This is a Class 1 exam

Lebanon Evangelical School for Boys and Girls

Lighting the fires that burn for eternity

Loueizeh - Baabda

Lebanon Evangelical School

for Boys and Girls — Loueizeh - Baabda

Stage Exam 01

11NOV2022

Do NOT write in this box. Your MARK will be placed here.

Subject :	A Level : Chemistry 1	
Class :	11A and 12A	
Teacher :	Mrs. Saydeh Nasrallah	
Duration :	1 hour	
Your name :		*Time taken to complete exam*
Your Class :		
Exam Room :		
How many sheets, including cover sheet :		

- Do not open this paper until the teacher in charge instructs you to do so.
- The most important thing to remember in taking an exam is NEVER PANIC.
- If you are caught cheating in this exam, you will be awarded zero for ALL exams that are taken on this day.

SECTION A

Answer ALL the questions in this section.
You should aim to spend no more than 15 minutes on this section.
For each question, select one answer from A to D and put a cross in the box.
If you change your mind, put a line through ☒ the box and then mark your new answer with a cross. ☒

1. Element **X** is in Group 2 of the Periodic Table and element **Y** is in Group 7.
X and Y are not the symbols of the elements.
(a) What is the formula of the compound formed from **X** and **Y**?

(1)

☐ **A** XY
☐ **B** X_2Y
☐ **C** XY_2
☐ **D** X_2Y_2

(b) Under what conditions does the compound formed from **X** and **Y** conduct electricity?

(1)

☐ **A** in the solid state and in the liquid state and in aqueous solution
☐ **B** in the solid state and in aqueous solution only
☐ **C** in the solid state and in the liquid state only
☐ **D** in the liquid state and in aqueous solution only

(Total for Question 1 = 2 marks)

2. Which of these compounds would you expect to have the highest melting temperature?

☐ **A** NaCl
☐ **B** NaF
☐ **C** KCl
☐ **D** KF

(Total for Question 2 = 1 mark)

3. A drop of an aqueous solution of green copper(II) chromate(VI) is placed in the centre of a strip of damp filter paper.
The ends of the filter paper are connected to a DC power supply.
What is observed after a few minutes?

☐ **A** a green colour has moved to the negative end
☐ **B** a green colour has moved to the positive end
☐ **C** a yellow colour has moved to the positive end and a blue colour to the negative end
☐ **D** a blue colour has moved to the positive end and a yellow colour to the negative end

(Total for Question 3 = 1 mark)

4. Which of these isoelectronic ions has the smallest ionic radius?

☐ **A** N^{3-}
☐ **B** F^{-}
☐ **C** Na^{+}
☐ **D** Al^{3+}

(Total for Question 4 = 1 mark)

5. Which properties of a **cation** result in the greatest polarising power?

☐ **A** large radius and large charge
☐ **B** large radius and small charge
☐ **C** small radius and small charge
☐ **D** small radius and large charge

(Total for Question 5 = 1 mark)

6. Which properties of an **anion** result in it being most easily polarised?

☐ **A** large radius and large charge
☐ **B** large radius and small charge
☐ **C** small radius and small charge
☐ **D** small radius and large charge

(Total for Question 6 = 1 mark)

7. Which row in the table shows the correct forces in a crystal of lithium iodide?

	Attractive forces between ions with opposite charges	Repulsive forces between ions with like charges	Some covalent bonding forces
☐ A	✓	×	×
☐ B	✓	✓	×
☐ C	✓	×	✓
☐ D	✓	✓	✓

(Total for Question 7 = 1 mark)

8. The element manganese has the atomic number Z = 25.
What are the numbers of s, p and d electrons in an atom of manganese?

	s electrons	p electrons	d electrons
☐ A	6	12	7
☐ B	8	12	5
☐ C	6	18	1
☐ D	8	17	0

(Total for Question 8 = 1 mark)

9. Which equation represents the first ionisation energy of iodine?

☐ **A** $I_2(s) \rightarrow 2I^+(g) + 2e^-$
☐ **B** $I_2(g) \rightarrow 2I^+(g) + 2e^-$
☐ **C** $\frac{1}{2}I_2(s) \rightarrow I^+(g) + e^-$
☐ **D** $I(g) \rightarrow I^+(g) + e^-$

(Total for Question 9 = 1 mark)

