Centre No.			Paper Reference					Surname	Initial(s)			
Candidate No.			6	2	5	1	/	0	1	Signature		

Paner Reference(s)

6251/01 Edexcel GCE

Chemistry (Nuffield)

Advanced Subsidiary

Unit Test 1

Thursday 18 January 2007 – Morning

Time: 1 hour 15 minutes

Materials required for examination	Items included with question papers
Nil	Nil

A calculator may be used.

Instructions to Candidates

In the boxes above, write your centre number, candidate number, your surname, initial(s) and your signature.

Answer **ALL** the questions. Write your answers in the spaces provided in this question paper. Final answers to calculations should be given to an appropriate number of significant figures.

Information for Candidates

A Periodic Table is printed on the back cover of this question paper.

The marks for individual questions and the parts of questions are shown in round brackets: e.g. (2). The total mark for this paper is 60. There are 16 pages in this question paper. Any blank pages are indicated.

Advice to Candidates

You are advised to show all steps in any calculations.

You will be assessed on your ability to organise and present information, ideas, descriptions and arguments clearly and logically, taking account of your use of grammar, punctuation and spelling.

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Turn over

Total

Examiner's use only

Team Leader's use only

Question Number

1

2

3

4

5

6

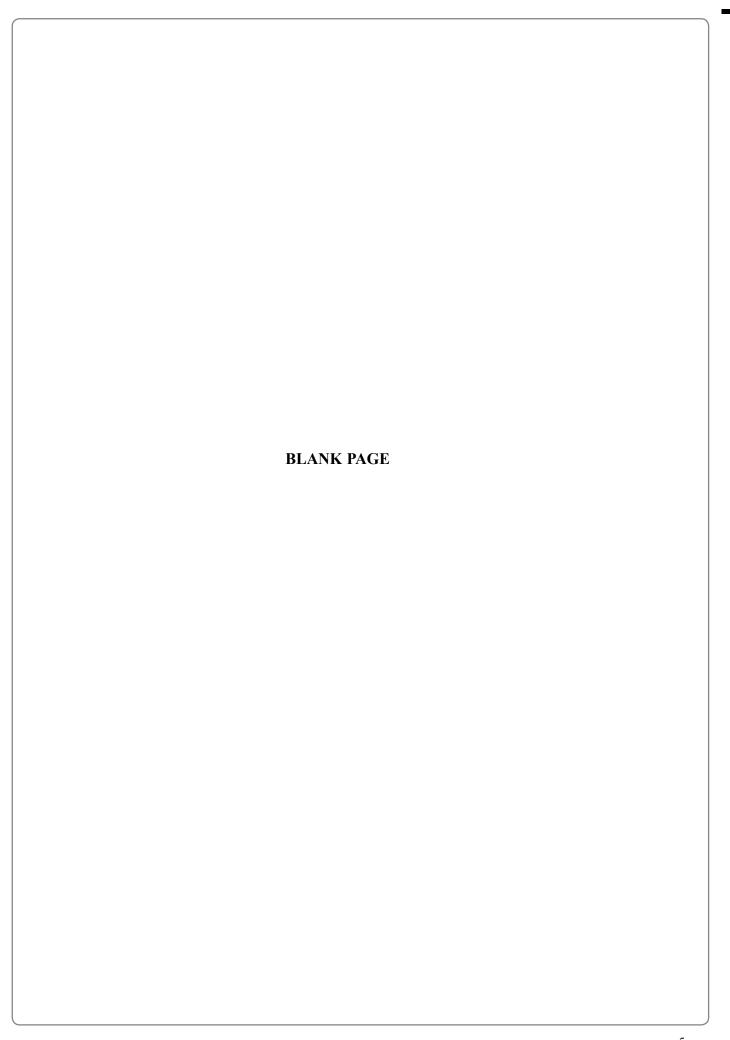


		Answer ALL the questions. Write your answers in the spaces provided.			ınk
		SECTION A			
1.	(a)	What is the formula of the ion found in all acidic solutions?			
			(1)		
	(b)	Which of the following substances would form an acidic solution in water?			
		A CH_4 B $NaOH$ C HCO_2H D NH_3 E HNO_3			
			(2)	Q1	
			marks)		
2.	(a)	What is the formula for strontium fluoride? Use the Periodic Table as a source of information.			
			(1)		
	(b)	Draw a 'dot and cross' diagram for the fluoride ion. Include all electrons and the charge on the ion.			
			40		
		(Total 2	(1) marks)	Q2	
		(10tai 2	marks)		

