

THE COLLEGE OF THE BAHAMAS

EXAMINATION

SEMESTER 02-2007

FACULTY OF PURE AND APPLIED SCIENCES

SCHOOL OF SCIENCES AND TECHNOLOGY

X NASSAU
FREEPORT
EXUMA
ELEUTHERA

DATE AND TIME OF EXAMINATION: Monday, June 18, 2007 at 9 am
DURATION: 2 ½ HOURS

COURSE NUMBER: CHEM 071

COURSE TITLE: COLLEGE PREP CHEMISTRY

STUDENT NAME:

STUDENT NUMBER:

LECTURER'S NAME

INSTRUCTIONS TO CANDIDATES: This paper has 5 pages and 30 questions. Please follow instructions given.

SEMESTER 02-2007
CHEMISTRY 071: COLLEGE PREP CHEMISTRY FINAL

Section A: Multiple Choice

Select the single best alternative in each of the following cases and indicate your answer by marking the appropriate letter on the answer sheet according to the instruction on the sheet. There is one mark for each question in this section.

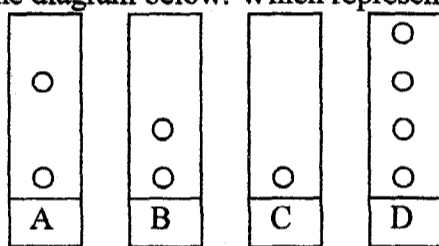
1) Which of the following is not a heterogeneous mixture?

- a) Sulphur and sand
- b) Peas and rice
- c) Oil and water
- d) Alcohol and water

2) The gases He, H₂ and O₂ are all classified as:

- a) Compounds
- b) Atoms
- c) Elements
- d) Mixtures

Questions 3-4 refer to the diagram below. Which represents chromatograms of some dyes?



3) Which chromatogram contains a pure substance? _____

4) Which chromatogram contains substances that are present in each of the other chromatograms?

5) Answer questions 5 & 6 using the elements of period 2 of the periodic table of elements below.

Li ³	Be ⁴	B ⁵	C ⁶	N ⁷	O ⁸	F ⁹	Ne ¹⁰
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All of the elements above:

- a) have the same number of protons
- b) have the same number of electrons in the outer shell
- c) have the same number of electron shells
- d) has the same valency

6) The element Li

- a) has the smallest atomic radius of these elements
- b) is a metal
- c) is not very reactive
- d) forms ionic compounds with itself

7) Which set of elements from the sets of elements below are all non-metals?

- a) Li, Be, C
- b) N, O, F
- c) B, C, F
- d) O, Be, C

- 8) CO_2 gas may be identified by its ability to
- Turn red litmus blue
 - Turns cobalt paper pink
 - Relights a glowing splint
 - Turns lime water milky
- 9) If a neutral atom has a mass number of 24 and an atomic number of twelve, how many electrons are in the outer shell?
- 2
 - 4
 - 6
 - 0
- 10) A single covalent bond between two atoms includes:
- one electron
 - Two electrons
 - Four electrons
 - Two pairs of electrons
- 11) Which acid can release two protons in water?
- H_2SO_4
 - HCl
 - HNO_3
 - H_3PO_4
- 12) Copper I oxide is written Cu_2O Because
- There is one oxygen in the formula
 - Copper has a valency of one in this compound
 - Copper has 1 atom in the outer shell
 - Copper is in group 1 of the periodic table
- 13) Element M is in group 3 of period 3. What is the electronic configuration of this element.
- 2,3
 - 2,8,3
 - 3,2
 - 2,8,2
- 14) Which of the following properties most likely indicate an ionically bonded compound?
- Colourless substance
 - High boiling point
 - Insoluble in water
 - Non conducting aqueous solution
- 15) Two atoms have an identical number of protons but different number of neutrons. Which statement about these atoms is **not correct**?
- They are atoms of the same element
 - They have the same atomic number.
 - They have the same number of electrons
 - They have the same mass number
- 16) A condenser is a piece of apparatus used to:
- Dry substances out
 - Turn liquids into solids
 - Evaporate liquids
 - Turn a gas into a liquid

