

Our country, our future

525/1

S6 CHEMISTRY

Exam 7

PAPER 1

DURATION: 2 HOUR 45 MINUTES

Instructions:

- This paper consists of two sections A and B
- Section A is compulsory.
- Attempt only six questions in section B
- Answers must be written in the spaces provided only

For	Exami	ner's l	Jse On	ly							2					
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SECTION A

Answer all questions from this section.

	e standard reduction electrode potentials (E²) f		table below.
	f cell	E ¹¹ (v)	
Fe	+ (aq), Fe ²⁺ (aq)	+0.77	
$S_{(s)}$	H2S(8) S(8) + 1/2 5, > 1/2 S(9)	+0.14	
	Write the		
aj	i) Cell rotation		(1mk)
	iy centrotation		(1111)
	2.85%		······································
(ii) Equation of reaction that takes place at the a	node and cathode	(2mks)
Al			
Anode			
Cathod	e		
			0800.40
		ar ar a san a	avena i
	ii) Equation for the overall cell reaction.		(1 ½ mks)
41.3	Control balls of the Control of the		(4.11)
(a)	State whether the reaction is feasible or not a	nd give a reason for your answer.	(1mk)
			* ** ** ** **
2. (a)	State what is observed and write equation of r	eaction in each case when the foll	owing
	mpounds are mixed.		
a)	Methanoic acid and ammoniacal silver nitrate	solution heated	
Ωh	servation		
0.0	Jer vacion		
••••••			
Equ	uation		
	/		A Marin II to tak

(b) Benzoic acid and aqueous so Observation;	odium bicarbonate solution.	
Equation;		
aliah a	On that takes place has again to	
c) Propanone and Brady's solut	ion.	
Observation;		
1965	9	pay be to define a financial section of the section
Equation;	an agus an	e università di Adit SC , Ce de la Constanti di Constanti
3. Calculate the boiling point of a water = 5.2°Cmol ⁻¹ kg ⁻¹)	solution formed by mixing 8g of glu	cose with 120g of water. (K_b for

the state of

 a) State three reasons for the diffeence in properties between fluorine and ot elements. 	her group(VII) (3mks)
	in the state of th
 b) Write equation for the reaction that takes place between the following continuous in the solution (iv) oxide and hydrofluoric acid. 	ompounds. (1½ mks)
	N.31 9, (98.00)
ii) Fluorine and water	(1 ½ mks)
5. Complete the following reactions and write the accepted mechanism.	
(a) Conc H ₂ SO ₄	
	almati e liku likusi.
	a 2. i
O (b) $CH_3 - C - CH_3$ Na_2SO_3	
(b) $CH_3 - C - CH_3 \longrightarrow Na_2SO_3 \longrightarrow $	1 S 1 S 1 S 1 S 1 S 1 S 1 S 1 S 1 S 1 S
H⁺	
At Association	
6. State what would be observed and write equation(s) for the reaction(s) that(a) When aqueous sodium sulphite solution is added to acidified potassium man	
	.,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,
Observation.	
	ers in see
Equation	
	4. el 1.
1	

) When aluminium powder is added to iron (iii) chloride.	
bservation.	1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 -
unation.	
luation.	
a) Write the electronic configuration of	
i) Nitrogen	(1mk)
	August de
ii) Phosphorus	(1mk)
b) Explain why nitrogen only forms (NCI ₃) whereas phosphorus forms the chlo	orides PCl ₃ and PCl ₅ .
	. ma i tipo i projeti i i
	(Smki -
c) Write equation(s) for the hydrolysis of phosphorus chlorides by water.	
i) phosphorus chloride	(3mks)
equation	
"Anharate and the state of the	
ii) phosphorus (III) chloride	
5	

	equation	
	2	
8.	(a) When 20cm ³ of a hydrocarbon Z was exploded in 200cm ³ of oxygen (exce with a sooty flame. The volume of residual gas after cooling to room temper addition of aqueous potassium hydroxide to the residual gas, the final volum Calculate the molecular formula of Z.	rature was 160cm ³ . On
		Section of the section of
		d-jienh
		The second secon
		negotti
	(b) When Z was heated with alkaline potassium manganate (VII) solution for which cooled in the presence of dilute sulphuric acid to form a crystalline so	rms a colourless solution blid P.
	i) identify;	
	Z	au (1mk)
	Р	
	and the state of t	
	(ii) Write equations to show how P is formed.	(1 ½ mks)
••••		picariper distrib
9.	(a) Explain why diffusion in solution is very much slower than in gases.	
	restato y di calciano.	
	12 - 12	id

