



Mark

Junior Lyceum Programme

FORM 3 CHEMISTRY TIME: 1h 30min

[illegible]

DO NOT WRITE ABOVE THIS LINE

Class:

Below is a copy of the periodic table.

PERIODIC TABLE

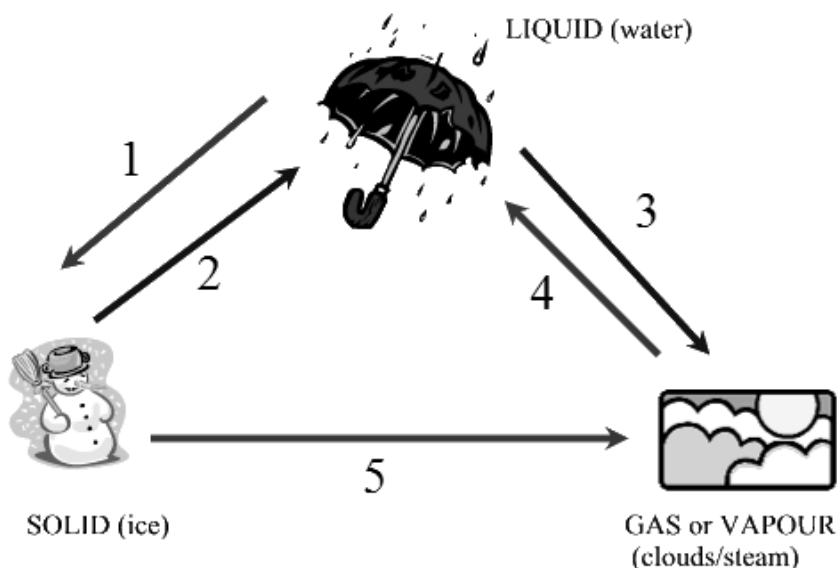
1		2																		3		4	5	6	7	0											
																																				4	He
																																				2	
7		9																		11		12		14		16		19		20							
Li		Be																		B		C		N		O		F		Ne							
3		4																		5		6		7		8		9		10							
23		24																		27		28		31		32		35.5		40							
Na		Mg																		Al		Si		P		S		Cl		Ar							
11		12																		13		14		15		16		17		18							
39		40		45	48	51	52	55	56	59	59	63.5	65	70	73	75	79	80	84																		
K		Ca		Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ga	Ge	As	Se	Br	Kr																		
19		20		21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36																		
85		88		89	91	93	96	99	101	103	106	108	112	115	119	122	128	127	131																		
Rb		Sr		Y	Zr	Nb	Mo	Tc	Ru	Rh	Pd	Ag	Cd	In	Sn	Sb	Te	I	Xe																		
37		38		39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54																		
133		137		139	178	181	184	186	190	192	195	197	201	204	207	209	210	210	222																		
Cs		Ba		La	Hf	Ta	W	Re	Os	Ir	Pt	Au	Hg	Tl	Pb	Bi	Po	At	Rn																		
55		56		57	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86																		

a	relative atomic mass
X	symbol
b	atomic number

Section A: Answer ALL questions in this section, using the spaces provided.

This section carries 60 marks.

- 1 Look at this picture and then answer the questions that follow.



- a) Name the processes (labelled 1-5) that are taking place in the picture above.

1. _____
2. _____
3. _____
4. _____
5. _____

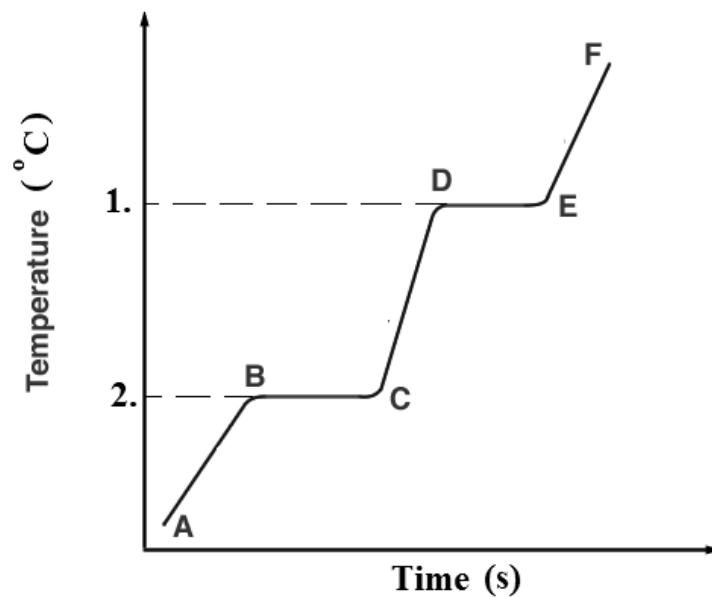
(5 marks)