- 17) Mm Hg. Is a unit of:
- Force
 - Mass
 - Pressure
 - Volume
- 18) A porcelain boat was weighed and its mass recorded as 2.50g. after filling with copper II oxide its mass was 7.50g. this value decreased to 6.85g after heating in a stream of propane gas. The mass of the oxygen in the copper II oxide was.
- 2.0g
 - 0.65g
 - 4.35g
 - 5.0g
- 19) Which statement best describes a substance that is partially ionized in solution and turns blue litmus paper pink.
- It has a pH of 1
 - It has a high concentration of OH⁻ ions
 - It has a PH between 4 and 6.9
 - It has a high PH

Select from the alternatives below to answer questions 20-22

A. Proticity	B. atomicity	C. covalency	D. valency
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- 20) Describes the number of atoms in the molecule .
-
- 21) Refers to the number of hydrogen ions an acid will donate in a reaction.
-
- 22) Describes the number of electrons a metal will loose as it reacts.
-
- 23) In chemistry a salt is a substance that:
- Decomposes when heated
 - Is formed when an acid reacts with a base
 - Makes food taste sweet
 - Form white crystals
- 24) Which group of substances are all ionic compounds?
- NaCl, CH₄, MgO
 - LiF, CaCl₂, Na₂O
 - NH₃ CH H₂
 - KI CCl₄ O₂
- 25) Oxidation may be described as:
- The removal of protons from and element
 - The removal of electrons
 - The addition of electrons
 - The addition of electrons

Section B

Answer all of the following questions

1)

a) Write the chemical formula for each of the following substances. (4Marks)

Iron II Carbonate

i. Ammonium Chloride

ii. Sodium Hydroxide

iii. Magnesium Sulphate

b) Write the name of the following (4marks)

i. Li_2O ii. $(\text{NH}_4)_2\text{SO}_4$ iii. AlCl_3 iv. CaS

c) Write balanced chemical equations with symbol of the states for each of the following :(4Marks)

i. $\text{Al} + \text{O}_2 \longrightarrow \text{Al}_2\text{O}_3$ ii. $\text{AgNO}_3 + \text{NaCl} \longrightarrow \text{AgCl} + \text{NaNO}_3$

iii. Combustion Magnesium.

2) Fill in the following table (7Marks)

Symbol of Atom or ion	Name of element	Mass Number	Number of Protons	Number of Neutrons	Number of electrons	Electronic Config'n
${}^{36}_{17}\text{Cl}^-$						2,88
		2	1			0
	Magnesium	24	12			

3) State the difference between the following:(12Marks)

a)

Physical changes	chemical changes

b)

Ionic Compounds	Covalent compounds

c)

Acids	Bases

d)

Metals	Non-Metals

4) A sample of hydrogen gas occupied a volume 200cm^3 at 10°C and 2 atmosphere pressure .The pressure was increase to 5 atmosphere and the temperature increase to 50°C .Find the new volume of this gas.

a) **List the following:**

Initial Temperature _____ Initial Pressure _____

Initial Volume _____ Final Volume _____ Final

Temperature _____

b) What law must be applied to calculate the final volume.(1/2 Marks)

c) Show working and calculate the final volume of the gas.

 _____ (2Marks)

d) What would be the volume of this gas at STP?

 _____ (2Marks)

5) A porcelain boat first weighed empty an it's mass was found to be 3.1246g. It was then filled with a certain oxide of iron and re-weighed. Now the mass was 4.3245g.the boat was placed in a combustion tube and heated in a stream of hydrogen .after cooling the mass was found to be 3.9929g.

a) What is the weight of:

- i. iron oxide _____
- ii. the iron _____
- iii. the oxygen _____ (3Marks)

b) Calculate the percentage of iron and the percentage of oxygen in the iron -oxide.

 _____ (3Marks)