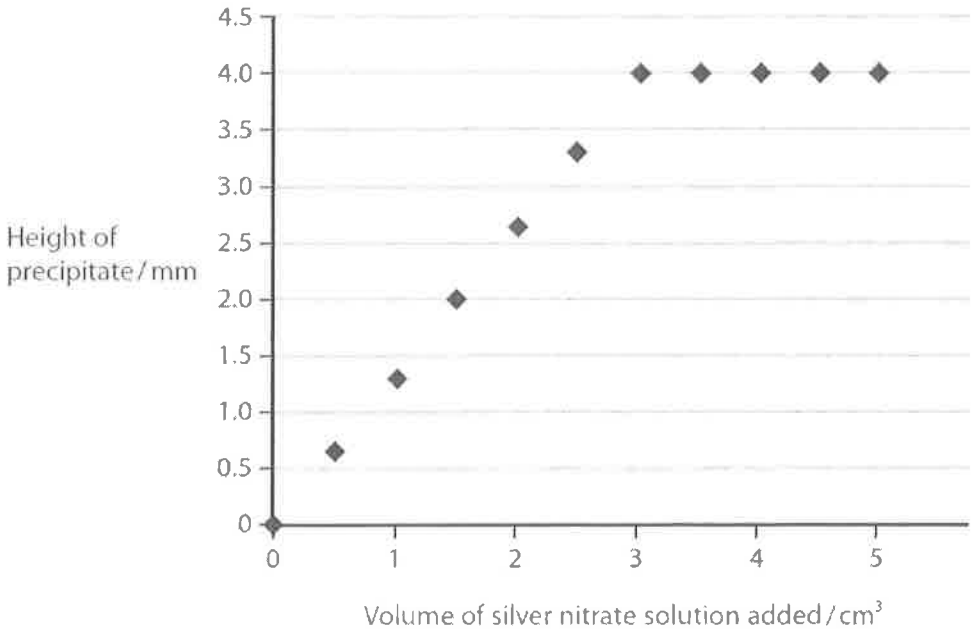
10. Ten test tubes, each containing $1.0\,cm^3$ of a chromium chloride solution of concentration $0.1\,mol\,dm^{-3}$, were placed in a test tube rack.

Different volumes of silver nitrate solution of concentration $0.1\,mol\,dm^{-3}$ were added to each test tube, giving a precipitate of silver chloride.

$$Ag^+(aq) + Cl^-(aq) \rightarrow AgCl(s)$$

The precipitates formed were allowed to settle and their heights measured.

The results were plotted on a graph.



What is the formula of the chromium chloride?

- ☐ **A** $CrCl$
- ☐ **B** Cr_3Cl_4
- ☐ **C** Cr_4Cl_3
- ☐ **D** $CrCl_3$

(Total for Question 10 = 1 mark)

11. The maximum permitted concentration of sulfur in diesel fuel is 10 mg of sulfur in 1 kg of diesel fuel.

(a) What is this concentration of sulfur in ppm?

(1)

☐ **A** 0.00001
☐ **B** 0.01
☐ **C** 10
☐ **D** 10 000

(b) 3.2 kg of this diesel fuel is burned in air.

What is the maximum volume, in dm^3 , of sulfur dioxide which can be produced, measured at room temperature and pressure (r.t.p.)?

[Molar volume of a gas at r.t.p. = $24 dm^3 mol^{-1}$]

(1)

☐ **A** 0.024
☐ **B** 0.77
☐ **C** 2.4
☐ **D** 24

(Total for Question 11 = 2 marks)

TOTAL FOR SECTION A = 13 MARKS

SECTION B

Answer ALL the questions.

Write your answers in the spaces provided.

12. This question is about copper and its compounds.

(a) Complete the electronic configurations of Cu and Cu^{2+}.

(2)

Cu [Ar] .....

Cu^{2+} [Ar] .....

(b) A sample of copper contains the isotopes ^{63}Cu and ^{65}Cu.

(i) Complete the table to show the numbers of subatomic particles in the atoms of these two isotopes of copper.

(2)

Isotope	Protons	Neutrons	Electrons
^{63}Cu			
^{65}Cu			

(ii) State why the two isotopes of copper have the same chemical reactions.

(1)

.....

.....

(iii) The relative atomic mass of copper in this sample is 63.4. Calculate the percentage abundances of the isotopes ^{63}Cu and ^{65}Cu in this sample. You **must** show your working.

