CHEMISTRY ENTRANCE TEST SAMPLE PAPER

sample paper only provide 10 MCQ and 2 SAQ

Actual Paper Total 30 MCQ + 4 SAQ

Each MCQ is 2 marks Each SAQ is 10 marks

Instructions

- 1. This is a **closed-book** test.
- 2. It has a time limit of **90 minutes** and allows for only **ONE attempt (submission)**.
- 3. Alert the invigilator if you are facing technical difficulties.
- 4. You are to **ensure** that:
 - your laptops, computers and any other devices used for this test is in good functioning order and have uninterrupted power supply and internet connection throughout the duration of the test.
 - you are in a conducive environment throughout the duration of the test.
 - your answers are correctly saved by the end of the test.

5. You are **allowed** to use:

- a scientific calculator.
- A blank piece of paper (no larger than A4 size) for rough work. The paper will not be accepted for submission at the end of the test.

6. You are **not allowed** to:

- leave the test or leave your devices throughout the duration of the test.
- use the washroom throughout the duration of the test.
- communicate with any person, either face-to-face or through any communication device, other than the invigilator.
- refer to any references, e.g. textbooks, resources from a laptop or smart devices etc.
- share materials (e.g. electronic calculator) during the test.
- use any communication devices such as mobile phones, tablets, smart watches, headsets during the test.
- 7. Enter the password provided by the invigilator to start Test paper.

SECTION A (20 MARKS)

Answer **ALL** questions in this section in the spaces provided.

- A1. Methanol boils at 65°C and water boils at 100°C. Given that methanol and water are completely miscible with each other, which is the **MOST SUITABLE** method to separate a mixture of these two liquids?
 - a. Evaporation
 - b. Crystallisation
 - c. Fractional distillation
 - d. Paper chromatography
- A2. A stopper was removed from a bottle containing perfume **A** and the time taken for the scent to reach the opposite side of the room was noted. The experiment was repeated using perfume **B**, which had a **LOWER** molecular mass than perfume **A**. Based on the information provided, predict the time taken for perfume **B** to reach the opposite side of the room compared to perfume **A**.
 - a. Same as perfume **A**.
 - b. Shorter than perfume **A**.
 - c. Longer than perfume **A**.
 - d. Insufficient data to compare the time taken by perfume **A** and **B**. ()
- A3. Two isotopes of carbon are ${}_{6}^{12}\text{C}$ and ${}_{6}^{13}\text{C}$. Which statement about the isotopes is **TRUE**?
 - a. They have the same number of electrons and neutrons.
 - b. They have the same number of electrons and protons.
 - c. They have the same number of neutrons and protons.
 - d. They have the same number of neucleons and electrons. ()
- A4. A label is missing from a bottle of green solution **C**. In order to identify the solution, two chemical tests are carried out.
 - Test 1: A few drops of aqueous sodium hydroxide are added to a sample of solution **C**. A green precipitate is formed.
 - Test 2: Excess aqueous sodium hydroxide and aluminium are added to another sample of solution C and heated. A pungent gas, which turns damp red litmus paper blue, is produced.

What is C?

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	, , ,			
a. b. c. d.	Iron(II) nitrate Iron(III) nitrate Iron(II) sulfate Iron(III) sulfate	()
Whic	h statement describes the formation of a covalent bond?			
a. b. c. d.	Electrons are shared between metallic atoms. Electrons are shared between non-metallic atoms. Electrons are transferred from a metallic atom to a non-metallic atom Electrons are transferred from a non-metallic atom to a metallic atom.)
	electronic configuration of atom ${f D}$ is 2, 7. The electronic configurat , 6. What is the formula of the compound formed between atoms ${f D}$			tom
a. b. c. d.	$\begin{array}{c} D_2E \\ DE_2 \\ D_6E \\ DE_7 \end{array}$	()
	ganese(III) sulfate has the formula, $Mn_2(SO_4)_3$. What is the charantees ion?	ırge	on	the
a. b.	2+ 3+			

A8. Dissolving sodium carbonate in water is an exothermic process. Which row shows the change in temperature of solution and the direction of heat flow when sodium carbonate is dissolved in a beaker of water?

	Temperature of solution	Direction of heat flow
a.	Increase	To surrounding
b.	Decrease	To surrounding
C.	Increase	From surrounding
d.	Decrease	From surrounding

()

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2-

3-

c. d.

A5.

A6.

A7.

A9. In which equation is copper reduced?

I:
$$CuO(s) + H_2(g) \rightarrow Cu(s) + H_2O(g)$$

II:
$$2Cu^{2+}(aq) + 4\Gamma(aq) \rightarrow 2CuI(s) + I_2(aq)$$

III:
$$CuSO_4(aq) + 2NH_4OH(aq) \rightarrow Cu(OH)_2(s) + (NH_4)_2SO_4(aq)$$

- a. **I & II**
- b. I & III
- c. II & III
- d. I, II & III ()

A10. The following reactions are carried out.

