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GENERAL CERTIFICATE OF ADVANCED LEVEL	EDUCATION (GC LEXAMINATION	E) BOARD	
SUBJECT TITLE CHEMISTRY	SUBJECT CODE 0715	PAPER NUMBER	.7"
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Verify that this booklet contains six questions, no question inform the invigilator in case this booklet contains less the blank pages so that the booklet should be changed. Blank spaces in this question booklet may be used for rough we note that the steps in your wall necessary working must be shown. No marks will be shown.	work.	s are repeated or there are	an arriva
All necessary working must be shown. No marks will be awarenswers have been obtained. Calculators may be used.	nen 1.50 g of ethyl ethann		the
Calculators may be used. Useful Data Calculative stomic messes (DAM)	nen 1.50 g of ethyl ethans. = 12 0, H= 1.6 Q= 16.0	C. The percentage yield will 0.63 g of ethanol. (RAM: 0.63 g of ethanol.)	the
Calculators may be used. Useful Data Calculative stomic messes (DAM)	mode lights to g 02.1 non 001-001-H,021-	C. The percentage yield will 0.63 g of ethanol. (RAM: 0.63 g of ethanol.)	the
Calculators may be used. Useful Data Relative atomic masses (RAM) C = 12.0, O = 16.0, H = 1.0, Na=23.0,	WWW.gCerev	C. The percentage yield will 0.63 g of ethanol. (RAM: 0.63 g of ethanol.)	the

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SECTION A: PHYSICAL AND GENERAL CHEMISTRY

1. (a) Define the term "mole of a su	ibstance"	
		(1 mark)
(b) 1.50 g of ethyl ethanoate was up to 250 cm ³ with distilled w	hydrolysed with 50.0 cm ³ of 0.5 M NaOlyater in a volumetric flask.	H solution and the mixture was made
Calculate:		
	l ethanoate in 1.50 g. (RMM: CH ₃ CO ₂ C ₂ l	
		<u> </u>
B: The number of moles of NaO		
C: The percentage yield when 1. 0.63 g of ethanol. (RAM: C=12)		with sodium hydroxide to give
	sa. La b	
11/2/12/2017 17/20	chylak cakta, letter.	
	· .	(5 marks)

c) The following is a path of the Uranium decay series

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B: ii) If a beta part	icle is emitted	in stage C, give	the atomic	c number a	nd mass nui	mber of th	e isotope X.	
Atomic nu	mber:	relation US: 0 to	M	lass Numbe	er:		010	
		reduced to 25%						Copy of the Copy o
•••••								
) ii Orteo mo	fort swamp two.	to he page of the		chern are				
A. Countle		• • • • • • • • • • • • • • • • • • • •				A north	se of the solu	at ve ser) (i
								(4 mark
The mass spectr	rum of a vapor	rized sample of c	nromium	shows the f	following da	ita:	vede da	i) Calculate the
Mass of isotor			52	53	54			
Relative abund								
Calculate the re	/ / /	mass of chromiu	n	0.1	0.02			
The following d	elative atomic		n ction belo			sas igon wo	gy cycle bek	(2 mark
The following d	ata were obtain 2H ₂ (g)	mass of chromiu	n etion belo	w:		die medes	gy cycle hele	(2 mark
The following d	ata were obtain 2H ₂ (g)	mass of chromium of the real $2H_2O(1) + N_2(g)$ (nitial Concentral)	n etion belo	w:	onts the enth	die medes	gy cycle betc	(2 mark
The following d 2NO(g) +	ata were obtain the late of th	mass of chromium ned from the real $2H_2O(l) + N_2(g)$ (nitial Concentrated) dm^{-3} [H ₂] r 0.1	n ction belo	Relat	onts the enth	die medes	gy cycle beic	(2 mark
The following d	ata were obtain the lative atomic at a were obtain the lative atomic at a were obtain the latitude of the lati	mass of chromium ned from the real $2H_2O(1) + N_2(g)$ initial Concentrated $\frac{1}{2}$	n ction belo	w:	onts the enth	die medes	gy cycle beig	(2 mark
The following d 2NO(g) + Experimen 1 2 3	ata were obtain 2H ₂ (g) To a long mole of the long mole	mass of chromium ned from the reaction $2H_2O(1) + N_2(g)$ (nitial Concentration of the co	ion	W: Relat	onts the enth	die medes	gy cycle beic	(2 mark
The following d 2NO(g) + Experimen 1 2 3	ata were obtain the state of th	mass of chromium ned from the real $2H_2O(1) + N_2(g)$ initial Concentration $\frac{1}{0.1}$ 0.1 0.2 espect to NO	ion and dm ⁻³	Relat	ive rate of re	die medes	gy cycle bet	(2 mark
The following d 2NO(g) + Experimen 1 2 3	ata were obtain 2H ₂ (g) -> t NO] mol 0.1 0.3 0.3 e order with re	mass of chromium ned from the real $2H_2O(1) + N_2(g)$ initial Concentration 0.1 0.1 0.2 espect to NO	ion and dm ⁻³	W: Relat	ive rate of re	eaction	gy cycle bek	(2 mark