(3)

(c) Copper(II) sulfate, $CuSO_4$, can be made by reacting solid copper(II) carbonate with dilute sulfuric acid.

(i) Write an equation for the reaction that occurs. State symbols are not required.

(1)

.....

(ii) An experiment was carried out to produce pure, dry crystals of hydrated copper(II) sulfate, $CuSO_4 \cdot 5H_2O$.

Copper(II) carbonate was mixed with $50.0\,cm^3$ of $1.00\,mol\,dm^{-3}$ sulfuric acid until no more reacted. The mass of $CuSO_4 \cdot 5H_2O$ obtained was 10.87 g.

Calculate the percentage yield for this reaction, giving your answer to an appropriate number of significant figures.

(4)

(Total for Question 12 = 13 marks)

13. The elements carbon and silicon both form dioxides.

(a) Carbon dioxide is a simple covalent molecule but silicon dioxide has a giant covalent structure.

(i) Describe the covalent bond between a silicon atom and an oxygen atom in silicon dioxide, in terms of the particles involved.

(2)

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(ii) Compare and contrast the covalent bonding in carbon dioxide and silicon dioxide in terms of orbital overlap.

(3)

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(b) The shape of the carbon dioxide molecule affects its physical properties.

(i) Explain the shape of the carbon dioxide molecule.

(3)

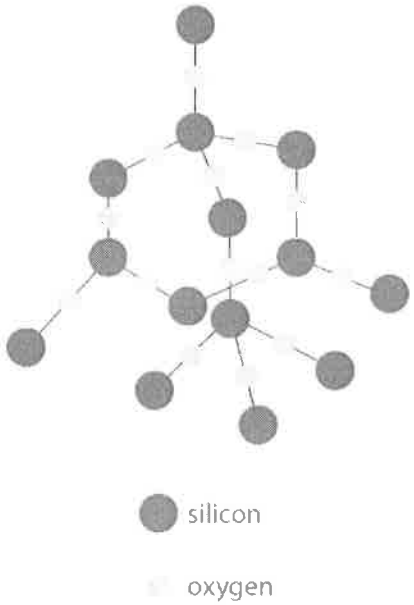
(ii) Explain the polarity of the carbon–oxygen bond.

(2)

(iii) State whether or not the carbon dioxide molecule is polar. Justify your answer.

(2)

(c) The structure of silicon dioxide may be referred to as a diamond structure.



(i) Using your knowledge of the structure of diamond, suggest how the structure of silicon dioxide is similar to that of diamond.

(1)

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(ii) Give a possible reason why silicon dioxide has a lower melting temperature than diamond, even though the Si—O bond is stronger than the C—C bond.

(1)

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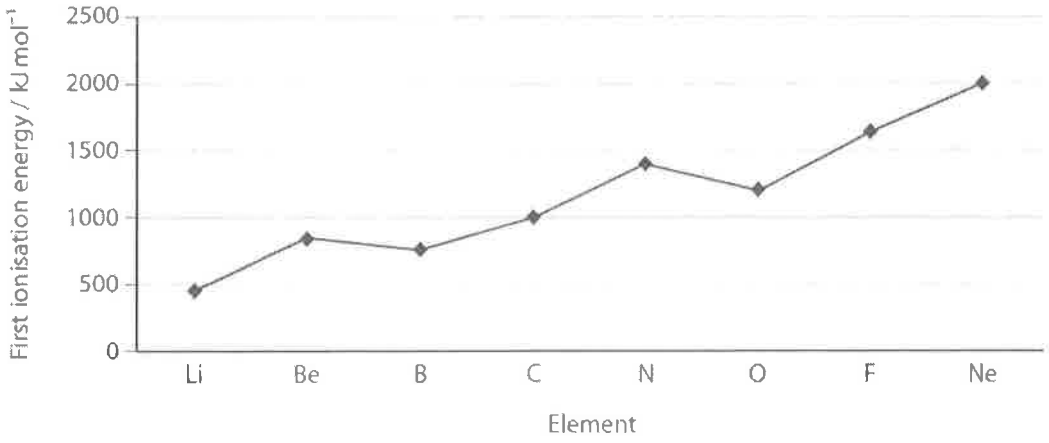
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(Total for Question 13 = 14 marks)

14. This question is about the ionisation energies of the elements in Period 2 of the Periodic Table.

(a) The first ionisation energies of the Period 2 elements are shown.