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h) 141 4cm ³ of gas X diffused	through a porous plug in the same time as	it took 50cm ³ of oxygen to
diffuse through the same plug		
Calculate the reactive molecul		
ever the so a south a silicity		
		edsistana Carcialiste
		in a market of the con-
		an area distriction
,	SECTION B	
	SECTION B	
At	SECTION B ttempt only six questions in this section	
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10. State what is observed an	ttempt only six questions in this section	
10. State what is observed and a) Potassium iodide is ad	ttempt only six questions in this section	
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10. State what is observed and a) Potassium iodide is ad	ttempt only six questions in this section	
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10. State what is observed and a) Potassium iodide is ad Observation; Equation;	ttempt only six questions in this section d write equation for the reaction that takes dded to acidified hydrogen peroxide solutio	n roomer a
10. State what is observed and a) Potassium iodide is ad Observation; Equation; (b) Concentrated hyd	ttempt only six questions in this section d write equation for the reaction that takes dded to acidified hydrogen peroxide solution	n roomer a
10. State what is observed and a) Potassium iodide is ad Observation; Equation; (b) Concentrated hydicontaining cobalt (II) is	ttempt only six questions in this section d write equation for the reaction that takes dded to acidified hydrogen peroxide solution	n rocker
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10. State what is observed and a) Potassium iodide is ad Observation; Equation; (b) Concentrated hydicontaining cobalt (II) is	ttempt only six questions in this section d write equation for the reaction that takes dded to acidified hydrogen peroxide solution	ccess to aqueous solution
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10. State what is observed and a) Potassium iodide is ad Observation; Equation; (b) Concentrated hydicontaining cobalt (II) is	ttempt only six questions in this section d write equation for the reaction that takes dded to acidified hydrogen peroxide solutions.	ccess to aqueous solution

	taining beryllium (II) ior
(c) Aqueous sodium hydroxide is added drop wise to aqueous solution con	es della segli
Observation;	
the control of the co	
Equation;	
	N 13 T 9 9 9 9 1
a) A compound Y contains mass of 22.86% oxygen, 8.57% hydrogen an	d the rest is carbon.
i) Calculate the empirical formula of Y.	(2 ½ mks)
	e e el jord
	The second second
	e son en en
	- 1
" (A/han n 2ng at v is vanarized at au t. and / Uullilling Diessure,	
ii) When 0.30g of Y is vaporized at 80°C and 700mmHg pressure, 134.77cm ³ . Determine the molecular formula of Y.	(3.1/2 mks)
134.77cm ³ . Determine the molecular formula of Y.	(3 ½ mks)
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134.77cm ³ . Determine the molecular formula of Y.	(3 ½ mks)
134.77cm ³ . Determine the molecular formula of Y.	(3 ½ mks)
134.77cm ³ . Determine the molecular formula of Y.	Consequence of the consequence o
134.77cm ³ . Determine the molecular formula of Y.	d does not react with
134.77cm ³ . Determine the molecular formula of Y.	Consequence of the consequence o
b) Y forms a yellow precipitate with 2, 4-dinitrophenyl-hydrazine and	d does not react with
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b) Y forms a yellow precipitate with 2, 4-dinitrophenyl-hydrazine and	d does not react with