zide, NaN ₃ , is used to inflate air bags in cars because, in a collision, taide decomposes rapidly to produce nitrogen gas.		
$2NaN_3(s) \longrightarrow 2Na(s) + 3N_2(g)$		
Calculate the mass of one mole of sodium azide, NaN ₃ . Jse the Periodic Table as a source of data.	(i)	(a)
What mass of sodium azide would be needed to liberate 48 dm ³ of nitrogen? Molar volume of a gas is 24 dm ³ mol ⁻¹ at room temperature and pressure]	(ii	
safety problem would arise when disposing of the air bag after a collision your answer.		(b)
safety problem would arise when disposing of the air bag after a collision		(b)
safety problem would arise when disposing of the air bag after a collision		(b)
safety problem would arise when disposing of the air bag after a collision		(b)
safety problem would arise when disposing of the air bag after a collision by your answer.		(b)
safety problem would arise when disposing of the air bag after a collision		(b)

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	SECTION B
	neral carnallite is an ore which can be used to produce potassium. Its formula is $gCl_2.xH_2O$ where x is the number of moles of water of crystallisation in one mole allite.
wc	e mass of one mole of carnallite is 277.5 g. Calculate the value of x. Show your orking. e the Periodic Table as a source of data.
	(2)
	rnallite is soluble in water. Give the formulae of all the ions present in the solution med.
	(2)
	flame test was carried out on a solid sample of carnallite, using nichrome wire as a port.
(i)	What substance would you use to clean the wire?
	(1)
(ii)	What colour would you expect to see in the flame test? Justify your answer by considering the metal ions present in carnallite.
	(2)
	(Total 7 marks)



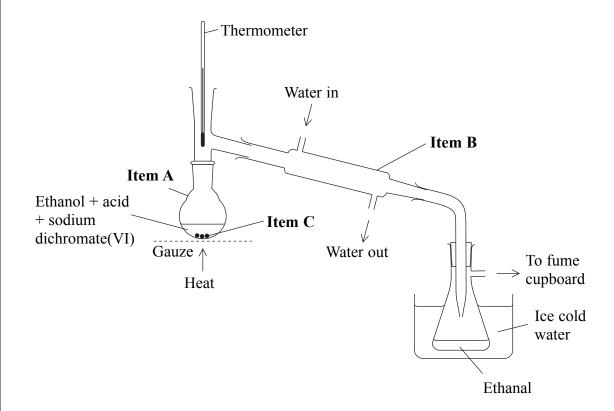


aı.	What is the name given to atoms of the same element with different mass n						
(u)	** 11	at is the name given to atoms of the same element with different mass numbers?					
		(1)					
b)	Hov	w many neutrons are there in an atom of gallium with mass number 71?					
		(1)					
(c)	(i)	What instrument would be used to obtain the percentage composition of the gallium sample?					
		(1)					
	(ii)	Calculate the average atomic mass of gallium in this sample. Show your working and give your answer to 3 significant figures .					
		(2)					
		(2)					

(d)	(i)	Complete the electron configuration of a gallium atom, using the s p d notation.	Leav blan
		1s ²	
		(2)	
	(ii)	Write a balanced equation which represents the change that corresponds to the first ionisation energy of gallium. Include state symbols in your answer.	
		(2)	
	(iii)	The first four ionisation energies, in kJ mol ⁻¹ , of the Group 3 elements gallium and indium and the Group 4 elements germanium and tin are shown below.	
		A 558 1821 2705 5200 B 579 1979 2963 6200	
		C 709 1412 2943 3930 D 762 1537 3302 4411	
		Which set of figures, A, B, C or D, represents gallium?	
		(1)	Q
		(Total 10 marks)	

6. Ethanol, C₂H₅OH, can be converted into ethanal, CH₃CHO, if it is heated with an acid and sodium dichromate(VI) solution, provided that the ethanal is immediately distilled off.