(i) Give an equation that represents the first ionisation energy of lithium.
Include state symbols.

(2)

(ii) Explain why there is a general increase in the first ionisation energy across the period.

(2)

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(iii) Explain why the first ionisation energy of oxygen is lower than that of nitrogen.

(3)

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(b) All the successive ionisation energies of nitrogen are shown in the table.

Ionisation number	1	2	3	4	5	6	7
Ionisation energy / $kJ.mol^{-1}$	1402	2856	4578	7475	9445	53267	64360

Explain the trend in the successive ionisation energies of nitrogen.

(3)

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(Total for Question 14 = 10 marks)
TOTAL FOR SECTION B = 37 MARKS
TOTAL FOR PAPER = 50 MARKS

The Periodic Table of Elements

1	2											3	4	5	6	7	0 (8) (18)
							1.0 H hydrogen 1										4.0 He helium 2
(1)	(2)		Key									(13)	(14)	(15)	(16)	(17)	
6.9 Li lithium 3	9.0 Be beryllium 4		relative atomic mass atomic symbol name atomic (proton) number									10.8 B boron 5	12.0 C carbon 6	14.0 N nitrogen 7	16.0 O oxygen 8	19.0 F fluorine 9	20.2 Ne neon 10
23.0 Na sodium 11	24.3 Mg magnesium 12	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	27.0 Al aluminium 13	28.1 Si silicon 14	31.0 P phosphorus 15	32.1 S sulfur 16	35.5 Cl chlorine 17	39.9 Ar argon 18
39.1 K potassium 19	40.1 Ca calcium 20	45.0 Sc scandium 21	47.9 Ti titanium 22	50.9 V vanadium 23	52.0 Cr chromium 24	54.9 Mn manganese 25	55.8 Fe iron 26	58.9 Co cobalt 27	58.7 Ni nickel 28	63.5 Cu copper 29	65.4 Zn zinc 30	69.7 Ga gallium 31	72.6 Ge germanium 32	74.9 As arsenic 33	79.0 Se selenium 34	79.9 Br bromine 35	83.8 Kr krypton 36
85.5 Rb rubidium 37	87.6 Sr strontium 38	88.9 Y yttrium 39	91.2 Zr zirconium 40	92.9 Nb niobium 41	95.9 Mo molybdenum 42	[98] Tc technetium 43	101.1 Ru ruthenium 44	102.9 Rh rhodium 45	106.4 Pd palladium 46	107.9 Ag silver 47	112.4 Cd cadmium 48	114.8 In indium 49	118.7 Sn tin 50	121.8 Sb antimony 51	127.6 Te tellurium 52	126.9 I iodine 53	131.3 Xe xenon 54
132.9 Cs caesium 55	137.3 Ba barium 56	138.9 La* lanthanum 57	178.5 Hf hafnium 72	180.9 Ta tantalum 73	183.8 W tungsten 74	186.2 Re rhenium 75	190.2 Os osmium 76	192.2 Ir iridium 77	195.1 Pt platinum 78	197.0 Au gold 79	200.6 Hg mercury 80	204.4 Tl thallium 81	207.2 Pb lead 82	209.0 Bi bismuth 83	[209] Po polonium 84	[210] At astatine 85	[222] Rn radon 86
[223] Fr francium 87	[226] Ra radium 88	[227] Ac* actinium 89	[261] Rf rutherfordium 104	[262] Db dubnium 105	[266] Sg seaborgium 106	[264] Bh bohrium 107	[277] Hs hassium 108	[268] Mt meitnerium 109	[271] Ds darmstadtium 110	[272] Rg roentgenium 111							

Elements with atomic numbers 112-116 have been reported but not fully authenticated

* Lanthanide series	140 Ce cerium 58	141 Pr praseodymium 59	144 Nd neodymium 60	[147] Pm promethium 61	150 Sm samarium 62	152 Eu europium 63	157 Gd gadolinium 64	159 Tb terbium 65	163 Dy dysprosium 66	165 Ho holmium 67	167 Er erbium 68	169 Tm thulium 69	173 Yb ytterbium 70	175 Lu lutetium 71
* Actinide series	232 Th thorium 90	[231] Pa protactinium 91	238 U uranium 92	[237] Np neptunium 93	[242] Pu plutonium 94	[243] Am americium 95	[247] Cm curium 96	[245] Bk berkelium 97	[251] Cf californium 98	[254] Es einsteinium 99	[253] Fm fermium 100	[256] Md mendelevium 101	[254] No nobelium 102	[257] Lr lawrencium 103