Reaction	Result
Ammonium chloride is added to	Gas F is given off.
barium hydroxide.	
Sulfuric acid is added to ammonium	Gas G is given off.
carbonate.	_
Hydrochloric acid is added to an	Compound H is formed
aqueous solution of ammonia.	_

What are **F**, **G** and **H**?

	Gas F	Gas G	Compound H					
a.	Chlorine	Ammonia	Ammonium sulfate					
b.	Ammonia	Carbon dioxide	Ammonium sulfate					
C.	Carbon dioxide	Ammonia	Ammonium chloride					
d.	Ammonia	Carbon dioxide	Ammonium chloride					



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SECTION B (20 MARKS)

Answer ALL questions in this section in the spaces provided.

B1. (a) Table 1 describes the properties of compounds. Complete Table 1 by writing True **OR** False in the spaces provided. (2 marks)

Table 1

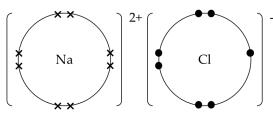
Properties of compounds	True / False
A compound has a fixed composition.	True
A compound has a fixed melting/boiling point.	
A compound can only be decomposed by a chemical	
reaction.	

(b) Sodium chloride and ethene are compounds with different physical and chemical properties. Figures 1 and 2 show the 'dot and cross' diagrams of the outer shell electrons in sodium chloride and ethene. Identify the **TWO** errors in **EACH** figure.

(i) Sodium chloride

(2 marks)

Figure 1



 $\boldsymbol{\mathsf{x}}$ electrons of Na

• electrons of Cl

Error 1:

Error 2:

Figure 2

Figure 2

x electrons of C
electrons of H

Error 1:

(c) Explain, in terms of structure and bonding, why:

Error 2:

(i) both solid sodium chloride and gaseous ethene do **NOT** conduct electricity. (3 marks)

(ii) molten sodium chloride will conduct electricity. (1 mark)

B2.	In the	ermite welding, iron(III) oxide reacts with aluminium according to the following on.
		$Fe_2O_3(s) + 2Al(s) \rightarrow 2Fe(l) + Al_2O_3(s)$
	(a)	Fine powders of both iron(III) oxide and aluminium are used in this reaction. State the advantage of using reactants in powder form. (1 mark)
	(1.)	

(b) If 9.00 g of iron(III) oxide is reacted with 2.80 g of aluminium, calculate the theoretical yield of molten iron in the reaction. (7 marks)

(c) Determine the percentage yield if 5.23 g of molten iron is obtained from the reaction. (2 marks)

----- End of Paper -----

Periodic Table

The Periodic Table of the Elements		4	hydrogen 7	7	11 12 14 16 19 20	Z .	boran carbon nitrogen oxygen fluorine neon 5 6 7 8 9 10	31 32 35.5	Si P S C1	aluminium silicon phosphorus suffur chlorine argon 13 14 15 16 17 18	51 52 55 56 59 59 64 65 70 73 75 79 80	V Cr Mn Fe Co Ni Cu Zn Ga Ge As Se Br	inlum vanadium chromium manganese iron cobalt nickel copper zinc gallium germanium arsenic selenium bromine h 23 24 25 26 27 28 29 30 31 32 33 34 35 36	91 93 96 – 101 103 106 108 112 115 119 122	Nb Mo Tc Ru Rh Pd Ag Cd In Sn Sb Te I	onium niobium molybdenu technetium ruthenium rhodium palladium silver cadmium indium	41 42 44 45 46 47 46 48 50 51 52 55	181 184 186 190 192 195 197 201 204 207 209 -	Ta W Re Os Ir Pt Au Hg T1 Pb Bi Po At	finium tantalum tungsten menium o 73 74 75 76					141 144 - 150 152 157 159 162 165 167 169 173	Pr Nd Pm Sm Eu Gd Tb Dy Ho Er Tm Yb	cerium praesodymium neodymium promethium samarium europium gadolinium terbium dysprosium holmium erbium tuteium tuteium tuteium samarium s	232	Th Pa U Np Pu Am Cm Bk Cf Es Fm Md	thorium protactinium uranium neptunium plutonium americium curium berkelium califomium einsteinium fermium mendelevium no od
The Perio			hydr 1								52 55	C	adium chromium manganese	93 96 -	Mo	blum molybdenu technetium	42 #	184 186	W Re	rtalum tungsten rhenium 74 75							uju	32 - 238	- Da	orium protactinium uranium
					o.,	Be	mnil	4	Mg	esium	45	Sc	21 22	89 91	Y Zr	yttrium zirconium	39	-	La H	lanthanum hafnium 57 * 72		um acunum	anoid series	noid series			ď	a = relative atomic mass	X = atomic symbol	number
	_				3 ·		lithium beryllium 3	23		E +-	39		potassium calcium 19 20		·	widinm	3/	133 137	Cs	- 26 t		rrandum radium 87 88	*58-71 Lanthanoid series	†90-103 Actinoid series				Kov	>	< _