A possible arrangement of apparatus for this experiment is shown below. However, it is incompletely labelled and the diagram contains some errors. You may assume that the apparatus is correctly clamped.



(a) What are the names of the three items labelled A, B and C?

A	 	
B		
C	 	
		(3)



	(3)
(c) V	Which acid should be used?
(-)	
	(1) What type of reaction is the conversion of ethanol to ethanal? Justify your answer by considering their formulae.
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	-	eriment was carried out to find the enthalpy change for the reaction of zinc powder pper(II) sulphate solution.	Le bl
		$Zn(s) + CuSO_4(aq) \longrightarrow ZnSO_4(aq) + Cu(s)$	
p	oolystyr of zinc	of copper(II) sulphate solution, of concentration 1.0 mol dm ⁻³ , was put into a rene cup and the temperature of the solution measured. After one minute, 5.0 g powder was added, the mixture stirred with a thermometer and the temperature ed every 30 s.	
((a) (i)	What is meant by a spectator ion?	
		(1)	
	(ii)	Give the formula of the spectator ion in this reaction.	
	(iii)	(1) Write the equation for this reaction, omitting the spectator ion.	
(b) Hov	(1) w would you measure the 50 cm ³ of copper(II) sulphate solution?	
		(1)	
(TWO reasons why it is better to use a polystyrene cup, rather than a metal stainer, to obtain more accurate results.	
		(2)	

(d)	(i)	Calculate the number of moles of each of the reactants and hence deduce which reactant is completely used up. Use the Periodic Table as a source of data. Moles of zinc powder	Leave blank
		Moles of copper(II) sulphate	
		Reactant used up(3)	
	(ii)	Give the colour changes you would expect to see as the reaction progresses.	
		Solution from to	
		Solid from to	

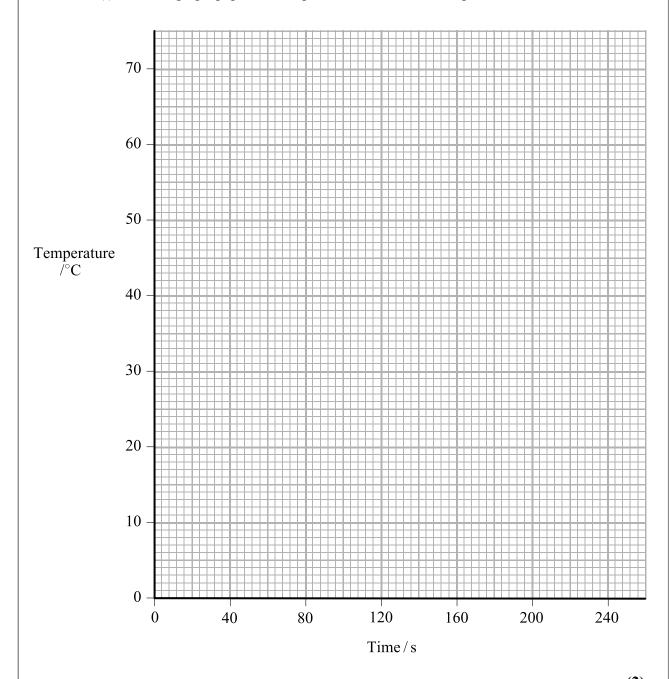
(2)

