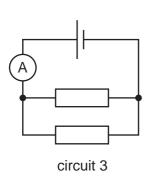
Fig. 5.1

(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 aquecopper(II) sulphate.	ous
	Mg + CuSO₄ → +	[1]
(c)	What happens when a piece of copper foil is put into a solution containing magnes ions?	um
		[1]

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







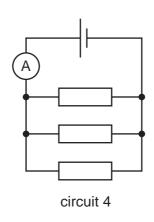


Fig. 6.1

(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.

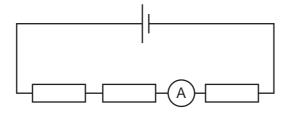


Fig. 6.2

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

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

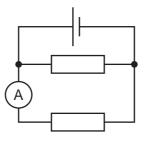


Fig. 6.3

Explain, giving a reason, how the ammete priginal circuit 3.	r reading	compares	with the	reading in	the
					[2]

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

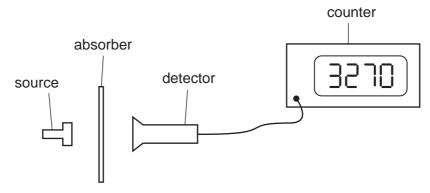


Fig. 8.1

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

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		9 For Examiner's
(a)	(i)	9 State, with reasons, the type or types of radiation emitted by the krypton source.
		Take Co.
	(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

For Examiner's Use 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]

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

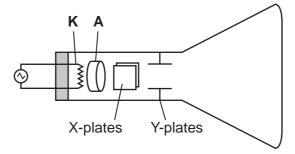


Fig. 10.1

(a)	Explain how parts K and A produce cathode rays.	
		······ [4]
		[4]

(b) Fig. 10.2a and Fig. 10.2b show two waveforms displayed on the cathode ray oscilloscope.

The settings of the oscilloscope are the same in each case.

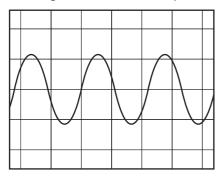


Fig. 10.2a

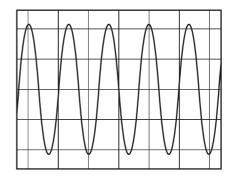


Fig. 10.2b

(i)	State, giving a reason, which of the waves has the greater amplitude.
(ii)	State, giving a reason, which of the waves has the greater frequency.
	[3]

11 Limestone is an important raw material.

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		12 AM-D	For Examiner's Use
Lim	nesto	ne is an important raw material.	Use
(a)	Give	e the name and formula of the main calcium compound present in limestone.	MATE
	nan	ne	Be Co
	forn	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 (slaklime)?	ked
			[1]
	(iii)	The reaction to make calcium hydroxide is exothermic. What does <i>exothermic</i> mean?	
			[1]
(c)	Wh	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.

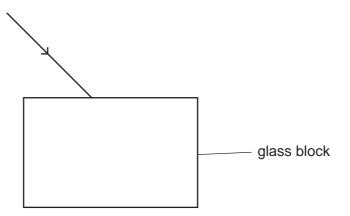


Fig. 12.1

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

[3]

13 Chlorine is a reactive element in Group VII of the Periodic Table. (a) Why is chlorine often added to drinking water supplies?

(b) Complete Table 13.1 by naming the type of bonding present in each of these substances.

Table 13.1

substance	type of bonding present
chlorine	
hydrogen chloride	
sodium chloride	

[1] [1]

[2]

(c) (i) What is the symbol for a chloride ion? (ii) How many electrons are in the outer shell of a chloride ion? (iii) How is the electron structure of Group 0 elements such as neon similar to that of ions such as a chloride ion?

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	Elements
DATA SHEET	Table of the
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	0	4 He Heium	20 Neon 10 Ar Argan	Krypton 36 Krypton 36 Xe x Xenon 24 Xe Xenon 254 Xe Xenon 254 Xe Xenon 254 Xe Xenon 254 Xenon 254 Xenon 255 Xenon 25	Lutetium 71 Lutetium 71 Luterium 71 Luterium 71 Luterium 103
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			16 Oxygen 8 32 Sulphur 16	79 Selection 34 Tablerium 34 Polonium 84 Polonium 84	Tm Trulium 69 Md Merdelevium 101
	>		14 Nitrogen 7 31 P Phosphorus 15	75	167 Er Erbium 68 Fam Famum 100
	2		12 Carbon 6 28 Si	73 Germanium 32 T19 T19 Sn Tin 50 Tin 82 Lead	Hombun of Hombun
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