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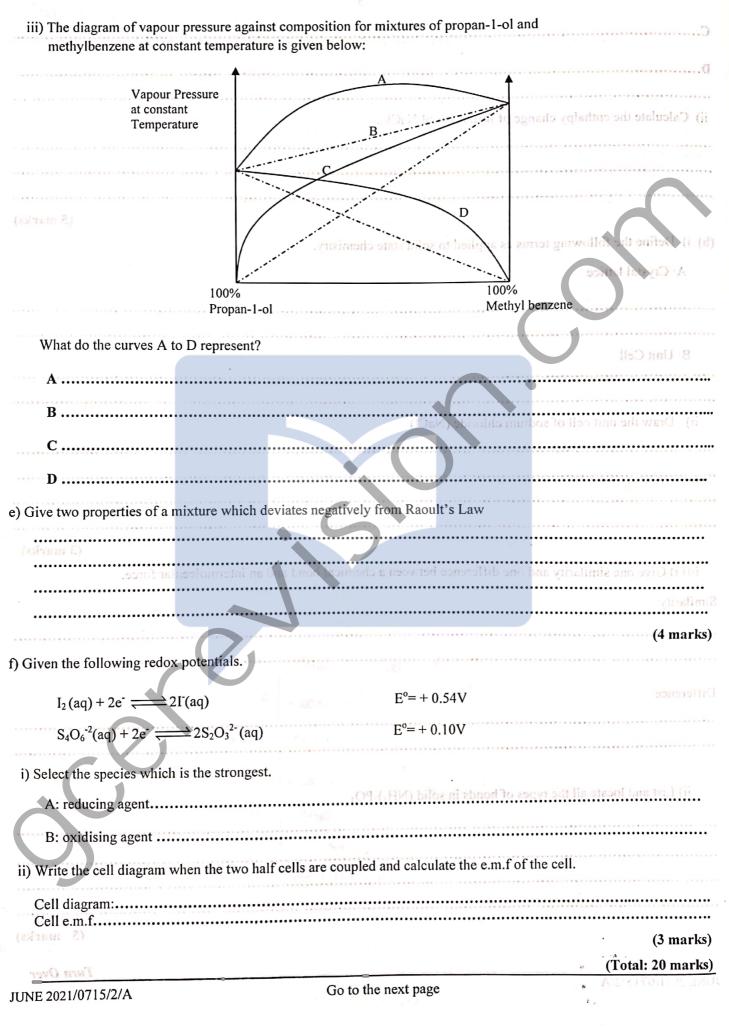
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iii) Write the rate expression		4 χ,	2 3 1 6 3 6 5	A ITAS A	10862
••••••				n paradys collect in	
iv) Calculate the value of t	the rate constant.				: A
X squitte	t mass number of the	iur 15dia ili etii	זו ענכ כ. קיועים וווסיפוס	s di Bantilla si alantila	8330 8 (1)
		Mass Number			(4 marks)
f) A solution, A contains 0.10 ethanoate).	0 mol dm ⁻³ of CH ₃ CO				
i) Give the general name		Δ	militarina-mili	Maria pinala anciona de la composición	
ii) Give one use of the so	olution A				
iii) Calculate the pH value	of solution A (Ka for	$CH_3COOH = 1$.8x10 ⁻⁵ mol dm ⁻³)	ectrum oxe yay 17eg	
	1.5				
	40.11		157 (1	529n6 a.c	. 97111127
•••••	••••			ae ar circotua academa.	
					(4 marks)
					()
				(Tota	,
				(Tota	l: 20 marks
(ciran 1)	olow represents the en	thalov changes	involved in the form		l: 20 marks
2. (a) The energy cycle be	elow represents the en	thalpy changes	involved in the form		l: 20 marks
		e + Cl.		nation of solid sodium	l: 20 marks
	Na ⁺ (g) +	e ⁻ + Cl _(g)	rayXi (bu		l: 20 marks
	Na ⁺ (g) +	e + Cl.		nation of solid sodium	l: 20 marks
	Na ⁺ (g) +	e ⁻ + Cl (g)	D -364 kJmol ⁻¹	nation of solid sodium	l: 20 marks
	$Na_{(g)}^{\dagger} + e^{-} + \frac{1}{2}C$	$e^{-} + CI_{(g)}$	rayXi (bu	nation of solid sodium	l: 20 marks