SECTION A

Answer ALL the questions in this section.
You should aim to spend no more than 15 minutes on this section.
For each question, select one answer from A to D and put a cross in the box.
If you change your mind, put a line through ☒ the box and then mark your new answer with a cross. ☒

1. Element **X** is in Group 2 of the Periodic Table and element **Y** is in Group 7.
X and Y are not the symbols of the elements.
(a) What is the formula of the compound formed from **X** and **Y**?

(1)

☐ **A** XY
☐ **B** X_2Y
☒ **C** XY_2
☐ **D** X_2Y_2

(b) Under what conditions does the compound formed from **X** and **Y** conduct electricity?

(1)

☐ **A** in the solid state and in the liquid state and in aqueous solution
☐ **B** in the solid state and in aqueous solution only
☐ **C** in the solid state and in the liquid state only
☒ **D** in the liquid state and in aqueous solution only

(Total for Question 1 = 2 marks)

2. Which of these compounds would you expect to have the highest melting temperature?

☐ **A** NaCl
☒ **B** NaF
☐ **C** KCl
☐ **D** KF

(Total for Question 2 = 1 mark)

3. A drop of an aqueous solution of green copper(II) chromate(VI) is placed in the centre of a strip of damp filter paper.
The ends of the filter paper are connected to a DC power supply.
What is observed after a few minutes?

- ☐ **A** a green colour has moved to the negative end
- ☐ **B** a green colour has moved to the positive end
- ☒ **C** a yellow colour has moved to the positive end and a blue colour to the negative end
- ☐ **D** a blue colour has moved to the positive end and a yellow colour to the negative end

(Total for Question 3 = 1 mark)

4. Which of these isoelectronic ions has the smallest ionic radius?

- ☐ **A** N^{3-}
- ☐ **B** F^{-}
- ☐ **C** Na^{+}
- ☒ **D** Al^{3+}

(Total for Question 4 = 1 mark)

5. Which properties of a **cation** result in the greatest polarising power?

- ☐ **A** large radius and large charge
- ☐ **B** large radius and small charge
- ☐ **C** small radius and small charge
- ☒ **D** small radius and large charge

(Total for Question 5 = 1 mark)

6. Which properties of an **anion** result in it being most easily polarised?

- ☒ **A** large radius and large charge
- ☐ **B** large radius and small charge
- ☐ **C** small radius and small charge
- ☐ **D** small radius and large charge

(Total for Question 6 = 1 mark)

7. Which row in the table shows the correct forces in a crystal of lithium iodide?

	Attractive forces between ions with opposite charges	Repulsive forces between ions with like charges	Some covalent bonding forces
☐ A	✓	X	X
☐ B	✓	✓	X
☐ C	✓	X	✓
☒ D	✓	✓	✓

(1)

(Total for Question 7 = 1 mark)

8. The element manganese has the atomic number Z = 25.
What are the numbers of s, p and d electrons in an atom of manganese?

	s electrons	p electrons	d electrons
☐ A	6	12	7
☒ B	8	12	5
☐ C	6	18	1
☐ D	8	17	0

(1)

(Total for Question 8 = 1 mark)

9. Which equation represents the first ionisation energy of iodine?

☐ **A** $I_2(s) \rightarrow 2I^+(g) + 2e^-$
☐ **B** $I_2(g) \rightarrow 2I^+(g) + 2e^-$
☐ **C** $\frac{1}{2}I_2(s) \rightarrow I^+(g) + e^-$
☒ **D** $I(g) \rightarrow I^+(g) + e^-$

(1)

(Total for Question 9 = 1 mark)

