

Student Number _____ Lecturer _____ Section No. _____

The College of the Bahamas
The School Of Natural Sciences & Environmental Studies

Mid-semester Examination, Semester 022004

Chemistry 071: College Prep Chemistry

Time: 1 hour

Section 1: Multiple Choice Questions (15 Marks)

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

- 1) Which heterogeneous sample would gradually become homogeneous if left undisturbed for several hours ?
- a mixture of ice and water.
 - a mixture of oil and water.
 - a mixture of sand and salt.
 - none of these.
 - all of these.
2. When lead(II) nitrate is heated a brown gas is released along with a gas which relights a glowing splint. Which statement is correct?
- This is a physical change.
 - Copper (II) nitrate is an element.
 - The brown gas is nitrogen dioxide.
 - The gas which relights the glowing splint is nitrogen.
 - Copper(II) nitrate is a mixture.
- 3) Which statement best explains the fact that gases are more compressible than liquids or solids?
- Gases contain more energy than the other states.
 - Gases are composed of molecules whereas liquids and solids consist of ions.
 - Gases are able to flow more easily than liquids and solids.
 - In a gas the molecules move much faster than in the other states.
 - The molecules of a gas are separated by large spaces, but those of other states are not.
- 4) Iodine, sodium chloride, and nitrogen gas are best classified as
- elements
 - compounds
 - solutions
 - mixtures
 - pure substances
- 5) 272K may be expressed as:
- 544°C
 - 1°C
 - 1°C
 - 0°C
 - 273°C
- Use the following answers for questions 6 to 10. Each answer may be used once , several times or not at all.
- a physical change
 - a chemical change
 - a physical property
 - a chemical property
 - compound
- Select the term that best applies to each statement.
- Fluorine is a corrosive gas.
 - Sodium metal burned in air.
 - Water evaporates from skin to give a cooling effect.
 - Copper (II) oxide is not soluble in water
 - Candle wax will melt when heated.

11. In an experiment Magnesium ribbon was burnt in air to form magnesium oxide. If the initial mass of Magnesium was 2.40g and the final mass of magnesium oxide was 4.00g, which of the following statements must be true?
- 1.60g more magnesium metal was formed.
 - 1.60 g of oxygen was used.
 - New atoms were formed
 - Some atoms of oxygen were destroyed.
 - None of the above is true.
12. Substance B was found to be composed of diatomic molecules. Each molecule was found to be composed of identical atoms. Which of the following statements is most likely to be true of substance B ?
- It is an element.
 - It is a heterogeneous mixture.
 - It is a homogeneous mixture
 - It is a compound..
 - Each molecule has three atoms.
13. A colourless gas was prepared in three different laboratories using three different methods. When the substances were chemically analyzed , they were all found to contain 75% carbon and 25% hydrogen. Which of the chemical laws do these observations support ?
- The law of definite proportions (constant composition).
 - The law of conservation of mass
 - The law of multiple proportions
 - The law of colourless gases.
 - Charles' Law
14. What is the atomicity of a propane molecule if the chemical formula is C_3H_8 ?
- 1
 - 3
 - 8
 - 11
 - 24
15. The boiling point of water on top of Mount Everest is lower than at sea level because:
- the air pressure is less.
 - it is very cold on top of Mount Everest.
 - there is very little water at higher altitudes.
 - flame temperatures are less on mountains.
 - physical changes are easier at higher altitudes.

Section II: Short answer questions (35 Marks)

Answer each of the following questions in the space provided on your question paper.

compound	mixture	heterogeneous	solution
evaporation	atom	variable	homogeneous
pure	state	distillation	new
element	molecule	recovered	

- 1) Fill in the blank spaces in the following paragraph with a single word from the above list in each case. Each word may be used only once. The words must complete the sentences grammatically and correctly.

“Elements and compounds are examples of _____ substances. All other kinds of matter are called mixtures. Mixtures consist of two or more substances and have _____ compositions. The properties of a mixture depend upon the composition of the mixture. Mixtures can be classified into two groups. . A _____ mixture is not uniform throughout but consists of parts that are physically distinct. A sample containing iron and sand is an example of this type of mixture The second type of mixture is a _____ mixture. It appears uniform throughout and may also be called a _____. Air ,and salt dissolved in water are both examples of this type of mixture..

Changes in _____, as well as changes in shape, or state of subdivision, are examples of physical changes. Physical methods such as _____ and _____ may be used to separate the components of a mixture, but a substance that was not present in the original mixture is never _____ by these methods. Chemical changes on the other hand, are transformations in which the old substances are converted into _____ ones”.

(5 marks)

- 2) Briefly but carefully explain each the following (2 marks each):

- (i) A pure solid decomposes on heating, yielding a solid and a gas, each of which is a pure substance. From this we can conclude with certainty that the original solid is not an element.

- (ii) When some corn kernels are heated in oil, the kernel eventually pops into fluffy white popcorn. (Hint: popcorn kernels contain a lot of water.)

- (iii) The chemical formula for carbon dioxide is written as CO₂ never CO_{1.98}.

(iv) A single drop of oil placed on the surface of water cannot spread out forever.

3. Read the passage then answer the questions, which follow.

A blue aqueous solution was mixed with a colorless aqueous solution. A dense blue precipitate (solid) was formed. The mixture was then heated over a non-luminous Bunsen flame. The blue solid turned black and settled to the bottom of the beaker. The hot mixture was then filtered. The black solid remained in the filter paper whilst the colorless filtrate went into the conical flask. Hot distilled water was used to wash the residue in the filter paper. The black solid residue was then placed in the oven to allow it to dry.

(i). Select two examples of chemical changes from the passage.(2)

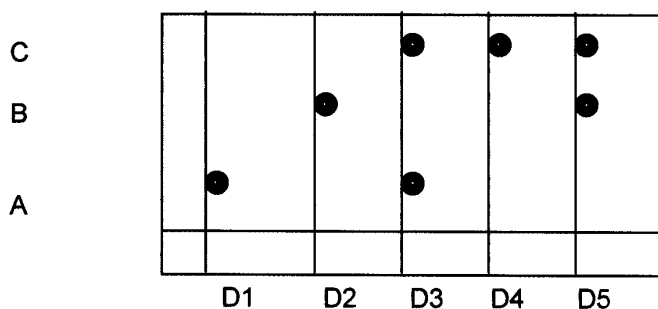
(ii) Select one example of a physical change. (1)

(iii) Identify one separation technique used.(1)

(iv) State the physical property that was taken advantage of in the separation process.(1)

(v) State one reason why a non-luminous Bunsen flame is preferred to a luminous one. (1)

4. Examine the chromatogram of dyes. The chromatography experiment was conducted using acetone as the solvent and chromatography paper. Then answer the questions that follow.



(i) State, with reasoning which dyes, D1 through D5 are pure and which are impure. (4)