	$Na_{(g)}^{\dagger} + e^{-} + \frac{1}{2}C$	e ⁻ + Cl (g)	D -364 kJmol ⁻¹	nation of solid sodium	l: 20 marks
	$Na_{(g)}^{\dagger} + e^{-} + \frac{1}{2}C$	e ⁻ + Cl _(g) — 121 kJmol ⁻¹ Cl _{2(g)} Na ⁺ (D -364 kJmol ⁻¹	nation of solid sodium	l: 20 marks
	$Na_{(g)}^{+} + e^{-} + \frac{1}{2}C$ $Na_{(g)}^{+} + e^{-} + \frac{1}{2}C$ $Na_{(g)}^{+} + \frac{1}{2}C$ $Na_{(g)}^{+} + \frac{1}{2}C$	e ⁻ + Cl _(g) 121 kJmol ⁻¹ Cl ₂ (g) Na ⁺ (500 kJmol ⁻¹	D -364 kJmol ⁻¹ g) + Cl (g)	nation of solid sodium	l: 20 marks
	$Na_{(g)}^{+} + e^{-} + \frac{1}{2}C$ $Ra_{(g)}^{+} + e^{-} + \frac{1}{2}C$ $Ra_{(g)}^{+} + \frac{1}{2}C$ $Ra_{(g)}^{+} + \frac{1}{2}C$ $Ra_{(g)}^{+} + \frac{1}{2}C$ $Ra_{(g)}^{+} + \frac{1}{2}C$	e ⁻ + Cl _(g) — 121 kJmol ⁻¹ Cl _{2(g)} Na ⁺ (500 kJmol ⁻¹ Cl _{2(g)}	D -364 kJmol ⁻¹ +Cl (g) E -776 kJmol ⁻¹	nation of solid sodium	l: 20 marks
	$Na_{(g)}^{+} + e^{-} + \frac{1}{2}C$ $A + 1$ $Na_{(s)}^{+} + \frac{1}{2}C$	e ⁻ + Cl _(g) — Na ⁺ (121 kJmol ⁻¹ Si ₂ (g) Na ⁺ (12(g) Na ⁻¹ Cl ₂ (g) Na ₁ Na ⁻¹ Cl ₂ (g)	D -364 kJmol ⁻¹ g) + Cl (g)	nation of solid sodium	l: 20 marks
	$Na_{(g)}^{+} + e^{-} + \frac{1}{2}C$ $Ra_{(g)}^{+} + e^{-} + \frac{1}{2}C$ $Ra_{(g)}^{+} + \frac{1}{2}C$ $A + 1$ $Na_{(s)}^{+} + \frac{1}{2}C$ ΔH_{f}^{\pm}	e ⁻ + Cl _(g) — 121 kJmol ⁻¹ Cl _{2(g)} Na ⁺ (500 kJmol ⁻¹ Cl _{2(g)} 1.08.3 kJmol ⁻¹ Cl _{2(g)} Na ⁺ Cl _(s)	D -364 kJmol ⁻¹ g) + Cl (g) E -776 kJmol ⁻¹	nation of solid sodium	l: 20 marks