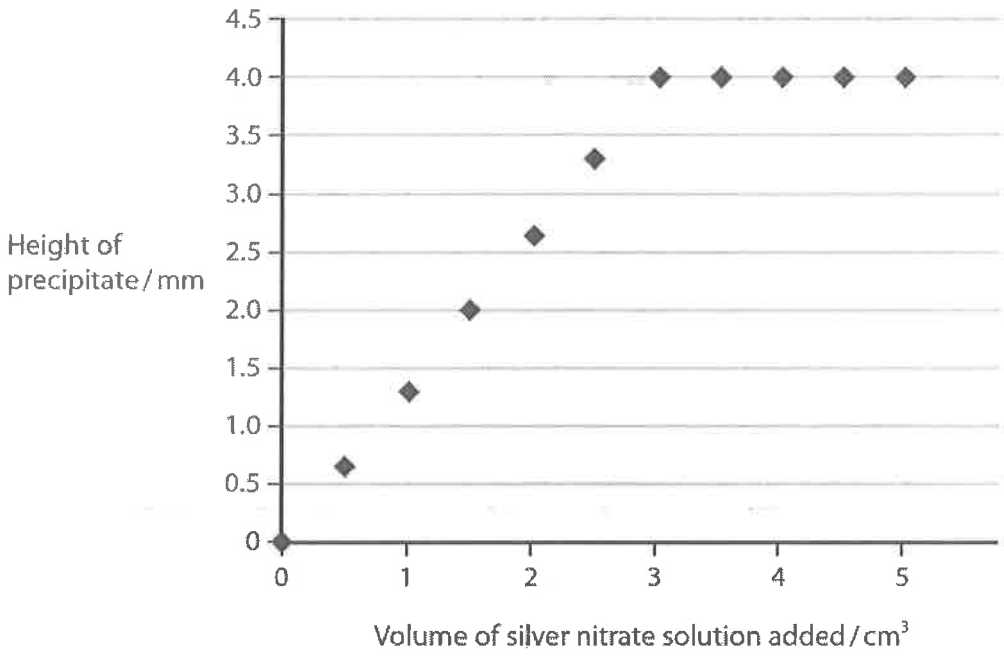
10. Ten test tubes, each containing $1.0\,cm^3$ of a chromium chloride solution of concentration $0.1\,mol\,dm^{-3}$, were placed in a test tube rack.

Different volumes of silver nitrate solution of concentration $0.1\,mol\,dm^{-3}$ were added to each test tube, giving a precipitate of silver chloride.

$$Ag^+(aq) + Cl^-(aq) \rightarrow AgCl(s)$$

The precipitates formed were allowed to settle and their heights measured.

The results were plotted on a graph.



What is the formula of the chromium chloride?

- ☐ **A** $CrCl$
- ☒ **B** Cr_3Cl_4
- ☐ **C** Cr_4Cl_3
- ☐ **D** $CrCl_3$

(1) ✓

(Total for Question 10 = 1 mark)

11. The maximum permitted concentration of sulfur in diesel fuel is 10 mg of sulfur in 1 kg of diesel fuel.

(a) What is this concentration of sulfur in ppm?

(1)

- ☐ **A** 0.00001
- ☐ **B** 0.01
- ☒ **C** 10
- ☐ **D** 10 000

(b) 3.2 kg of this diesel fuel is burned in air.

What is the maximum volume, in dm^3 , of sulfur dioxide which can be produced, measured at room temperature and pressure (r.t.p.)?

[Molar volume of a gas at r.t.p. = $24 dm^3 mol^{-1}$]

(1)

- ☒ **A** 0.024
- ☐ **B** 0.77
- ☐ **C** 2.4
- ☐ **D** 24

(Total for Question 11 = 2 marks)

TOTAL FOR SECTION A = 13 MARKS

SECTION B

Answer ALL the questions.

Write your answers in the spaces provided.

12. This question is about copper and its compounds.

(a) Complete the electronic configurations of Cu and Cu^{2+}.

(2)

Cu [Ar] $4s^1 3d^{10}$ ✓ (1)

Cu^{2+} [Ar] $3d^9$ ✓ (1)

(b) A sample of copper contains the isotopes ^{63}Cu and ^{65}Cu.

(i) Complete the table to show the numbers of subatomic particles in the atoms of these two isotopes of copper.

(2)

Isotope	Protons	Neutrons	Electrons
^{63}Cu	29 ✓	34 ✓	29 ✓ (1)
^{65}Cu	29 ✓	36 ✓	29 ✓ (1)

(ii) State why the two isotopes of copper have the same chemical reactions.

(1)

They both have the same number of valence e^- ✓ (1)

(iii) The relative atomic mass of copper in this sample is 63.4. Calculate the percentage abundances of the isotopes ^{63}Cu and ^{65}Cu in this sample. You **must** show your working.

