BAULKHAM HILLS HIGH SCHOOL

HALF YEARLY EXAMINATION

2010

YEAR 11

CHEMISTRY

GENERAL INSTRUCTIONS

- Reading time - 5 mins
- Working time - 1 ½ hours
- Board approved calculators may be used
- Write, using black or blue pen only
- Draw diagrams using pencil
- A periodic table is supplied

TOTAL MARKS: 60

Part A :

- 15 Multiple Choice Questions worth 1 mark each
- 15 marks total

Part B :

- Questions of variable length
- Total marks = 45

Answer all questions in the space provided

Part A - 15 Multiple Choice Questions (15 marks total)

1. The ion of which element could have an electron configuration of 2.8?

   a) Aluminium
   b) Beryllium
   c) Chlorine
   d) Neon

2. Which of the following correctly shows the Lewis electron dot structure of hydrogen sulfide?

   a) H **:** S **:** H

   b) H **:** S **:** H

   c) **:** H **:** S **:** H **:**

   d) $[H]^{+}$ **[:** S **:]** $^{2-}$ $[H]^{+}$

3. Given that the charge on the sulfate ion is -2, the formula for iron (III) sulfate is -

   a) $Fe_2 S0_4$
   b) $Fe_2 (S0_4)_3$
   c) $Fe (S0_4)_2$
   d) $Fe_2 (S0_4)_2$

4. The list of substances that contain ionic bonds only is:-

   a) $KC\ell$, Mg0, $CuC\ell_2$
   b) $KC\ell$, $Mg(N0_3)_2$, $C0_2$
   c) Mg0, Cu $C\ell_2$, $S0_2$
   d) $Mg(N0_3)_2$, K_20, $C0_2$

5. Which list contains four mixtures ?

   a) air, seawater, mercury, ammonia
   b) sand, seawater, bauxite, brass
   c) copper chloride, diamond, mild cement
   d) coffee, milk, glass, graphite

6. The property that would be most important in deciding how to separate a mixture of sodium chloride and lead bromide would be :

   a) their solubilities
   b) the colour of the lead compound
   c) their ability to evaporate at temperatures above $100^{o}C$
   d) the fact that the bromide and chloride belong to different groups on the periodic table

7. The part of the Earth where all life exists is called the :

a) lithosphere
b) biosphere
c) hydrosphere
d) atmosphere

8. The compounds H_2O, SiO_2 and Fe_2O_3 are all likely to be found in the :

a) biosphere
b) hydrosphere
c) lithosphere
d) atmosphere

9. The following data was collected about the elements M, N, O and P.

Element	**Melting Point (ºC)**	**Boiling Point (ºC)**	**Density (g/cm3)**	**Electricity Conductivity ($\mu\Omega^{-1}m^{-1}$)**
M	1410	3267	2.03	10^{-3}
N	1064	2808	19.3	44
O	114	184	4.95	10^{-13}
P	3974	4830	2.26	0.07

Which one of the four elements above is the only metal?

a) M
b) N
c) O
d) P

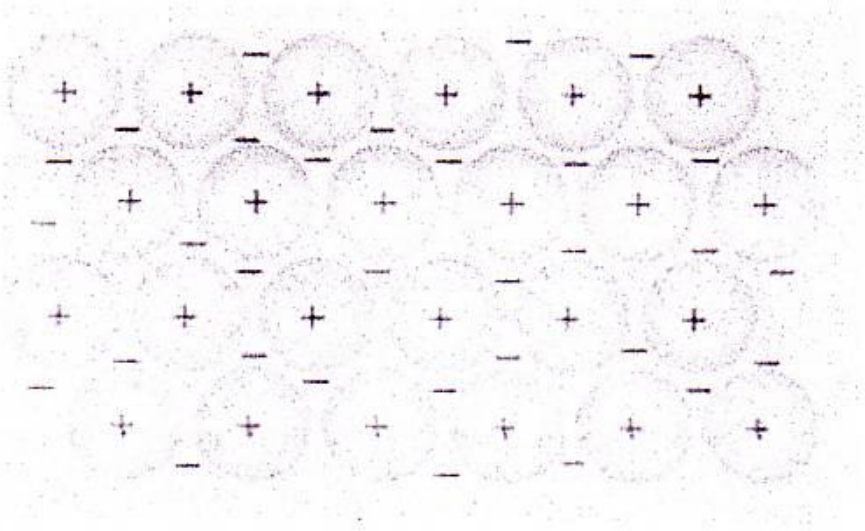
10. In which of the following do BOTH processes involve physical changes?