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C	position for mixtures of propin-1-of and	our pressure against con	iii) The diagram of vap
D		onstant temperature is gr	methythenzene at c
ii) Calculate the enthalpy ch	ange of formation of NaCl _(s)	in Presents istant crature	
(h) i) Define the following to			(5 marks)
A: Crystal lattice	erms as applied to solid state chemistry.	econt fortunant	
B: Unit Cell		Olmov organ () 17	When do me curve.
ii) Draw the unit cell of so			a
		a amxtere wheli deviate	lo kathaqyaq awtestalas al
iii) i) Give one similarity a	nd one difference between a chemical bor		(3 marks) force.
Similarity			
Difference	16wn		
	701.0 + e-g	(pa) 1055	1, (eq) + 2e'
ii) List and locate all the t	ypes of bonds in solid (NH ₄) ₃ PO ₄		Select the species whi Ar reducing agent
e celt.	s are coupled and carculate the e.mt.t or the	when the two hast cells	III W 155 The Oct Oragini
			(5 marks)
(miram 6) (miram 6) (and 6) JUNE 2021/0715/2/A	Go to the next page		Turn Over



	Explain why carbon tetrachloride will NOI react smallarly wild as secretary section B: INORGANIC CHEMISTRY
3. a)	Li, Be, B, C, N, O, F and Ne are the elements of the Period 2 of the Periodic Table.

3. a) Li, Be, B, C, N	N, O, F and Ne are the	he elements of the Period 2 of the Period	odic Table.
i) Sketch a graph	of melting points a	gainst atomic number for the elements	
Arem b)			
		"inert pair effect"	d) Some of the Group IV elements show
• • • • • • • • • • • • • • • • • • • •			ti what is the 'inen pair effect
	•••••••••••••••••••••••••••••••••••••••		OR A BERT STORES OF A COMMAN OF A TH
ii) Evaloin the ch	ana of the graph		
ii) Explain the sh			
	•••••	ients (Halegers)	e) This question is on the Grann VII alen
			Il Coronbuctor following t. C
	Physical state	room temperature	Colour
			(4 marks)
	ts of the period lithi ch is amphoteric	ium to neon, write the formula of:	lodine
i) Ali oxide wili	ch is amphoteric	And the second s	2.652.482.484.484
		la incerto a a caracteria de la circa de la coloria.	ai) All the baloners shows winble axis
ii) A hydride wl	hich is a liquid		
			muniter
			(2 marks)
c) The elements of (Group IV(Group 14)	of the Periodic Table are carbon, silic	on, germanium, tin and lead.
		metalloids and non-metals. 10 H (IIII	
***************************************			1 1 4 4 1 20000000
	Element		A. From the reacting species lets
Barra	C		Oxidani
	Si	200	
	Ge Sn		
	Pb		
nouvered a enganter	b) Po and air	Linting v. in observation a clearly level	
ii) Give a chem	nical equation for the	e reaction of germanium tetrachloride v	with water.
7 47 - 12 4 A A A A A A A A A A A A A A A A A A	on the bound of the control of the c		
	most unit toda e presiden	indi Millia Mercheell alla, compresso distina	
(8 marks)			
[AL = (20 marks)	OT		
4 € €			
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iii	Explain why carb	on tetrachloride w	rill NOT react similarly with water	as germanium tetrachloride	: .
	•••••	alife i alberte	March to a description of the consequence of	de consideration of the Market	••••••••••••••••••••••••••••••••••••••
		200011	2 2 3 1 1 1 2 1 1 1 1 2 1 3 1 1 1 2 1 1 1 1		
	• • • • • • • • • • • • • • • • • • • •		e en 1 mander for the clume	is straed martier, le richna i	rdshall u
					(4 marks)
d) Som	e of the Group IV	elements show "in	nert pair effect"		
1) V	Vhat is the "inert p	air effect"			
1		······································			
ii) V	Why is PbO more s	table than DbO 0	***************************************		••••••
11) 1	vily is 1 00 illole's	table than PbO ₂ ?			
•••••	••••••••••	••••••••••	••••••		•••••
••••••	••••••••	•••••••••	•••••	the some of the Japh,	randrjael (m
-> T1:-					(2 marks)
e) Inis	question is on the	Group VII elemen	its (Halogens).		***********
i) Co	mplete the follow	ing table:	···		************
	Chlorine	Colour at 1	oom temperature	Physical state	
elante.	Chlorine				
	Iodine		to urnition of allow Moan of the	lements of the perjodition	b) I rom the c
				ie which is anophotem.	asout (i
ii) A	ll the halogens sho	w variable oxidat	ion states except fluorine. Explain.		
•••••		••••		blig Hasi lilka di	think A
•••••		••••		•••••••••••••••••••••••••••••••••••••••	
eal patiff					•••••
iii) Th	e following equati	on is used in iodo	of the Periodic Tab noitaritis	ts of Group IV(Group 14)	c) The elemen
	$IO_3(aq) + I(aq)$	$+ H^+ (aq) \rightarrow I_2 (aq)$	$H_2O(1)$ mentioned and non-metal (1) $H_2O(1)$	y the elements as metals, n	it Classit
	A: From the read	ting species ident	ify the oxidant and reductant		
	Oxidant	ing species ident	ify the oxidant and reductant.	Javanera	•••
	Reductant	-		iz i	

