

KULLEĠĠ SAN BENEDITTU

Boys' Secondary, Kirkop

Mark

HALF-YEARLY EXAMINATION – 2013/2014

Junior Lyceum Programme

FORM 3

CHEMISTRY

TIME: 1h 30min

Question	1	2	3	4	5	6	7	8	Global Mark
Max. Mark	9	4	7	20	12	8	20	20	100
Mark									

DO NOT WRITE ABOVE THIS LINE

Name: _____

Class: _____

Below is a copy of the periodic table.

PERIODIC TABLE

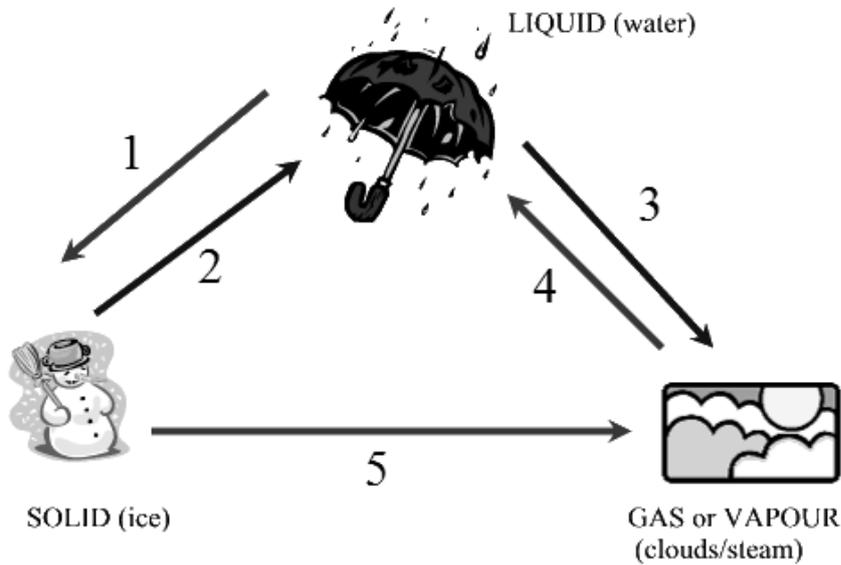
1	2											3	4	5	6	7	0
																	4 He 2
7 Li 3	9 Be 4											11 B 5	12 C 6	14 N 7	16 O 8	19 F 9	20 Ne 10
23 Na 11	24 Mg 12											27 Al 13	28 Si 14	31 P 15	32 S 16	35.5 Cl 17	40 Ar 18
39 K 19	40 Ca 20	45 Sc 21	48 Ti 22	51 V 23	52 Cr 24	55 Mn 25	56 Fe 26	59 Co 27	59 Ni 28	63.5 Cu 29	65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

Key

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. _____

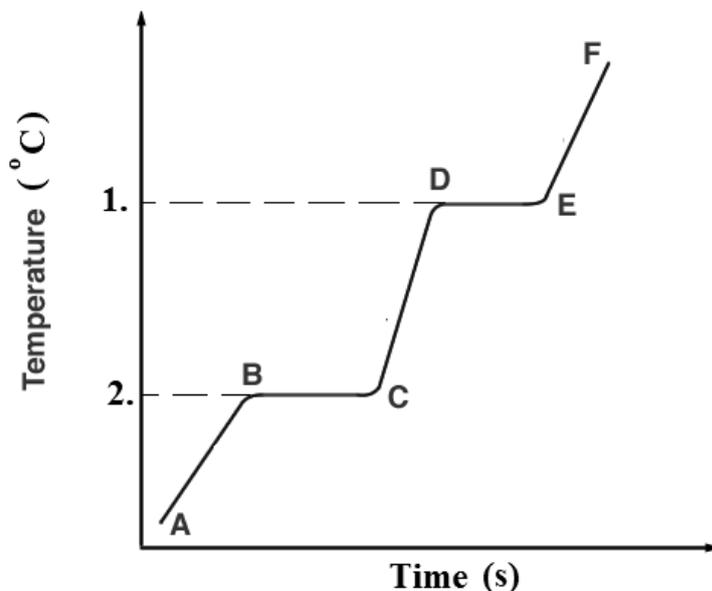
(5 marks)

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)