a) Burning coal; evaporating alcohol
b) Melting sugar; dissolving alcohol in water
c) Boiling water; forming rust on a nail
d) Burning alcohol; discolouring silver salts in the presence of light

11. Which of the following groups contains only non-metal elements?

a) Cℓ, Kr, Pd, P
b) I, N, He, C
c) W, Se, S, Si
d) N, O, Ag, Ar

12. The following diagram represents:



a) a molten ionic substance
b) a metallic crystal
c) a network covalent lattice
d) non-metal atoms forming ions

13. Which property of copper is least important when it is used in cooking equipment?

a) Low chemical reactivity
b) High malleability
c) High thermal conductivity
d) Salmon pink colour

14. The compound formed between the elements aluminium and fluorine has the following formula and name –

a) $A\ell_2 F_3$ Aluminium fluorite
b) $A\ell_2 F_3$ Aluminium fluoride
c) $A\ell F_3$ Aluminium fluoride
d) $A\ell_2 F_3$ Aluminium fluorite

15. Light energy is produced during the :

a) Combustion of magnesium
b) Photolysis of silver bromide
c) Electrolysis of sodium chloride
d) Thermal decomposition of magnesium

Name: …….. Teacher: ……..

BAULKHAM HILLS HIGH SCHOOL

HALF YEARLY EXAMINATION

2010

YEAR 11

CHEMISTRY

MULTIPLE CHOICE – ANSWER SHEET

Place a (X) in the box that corresponds to the best answer

	A	B	C	D
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				

Part B – Questions of variable length – Total 45 Marks
Write your answers for Section II in the spaces provided.

Marks

Question 16 (4 marks)

You are provided with a beaker containing a mixture of sand and salt water.

a) Describe, with experimental details, a method you would use to separate the sand from the salt water. **2**

……...

……..

……...

……...

……...

……...

b) A gravimetric analysis of the mixture was carried out, and the following results were obtained. **2**

mass of sand + water + beaker = 180.4 g
mass of beaker = 120.2 g
mass of dried sand = 30.6 g
mass of dried salt = 4.1 g

Calculate the % of sand and salt in the mixture.

Marks

Question 17 (3marks)

Match the method of separation with the substances being separated in each of the following cases:

Substance being Separated	Method of Separation
a) Copper pyrite from its ore	(i) Fractional distillation
b) Sodium chloride from seawater	(ii) Solar evaporation
c) Steel beer cans from aluminium coke cans	(iii) Magnetic means
	(iv) froth flotation

a) ……. **1**

b) ……. **1**

c) ……. **1**

Question 18 (2 marks) **2**

Describe examples where gravimetric analysis can provide useful information for scientists.

……

……

……

……

Question 19 (2 marks) **3**

Identify one industrial separation process on a mixture from the biosphere, lithosphere, atmosphere or hydrosphere. For this process -

i) name the principal product of the separation process
ii) describe the physical property involved in the identified separation process
iii) outline one issue associated with wastes from the process.

Process : ……

i) ……

ii) ……

iii) ……

……

……

Marks

Question 20 (5 marks)

The nucleus of an atom contains 17 protons and 20 neutrons.

a) What is the electron configuration of this atom? **1**

……..

b) Draw the Lewis dot structure of the ion of this atom. **1**

c) Write the chemical formula of a metal ion which has the same electron configuration as this ion. **1**

……..

d) Would the ions in part (b) and part (c) attract or repel each other. Explain. **2**

……..

……..

……..

Question 21(2 marks) **2**

Carbon-14 is a radioactive isotope of carbon that is present in living things.
Define mass number and atomic number and explain how this applies to Carbon-14.

……..

……..

……..

……..

Question 22 (3 marks) **3**

Explain in terms of bonding why sodium chloride (NaCℓ) is ionic whereas hydrogen chloride (HCℓ) is covalent.

……..

……..

……..

……..

……..