- b) Explain in terms of particles what is happening during processes **2** and **4** shown in the picture above.

(4 marks)

(Total: 9 marks)

2. The picture above shows the heating curve of pure water.



- a) Explain in terms of particles why the temperature does not increase between points B and C even though heat is given.

(2 marks)

- b) Predict what temperatures 1 and 2 should read. What are these temperatures called?

Temperature 1: _____

Name: _____

Temperature 2: _____

Name: _____

(2 marks)

(Total: 4 marks)

3. a) Write physical or chemical change for each of the changes described in the table below.

Change	Physical or chemical?
i) digesting food	
ii) a hot glass cracking when placed in cold water	
iii) a nail rusting	
iv) autumn leaves changing colour	
v) melting gold to make jewellery	

(5 marks)

- b) Give two reasons for your answer to question a) ii) above.

(2 marks)

(Total: 7 marks)

4. a) Complete the following table:

Atom	Number of protons	Number of neutrons	Electronic configuration	Metal, non-metal or noble gas?
$^{18}_{40}\text{Ar}$				
$^8_{16}\text{O}$				
$^{17}_{35}\text{Cl}$				
$^{12}_{24}\text{Mg}$				

(16 marks)

b) Give **two** properties of metals and **two** properties of non-metals.

(4 marks)

(Total: 20 marks)

5. Write **balanced** equations, **including state symbols**, for the following reactions:

a) Zinc and lead (II) nitrate react to form zinc nitrate and lead.

b) Potassium metal and chlorine gas combine to form potassium chloride.

c) Copper reacts with silver nitrate to produce copper (II) nitrate and silver.

d) Sodium sulfate and water form during the reaction that occurs between sulfuric acid and sodium hydroxide.

(12 marks)

(Total: 12 marks)

6. Magnesium consists of three isotopes with masses of 24 (78.5%), 5 (10%) and 26 (11.5%).

a) Define the term isotope.

(3 marks)

b) Calculate the relative atomic mass of magnesium. (Show your working)

(5 marks)

(Total: 8 marks)

Section B: Answer BOTH the questions in this section on the separate sheets provided. This section carries 40 marks.

7. This question is about bonding.

a) Draw a dot-cross diagram (showing outer shell electrons only) to show the structure of the following compounds. **For each compound state what type of bonding is present.**

- i) an oxygen **molecule**
- ii) carbon dioxide
- iii) calcium chloride
- iv) aluminium oxide

(16 marks)

b) Give **two** different properties of ionic and covalent bonding. (Copy and fill in the table on the separate sheets provided.)

Ionic bonding	Covalent bonding

(2 marks)

c) Give **two** differences between mixtures and compounds.

(2 marks)

(Total: 20 marks)

8. In Malta, it is illegal to drink alcohol if you are not over 16 years old. A policeman passing in front of a group of teenagers, one Saturday night, suspects that they have alcohol (ethanol) mixed with water in their drinking bottles.

a) Devise an experiment to help the policeman check whether his suspicions are true or not. In your answer you should include:

- The necessary practical steps (method). (7 marks)
- A labelled diagram of the apparatus that has to be used. (5 marks)
- 2 precautions that need to be taken during the experiment. (2 marks)
- 2 observations made during the experiment. (2 marks)

b) Alcohol and water are said to be miscible. What does the term miscible mean?

(1 mark)

c) i) Jack was rushing to make his lunch before going to work when he accidentally hit a bottle of oil which was left open. As a result some oil ended in a glass of water which was standing next to it. Can John separate the oil and water in the same way? Why?

(2 marks)

ii) How could these two substances be separated instead?

(1 mark)

(Total: 20 marks)