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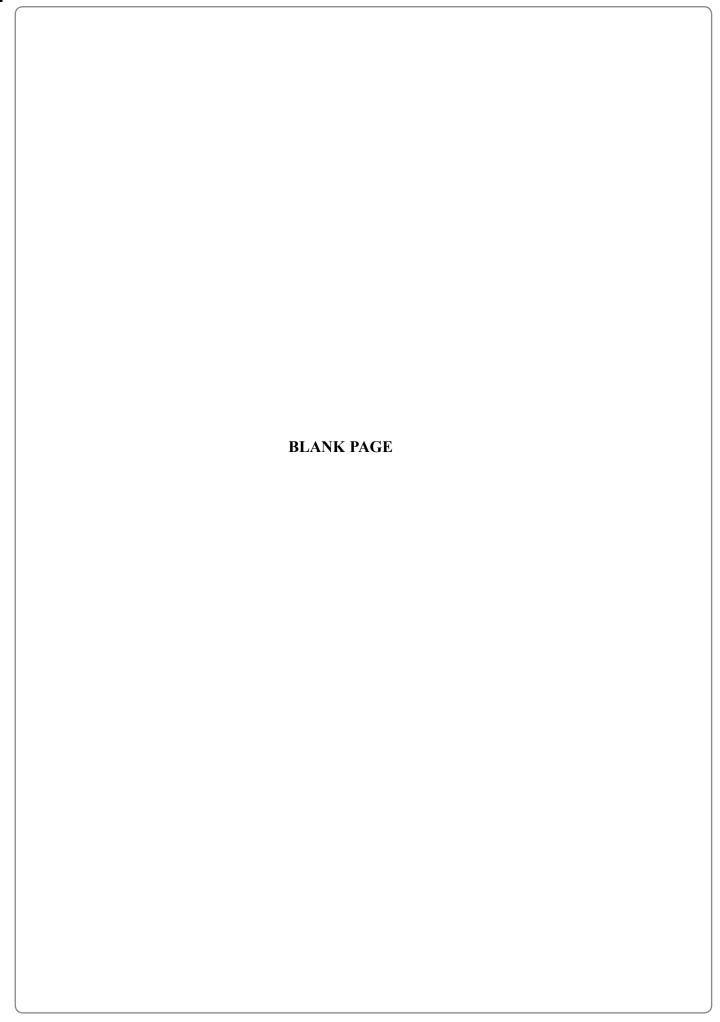
(e) The following results were obtained.

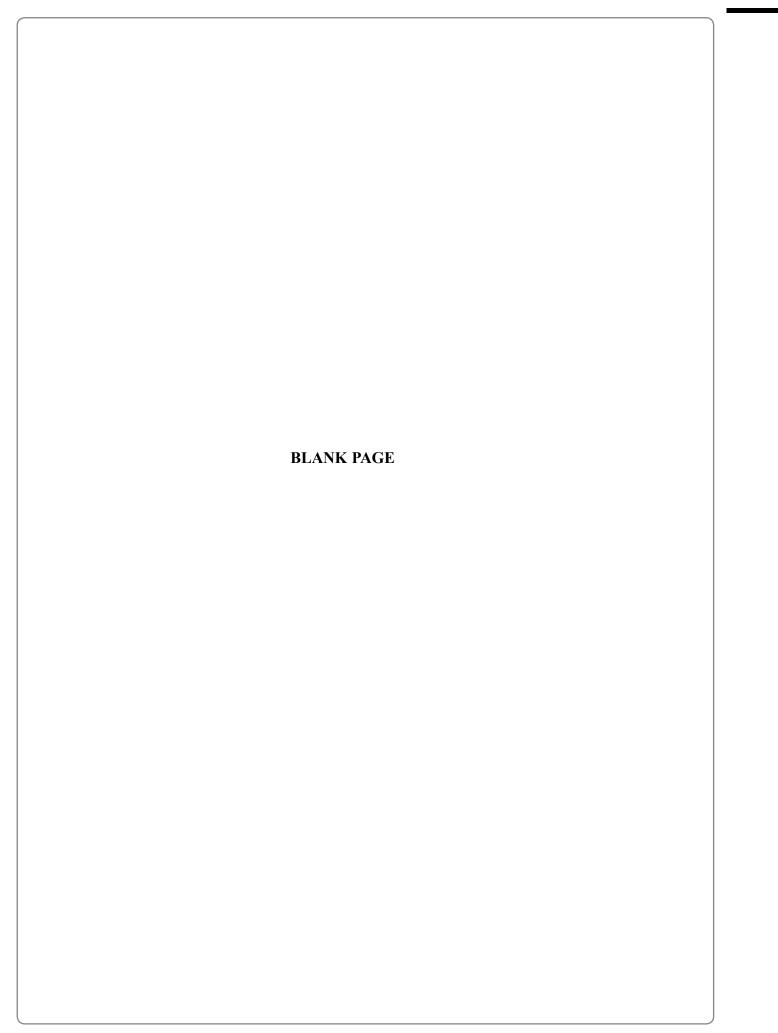
Time/s	0	60	90	120	150	180	210
Temperature /°C	22	22	60	65	63	61	59

