SUBJECT: SCIENCE

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Instructions:

1) Students MUST complete the study guide before revision classes.

2) Students are ALLOWED to use calculators for problem-solving tasks.

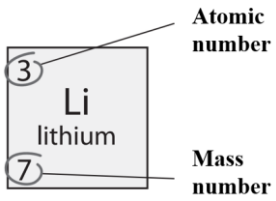
PART 1. SCIENTIFIC TERMS

NO.	TERMS	UNITS	DEFINITIONS	VIETNAMESE TRANSLATIONS
1	**atomic number**	2.1		
2	**electron shell**	2.1		
3	**electronic structure**	2.1		
4	**electrostatic force**	2.1		
5	**energy level**	2.1		
6	**mass number**	2.1		
7	**Periodic Table**	2.1		
8	**alkali metal**	2.2		
9	**halogen**	2.2		
10	**noble gas**	2.2		
11	**chemical bond**	2.3		
12	**covalent bond**	2.3		
13	**ion**	2.3		
14	**ionic bond**	2.3		
15	**ionic compound**	2.3		
16	**molecule**	2.3		
17	**stable**	2.3		

18	**outermost electron shell**	2.3		
19	**graphite**	2.4		
20	**intermolecular force**	2.4		
21	**lattice**	2.4		
22	**layer**	2.4		
23	**macromolecule**	2.4		
24	**density**	3.1		
25	**hollow**	3.1		
26	**regular**	3.1		
27	**irregular**	3.1		
28	**solid**	3.1		
29	**heat**	3.2		
30	**temperature**	3.2		
31	**conserve**	3.3		
32	**create**	3.3		
33	**destroy**	3.3		
34	**dissipate**	3.3		
35	**system**	3.3		
36	**cold**	3.4		
37	**hot**	3.4		
38	**conduction**	3.5		
39	**convection**	3.5		
40	**convection current**	3.5		
41	**emit**	3.5		
42	**expand**	3.5		
43	**radiation**	3.5		
44	**vigorously**	3.5		
45	**thermal energy**	3.5		
46	**porous**	3.6		
47	**random**	3.6		
48	**evaporation**	3.6		

PART 2. EXERCISES

Exercise 1. Complete the table below.



Formula
Atomic number = Number of protons = Number of electrons
Number of neutrons = Mass number – Atomic number

Element	Atomic number	Mass number	Number of protons	Number of neutrons	Number of electrons	Electronic structure	Alkali metal, halogen, or noble gas?
helium	2	4					
lithium	3	7					
neon	10	20					
chlorine	17	35					

Exercise 2. Draw dot and cross diagrams to illustrate atomic and ionic structures of the following elements and compounds.

Element	Atomic number	Compound
Mg	12	MgO
O	8	

1. The atomic diagram of magnesium

2. The atomic diagram of oxygen

3. The ionic structure of magnesium oxide

Exercise 3. Complete the table below.

Substance	Melting point in ^oC	Boiling point in ^oC	Electrical conductivity	Type of chemical bond	Why?
sodium chloride	801	1413	Yes - when it melts		
methane	-182	-161	No		

<u>Exercise 4</u>. Solve the following problems and show your calculation steps clearly. Give your answers correct to one decimal place.

<u>Formula</u>:

$$density = \frac{\text{mass}}{\text{volume}}$$

1. A jar made of polyethylene has a volume of 200 cm^3. Given that the density of polyethylene is 0.95 g/cm^3, calculate its mass.
2. A cubic box made of pine wood has a side length of 5 cm. Given that it weighs 51.25 g, calculate the density of pine wood.
3. A small rock made of quartz has a mass of 150 g. Given that the density of quartz is 2.65 g/cm^3, calculate the volume of the rock.

<u>Formula</u>: *the total energy input = the total energy output*

4. A fuel cell provides 950 J of chemical energy, producing 800 J of electrical energy. How much energy is lost to heat?
5. A motor outputs 550 J of useful energy but loses 150 J to friction. How much energy input does it need?
6. A light bulb is supplied with 400 J of electrical energy, but 100 J is lost as heat. How much useful light energy does it emit?