		141. 641.
12. a) State three character	ristics of chemical equilibrium.	(1 ½ mks
et krostiene etrebak dere	eff. og gennemgøre, snivetal eft sød	e ar naugur - 11 11 14
(Shall)		
	actico, per ty	- 0-3E 4057-40]4 /4
Phosphorus (V) chloride	when heated decomposed according to the Cl _{2(e)}	ne following equation.
	for the equilibrium constant KC.	(1mk)
	13/11/	and or solder in a
ii) When 1 mole of phos	phorus (V) chloride was heated in a closed	vessel at 350°C, the
equilibrium mixture was	phorus (V) chloride was heated in a closed s found to contain 38.4% of chlorine. Calcu	
equilibrium mixture was		late the equilibrium cor
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equilibrium mixture was		late the equilibrium cor
equilibrium mixture was		late the equilibrium cor
equilibrium mixture was Kc at 350°C.	s found to contain 38.4% of chlorine. Calcu	late the equilibrium cor (3 ½ mks
equilibrium mixture was Kc at 350°C.	tant of 250°C is 1.54. State whether the rea	late the equilibrium cor (3 ½ mks

c) State what would happen to the co	oncentra	tion of	chlorin	e if the	pressu	re is the	vessel w	as
decreased while the temperature is	maintain	ed at 35	50°C. G	ive a re	ason fo	r your a	nswer.	
							1 ½ mks)	
				• • • • • • • • • • • • • • • • • • • •				
Mary 18 20	editule o l							
SHE WAY								
		•••••	•••••		••••••			
13. Write equation to show the following	g convers	sions ca	n be ef	fected.	(Includ	le condit	ions for	the
reactions.)							3mks)	
a) Benzoic acid to phenylamine								
13 dié nag payad Yountoas ares ar								
uqqbaba 20546i oktorin, 8000 mis ba	2000000			,,,,,,,,,,,,,	********		***************************************	••••••
Green 13	etanos er					- 10 10 10 10 10 10 10 10 10 10 10 10 10	ofest of the	
b) Ethene to Butan-z-ol								
	•••••	•••••	•••••					
	**							
c) I – chloro ethane to ethanamide				pinesigh		n i ned		
		1510.00	27 5007	si e 6 w e	nubdim	mundil 1959°C	6 28 6 28	
								••••••
14. a) i) Explain what is meant by an acid	-base ind	licator.				(1	lmk)	
								:
	••••••	•••••	•••••	•••••			•••••••	÷;
								1.
ii) Explain why titration experiments	only one	or two	drone	of are u	cod	11	Lmk)	
in Explain why titration experiments	offiny offic	OI LWO	игорз (or are u	3EU	, , ,	LITIK)	
	••••••							
						4.0		1
 b) The table gives data obtained whe hydroxide solution. 	n 100cm	of pro	panoic	acid wa	as titra	ed with	1.0M so	dium
Volume of NaoH(1M) added (cm ³)	0.0	1.0	5.0	9.0	9.5	10.5	11.0	15.0
PH of solution	2.94	3.92	4.87	5.82	6.15	11.70		12.70
$e^{\sin X(\mathbf{I})}$	Yelv	ISUE JUI	77 101 7	beiling	9VI6	MARCH SELLE	7	1
 i) Draw a graph of PH against th 					•	with the court of the	.½ mks)	i -
ii) Explain the shape of the grap	h, you ha	ave drav	wn in b	(i).		(2	½ mks)	
						yoqtaa		See .
							111	
	10							

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		and the second section of the second sections are required to the second sections.	THE COURSE OF SECURITION OF SECURITIONS	
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	en en pagi de la Carla de la C			
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				og mensh atti (if
WOISC 0				
iii)	Determine the P	^H of the solution at equ	ivalence point.	(1mk)
	• • • • • • • • • • • • • • • • • • • •	•••••	•	
12 33 3			.jjc ni ravena šuby i	.elc;x7
iv)		ing indicators would be	suitable for the titration? (Give a reason for y
	Indicator	Methyl red	Bromothymol blue	Phenol red
	PH range	4.2 - 6.3	6.0 - 7.6	6.8 - 8.4
	TTTUIS			
	Indicator;			. (½mk)
				7928816 SHC[VI 3]1
	Reason			(½ mk)
				sample single it.
••••••				
			(I) and are in (I) also are	
			U) and group (I) elements.	In each case give a
reas	on for your answer.		U) and group (I) elements.	
			U) and group (I) elements.	In each case give a
reas	on for your answer.		U) and group (I) elements.	In each case give a
reas	on for your answer.		U) and group (I) elements.	In each case give a