(i) On the graph paper below, plot the results of this experiment.



(ii) Explain the shape of your graph	
	(2)
(iii) The maximum recorded temperature in this experim graph to estimate a more accurate maximum temperat	
	(1)
(f) (i) Calculate the energy change in this experiment using the relationship	your answer to (e)(iii) and
energy change = mass of \times specific heat capacity solution of solution /J /g /J $^{\circ}$ C ⁻¹ g ⁻¹	y × temperature rise
You may assume that	
 1.0 cm³ of solution has a mass of 1.0 g The specific heat capacity of the solution is 4.2 J 	°C ⁻¹ g ⁻¹
	(1)
(ii) Use your answers to (d)(i) and (f)(i) to calculate ΔH f sign and units in your answer.	for this reaction. Include a
	(3)
	(Total 20 marks)
	ECTION B: 50 MARKS OR PAPER: 60 MARKS
END	







7	ſ	H Hydrogen	3 4 Li Be Beylium Beylium	11 12 Na Mg Sodium Magnesium 23 24	19 20 21 22 23	38 39 40 Sr Y Zr Strontium Yttrium Zirconium 88 89 99	57 72 La Hf Hartinum 139 178	105 104 105	Eanthanide Cerium Praseo-elements 140 dymium	P► Actinide Thorium Protectinum 232 (231)
					24 Cr Um Chromium 52	Molybdenum	74 W Tungsten 184	D Unh Undil-	60 Nd o- Neodymium m 144	92 U nium Uranium 238
THE	Key	Atomic Number Symbol Name Molar mass in	g mo		25 Mn Manganese 55	43 TC Fechnetium (99)	75 Re Rhenium 186		Promethium S: (147)	93 Np Neptunium (237)
IE PERI		nber s in			26 Fe 56	Ē		1	Sm Eu	94 Plutonium An (242)
THE PERIODIC TABLE					CO Cobalt Nices			1	Eu Gado	Am Cu
ABLE		•			Nickel Copper 59 63.5	_	E		64 65 Gd Tb Gadolinium Terbium	96 97 Cm Bk Curium Berkelium (247) (245)
					30 June Zinc Sinc 65.4	٥	>		66 Dysprosium Dysprosium	SE 98 CF In Californium (251)
ო			5 Boron 11	13 AI Aluminium 27	Ga Gallium			1	67 HO Holmium	99 Einsteinium (254)
4			Carbon	Silicon 28	ő	-		ļ	68 Erbium	Fm Fermium (253)
ம			7 Nitrogen	15 P Phosphorus 31	<u> </u>		83 Bismuth 209		E9 Thulium	101 Md Mendelevium (256)
ဖ			8 Oxygen 16	16 Sulphur 32		52 Te Tellurium 128	Polonium (210)		70 Yb Ytterbium	102 No Nobelium (254)
7			9 Fluorine	17 Cl Chlorine 35.5		1	85 At Astatine (210)		71 Lu Lutetium 175	103 Lr Lawrencium (257)
0	1	Helium 4	Neon S	Argon 40	% Krypton 84	Xenon Xenon 131	Radon (222)			