(3)

Let x be the % abundance of ^{63}Cu

$$63.4 = \frac{63x + 65(100 - x)}{100}$$ ✓ (1)

$$\Rightarrow 6340 = 63x + 6500 - 65x$$

$$\Rightarrow 2x = 160$$

$$\Rightarrow x = 80$$ ✓ (1)

$$\Rightarrow \%\ ^{63}Cu = 80\%$$

$$\%\ ^{65}Cu = 20\%$$ ✓ (1)

(c) Copper(II) sulfate, $CuSO_4$, can be made by reacting solid copper(II) carbonate with dilute sulfuric acid.

(i) Write an equation for the reaction that occurs. State symbols are not required.

(1)

$CuCO_3 + H_2SO_4 \longrightarrow CuSO_4 + H_2O + CO_2$ (1)

(ii) An experiment was carried out to produce pure, dry crystals of hydrated copper(II) sulfate, $CuSO_4 \cdot 5H_2O$.

Copper(II) carbonate was mixed with $50.0\,cm^3$ of $1.00\,mol\,dm^{-3}$ sulfuric acid until no more reacted. The mass of $CuSO_4 \cdot 5H_2O$ obtained was 10.87 g.

Calculate the percentage yield for this reaction, giving your answer to an appropriate number of significant figures.

(4)

$CuSO_4 . 5H_2O \quad : \quad H_2SO_4$

$1 \quad : \quad 1$ ✓

$\Rightarrow n_{CuSO_4 . 5H_2O} = 50 \times 10^{-3} \times 1 = 5 \times 10^{-2}$ mol (1)

$M_{CuSO_4 . 5H_2O} = 63.5 + 32.1 + 4 \times 16 + 5 \times 18$

$= 249.6\ g.mol^{-1}$ (1)

$\Rightarrow$ mass of $CuSO_4 . 5H_2O$ theoretical $= 5 \times 10^{-2} \times 249.6$

$= 12.48\,g$ (1)

$\Rightarrow \%\ yield = \frac{10.87}{12.48} \times 100 = 87.1\ \%$ (1)

(Total for Question 12 = 13 marks)

13. The elements carbon and silicon both form dioxides.

(a) Carbon dioxide is a simple covalent molecule but silicon dioxide has a giant covalent structure.

(i) Describe the covalent bond between a silicon atom and an oxygen atom in silicon dioxide, in terms of the particles involved.

(2)

It's the attraction between the nuclei of Si and oxygen atoms with the shared pair of e^-. (2)

(ii) Compare and contrast the covalent bonding in carbon dioxide and silicon dioxide in terms of orbital overlap.

(3)



Both are covalent compounds where the atoms share their valence e^-. However, CO_2 shows 2 different types of molecular orbitals σ & π unlike SiO_2 which shows only σ (1)

σ is an axial overlap of atomic orbitals (1)

π is a lateral overlap of atomic orbitals (1)

(b) The shape of the carbon dioxide molecule affects its physical properties.

(i) Explain the shape of the carbon dioxide molecule.

(3)

The central atom C is surrounded with 4 bonding pairs and 2 peripheral atoms and no lone pairs ✓ (1)

As a result, the pairs of e^- arrange themselves such to minimize repulsion, ✓ (1) in a linear shape where the bond angle measures 180°. ✓ (1)

(ii) Explain the polarity of the carbon–oxygen bond.

(2)

Oxygen is more electronegative than carbon. ✓ (1)

Hence the bond carbon - oxygen is polar with a partial charge $-\delta$ on oxygen. ✓ (1)

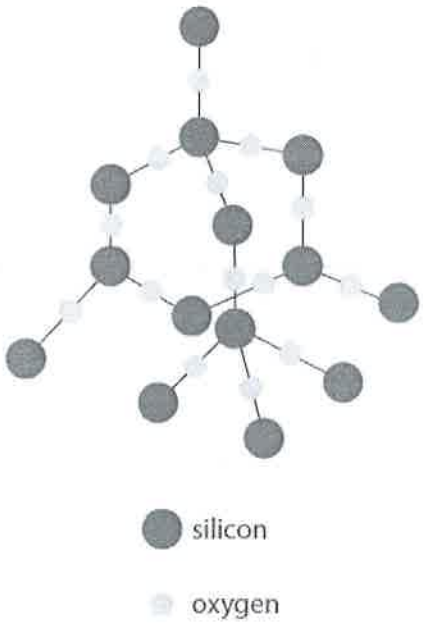
(iii) State whether or not the carbon dioxide molecule is polar. Justify your answer.