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iii) melting points b) The decomposition temperatures of the carbonates of group (II) elelemnts are given below Carbonate									
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b) The decomposition temperatures of the carbonates of group (II) elelemnts are given below Carbonate		17 - 11 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1			. Talleague es				
Carbonate	iii)	electro	o positivity	y				12 22 22 2	
Carbonate									
Carbonate									
Carbonate									
Carbonate	b) The	decompos	sition temp	peratures	of the carl	onates o	f group (II) elelemnt:	s are given belo
Decomposition temperature (°C) 404 826 1098 1370 i) State how the decomposition temperatures vary. (1imk) ii) Explain your answer in b(i). (3 1/2 mks)		emanica de la	Activities and the		leers en				1
ii) Explain your answer in b(i). (3 ½ mks) 16. Name a reagent that can be used to differentiate between the following pairs of compound State what would be observed if each compound is treated with the regent you have name of reagent (s) and Observation(s)			n tempera	ture (°C)					1091aQ. 111
ii) Explain your answer in b(i). (3 ½ mks) 16. Name a reagent that can be used to differentiate between the following pairs of compour State what would be observed if each compound is treated with the regent you have nam Name of reagent (s) and Observation(s)								1370	11 500 11
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State what would be observed if each compound is treated with the regent you have name Name of reagent (s) and Observation(s)									
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Observation(s)	Name	e of reage	nt (s)	^					
Observation(s)		\supset	and						
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	s sviz o	B. P.L.	. Sinuasi	again - (1) eyon	e bas (U) a	ins Liang to a	airesuo -	antwofful s	es es GMOS
	n Baltar	Ohsen			••••••				
12		Chacil	ration(c)						
			ration(s)						

Observation(s) (c) NH ₂ and CH ₂ NH ₂ Name of reagent; Observations 17. Ethanol can be produced by fermentation of molasses. a) i) Name two other raw materials from which ethanol can be produced by fermentation. liii) Write equations to show how crude ethanol can be obtained from the materials nar above. (3mks)	e (råtr	v	
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iii) Name two other raw materials from which ethanol can be produced by fermentation. Write equations to show how crude ethanol can be obtained from the materials nar above. (3mks)			
iii) Write equations to show how crude ethanol can be obtained from the materials nar above. (3mks)	17. Ethanol can be produced by fer	rmentation of molasses.	
iii) Write equations to show how crude ethanol can be obtained from the materials nar above. (3mks)	a) i) Name two other raw mat	terials from which ethano	ol can be produced by fermentation.
iii) Write equations to show how crude ethanol can be obtained from the materials nar above. (3mks)			
iii) Write equations to show how crude ethanol can be obtained from the materials nar above. (3mks)			
iii) Write equations to show how crude ethanol can be obtained from the materials nar above. (3mks)			
iii) Write equations to show how crude ethanol can be obtained from the materials nar above. (3mks)			
above. (3mks)			
above. (3mks)	iii) Write equations to sho	w how crude ethanol ca	n be obtained from the materials nar
			(3mks)
	Control of the Principle of the Principl		
			1.2 - 1 11

(ii).		m crude ethanol produced ir (2mks)
	0 0	
		- Oll bas HD - 3 1 1 3 1 3 1 3
c) Write equation(s) to show e	each of the following compound	s could be obtained from
i) polyethene		(1 ½ mks)
iii) ethoxyethane	CH ₂ NH ₂	has Hi (1 ½ mks)
Larbonnes .		
		mages in anner
	END	A Charge a line
Ada u lansah dalam kanaksa dalam d		The Artehol can be produced
The second secon		
		chi avity Witte coloring above