……..

Question 23 (6 marks)

During your practical investigation, you decomposed carbonates by heating.

a) Name a carbonate that decomposed on heating. **1**

……..

b) Name a carbonate that did not decompose on heating. **1**

……..

c) Write a balanced chemical equation for the decomposition of the carbonate in a). **1**

……..

d) Describe a chemical test and a physical test you could use to identify the gas product. **2**

Chemical test : …….

……..

Non-chemical test : ……

……..

e) What safety precautions need to be considered when decomposing a carbonate using a bunsen burner? **1**

……..

……..

……..

Marks

Question 24 (2marks)

The table below gives physical properties of a number of metals.
Use this table to answer the questions.

Metal	**Density ($g.cm^{-3}$)**	**Melting temperature (ºC)**	**Electrical conductivity ($MS\ m^{-1}$)**	**Thermal conductivity ($J\ s^{-1}\ m^{-1}\ K^{-1}$)**	**Tensile strength**
V	8.96	1085	57.9	401	High
W	11.4	327	4.8	37	Low
X	1.74	650	23	156	Low
Y	2.7	660	38	237	Moderate
Z	7.86	1535	10.3	80	Very high

Based on nothing more than the information in this table, identify which metal would be most suitable for the following purposes:

i) Electrical wiring in a house

……

ii) Building a bridge

……

iii) Constructing the frame of an ultralight aircraft

……

iv) Producing saucepans

……

Question 25 (3marks)

During practical work, you have constructed or used models to represent the structure of metals, ionic compounds, covalent molecular compounds and covalent network compounds.

Discuss the limitations of using such models to represent these structures.

……

……

……

……

……

……

Question 26 (3marks)

Three substances undergo changes when treated as described in the following table.

	Substance	Treatment	Observations
i	Lead	Strongly heated to 500^{o}C	Grey-silver solid melts to form a grey-silver liquid at 327^{o}C
ii	Zinc Iodide	Strongly heated to 700^{o}C	White crystalline solid changes to a grey liquid and a purple vapour.
iii	Lead (II) Bromide	Electrolysed at 500^{o}C	Pale yellow liquid which forms a brown gas at one electrode and a silver liquid at the other electrode

Identify the three changes as physical or chemical. Justify your answers.

i) …… Justification ……

……

……

ii) …… Justification ……

……

……

iii) …… Justification ……

……

……

Question 27 (3marks)

Use a diagram to aid an explanation of why ionic substances, such as NaCℓ, shatter when a force is applied.

……

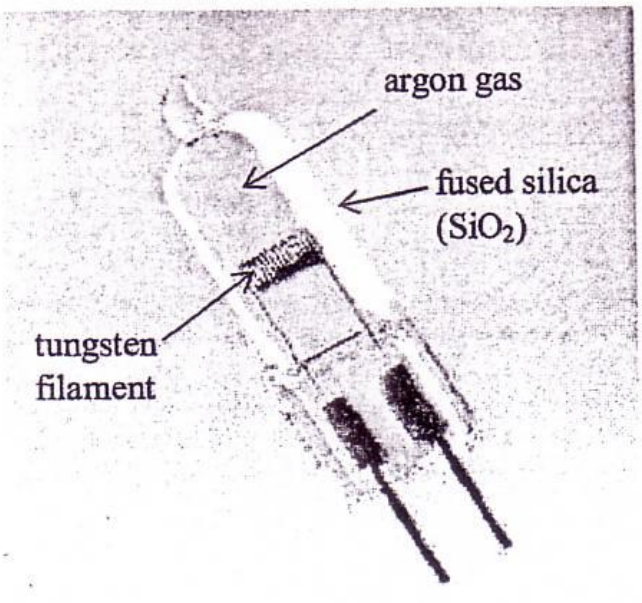
……

……

Marks

Question 28 (6marks)

Refer to the image below, showing the structure of a quartz-halogen lamp. Such lamps are designed for very high filament temperatures; and are much hotter and more efficient than standard lamps.



Compare the properties AND structure of EACH of the three labelled components.
Justify their selection in this application.

Tungsten : …… **2**

……

……

……

……

Silica : …… **2**

……

……

……

……

Argon : …… **2**

……

……

……

……

End of Exam