				· · · · · · · · · · · · · · · · · · ·	•••••
iv) Usi	ng suitable chemic	cal reagents and st	ating your observations, clearly exp	olain how you would disting	guish between
aqı	leous solutions of	potassium chlorid	e and potassium bromide?	rehemical equation for life	
				•••••	
•••••					•••••
					(8 marks)
1 5	1,			TOTAL =	= (20 marks)
			•	9	• 1
1979			Out that have been a		
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4. a) The Groups I and II elements are kno	own as the s-block elements.	iii) Braw the stereolsomers of [C
	ius varies down the Group I elements.	***************************************
	••••••	
ii) List the Group II elements in order	r of increasing atomic number.	
ng and converting to substants.	converting sulplur rate its oxides, purity in	// The Contact process involves
iii) Why is potassium carbonate readil	y soluble in water whereas calcium carbon	ate is insoluble?
	Thed?	ind atmixiv saw out it store fit
iv) Write chemical equations to show the	he product(s) formed when potassium and	barium are heated in excess
oxygen. A: Potassium (K)		
ultrain (1)		
a m watch ta cepet techniks the oxidation	to and have	(a) voted eight sitteleidite v
B: Barium (Ba)		states +3 and +5.
Name	Cuon Mumio 1	Osidation state
		(7 marks)
b) i) Give the symbols of the elements of the	first transition series in order of increasing	g atomic number.
Sirem 1)		
ii) What accounts for the ability of transiti	on metals to:	
A: Show variable oxidation states.	SECTION C: ORGANIC CHEMI	
	du svijets was totaid in pave a relative in	S at vir organic compound W. or formula C.H.O
B: Form coloured compounds	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	
		(3 marks)
c) Cobalt ($Z = 27$) forms a complex of form		
i) Determine the oxidation state of cobalt	in the complex	
		sorta)
ii) Using the electrons-in-boxes notation,	write the electronic configuration of the co	balt ion in the complex
***************************************		•••••••••••••••••••••••••••••••••••••••
***************************************		•••••••••••••••••••••••••••••••••••••••
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			me are shown below:	n reactions of 2-iodoprop.	6. (a) Three differen
Determine	·		under in		
A: The mole	cular f	ormula of W	CH3 CH(I)CH3		
	•				
	•				
B: Suggest t	wo pos	sible structures of W	the state of the	The second second	N 10,111 101
	•••••	<u>снэ сна сыр.</u>	<u></u>	CIQCIQCIQ	
•••••	•••••		••••••		
b) i) A liquion the table	d X wit le belov	th less than 4 carbon atoms we by giving the corresponding	vas subjected to the follow g inferences.	(7 magnetic ving tests in the laborator	
	Test	Reagent Company and the	Observation	Infere	nces
	Α	PCl ₅	No white fumes	3	10 11 11 11 10 10 1
	В	Bromine water	No reaction		Reaction It
	C	2,4- dinitrophenyl hydrazin	e Orange precipitate		Reaction III:
S mark	D	Ammoniacal silver nitrate (Tollen's Reagent)	No reaction	Audio des aitieta arrada un	b) Ranzena underge
		tic name for each of the follo)CH ₂ NH ₂	wing compounds.	ample of an electrophilic	(5 marks)
ii) CH₃CI	H ₂ CH ₂ C	COCI			
(3 marks)			••••••	•••••	(2 marks)
d) State the r	reagent	s and reaction conditions for	the conversions in the tab	ne below.	c) lithene is obtained in the income
· · · · · · · · · · · · · · · · · · ·	Reaction	n	Reagent	Reaction cond	tion
		$C_6H_6NO_2$ $_2OH \rightarrow CH_2=CH_2 + H_2O$	**************************************		(6 - 1)
		$2CI \rightarrow CH_3CH_2CN + KCI$	yd benikkia si sifetig dal	lw ni nonbasa s to noiten,	(6 marks)
********		*********************	***************************************		(Total: 20 marks)
***********	*******				
		g reagents:	othene with the followin	quarion for the reaction of	
***********		267279012914	***************************************		
******			20170374104545555555555555555	insic acid,	Turn Over
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					gcerevision.com