(2)

The resulting dipole moment is zero ✓ (1)

$\Rightarrow$ CO_2 is non-polar. ✓ (1)

(c) The structure of silicon dioxide may be referred to as a diamond structure.



(i) Using your knowledge of the structure of diamond, suggest how the structure of silicon dioxide is similar to that of diamond.

(1)

The arrangement of atoms is SiO_2 is tetrahedral same as in diamond. (1)

(ii) Give a possible reason why silicon dioxide has a lower melting temperature than diamond, even though the Si—O bond is stronger than the C—C bond.

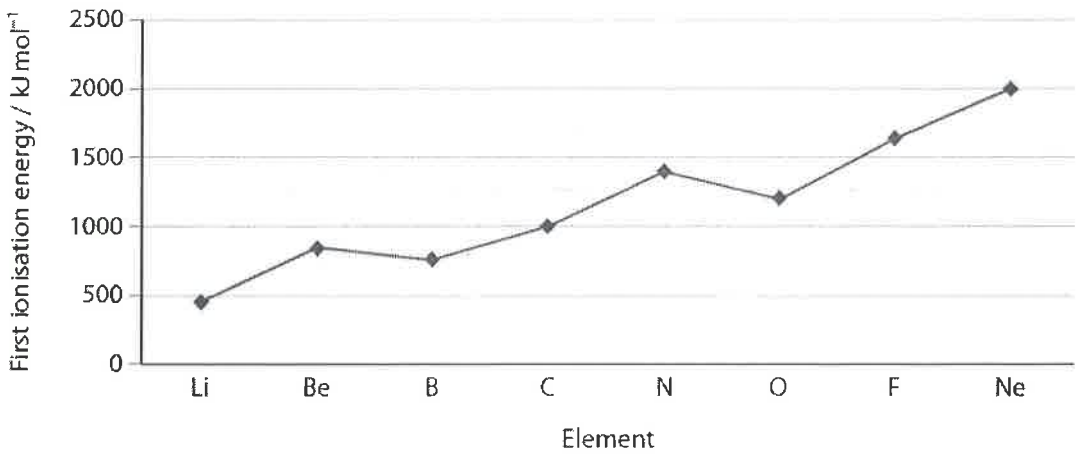
(1)

There are fewer bonds per atom in the structure of SiO_2, such oxygen atoms. (1)

(Total for Question 13 = 14 marks)

14. This question is about the ionisation energies of the elements in Period 2 of the Periodic Table.

(a) The first ionisation energies of the Period 2 elements are shown.



(i) Give an equation that represents the first ionisation energy of lithium.
Include state symbols.

(2)

$Li(g) \longrightarrow Li^{+}(g) + e^{-}$ ✓ ✓ (2)

(ii) Explain why there is a general increase in the first ionisation energy across the period.

(2)

Going across the period, where the nuclear charge increases while the shielding effect and the distance remain virtually constant, (1) result in a greater attraction. ✓ (1) Hence, an increase in 1st I.E values.

(iii) Explain why the first ionisation energy of oxygen is lower than that of nitrogen.

(3)

$_8O$: $1s^2\ 2s^2$ ↑↓ ↑ ↑ $_7N$: $1s^2\ 2s^2$ ↑ ↑ ↑

Both e^- are being removed from a 2p sublevel, but the repulsion between the pair of e^- occupying the oxygen p-orbital favours its ionisation which overcome the increase in the nuclear charge, and that explains the drop in I.E. (1) (1) (1)

(b) All the successive ionisation energies of nitrogen are shown in the table.

Ionisation number	1	2	3	4	5	6	7
Ionisation energy / $kJ.mol^{-1}$	1402	2856	4578	7475	9445	53267	64360

Explain the trend in the successive ionisation energies of nitrogen.

(3)

As e^- are removed, as the effective nuclear charge increases which results in a decrease in distance and shielding effect => successive I.E ↑. However, the huge increase between the 5th & 6th I.E is due to the removal of e^- from the inner most energy level. (2) (1)

(Total for Question 14 = 10 marks)
TOTAL FOR SECTION B = 37 MARKS
TOTAL FOR PAPER = 50 MARKS