6. (a) Three different reactions of 2-iodopropane are shown below:

	CH ₃ CH(l)CH ₃ W to alumnol reluccion and the
	W 10 Bunned Busselout Sk 1 Sk
***************************************	11
,, ,,:,	B: Su
	CH CH $=$ CH
	CH ₃ CH(OH)CH ₃ CH ₃ CH ₃ CH ₃ CH ₃ CH ₂ CH ₃
(7 marks)	CH ₃ -C- OCH ₃
	b) 1) A lique X of less than 4 carbon atoms was subjected to the following tests in the li
	the table below by aving the corresponding infercin \mathbf{H} s.
For each of the reactions	I, II and III, give suitable reagents and conditions.
	Control State of the Control of the
Reaction I:	ti Branting Vater, No reaction
Reaction II:	And the second of the second o
Reaction III:	(2 months)
b) Benzene undergoes electro	and head 1. Star to the indicate the second
i) What is an electroph	ilic substitution reaction?
***************************************	ai) Suggest an identity for compound X.
ii) Give an example of	an electrophilic reagent.
••••••	
	efficiency the systematild name for each of the following compounds.
iii) Explain why benze	ene reacts with electrophilic reagents
(2 marks)	(3 marks)
c) Ethene is obtained on a lar i) What is cracking?	ge scale from the process of cracking in the petroleum industry.
ii) Write the equation of	f a reaction in which ethene is obtained by cracking.
	or the reaction of ethene with the following reagents:
B: Concentrated sulphuric acid	1
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d) 2-aminopropanoic acid (Alanine) is an example of an amino acid.
i) Describe a chemical test to confirm the presence of any one of the functional groups present in 2-amino propanolacid.
ii) Write an equation for the synthesis of 2-aminopropanoic acid from propanoic acid stating the reagents and reaction conditions.
A STORE OF THE STO
(4 marks)
e) Give the structure and name of the main organic product of the following reactions:
i) $CH_3CONH_2 + Br_2 + 4 KOH \rightarrow$
Structure and name of product:
ii) $C_6H_5NO_2 + HCl/Sn \rightarrow$
Structure and name of product:
iii) CH ₃ COOH + LiAlH ₄ Structure and name of product:
(6 marks) (Total: 20 marks)
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