

Printed Last Name: |_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|

Printed First Name: |_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|

Social Security # |_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|

School: |_|_|Barnard |_|_|College |_|_|Engineering |_|_|General Studies

Chemistry 1403x FINE.Section 3 Exam 1 September 23, 2003

INSTRUCTIONS

Be certain you have all eight (8) exam pages and a BUBBLE SHEET

On the EXAM cover sheet, fill in your name and CUID number (as indicated above).

On the BUBBLE SHEET:

- 1) On Side 2 of the Bubble Sheet print your first and last name in the box provided.
- 2) Then fill in your Social Security IDENTIFICATION # in the space provided.
- 3) Using a soft lead pencil, blacken the one response that best answers the question or completes the statement. There is only one correct answer to each question. Any question with more than one answer will not be counted.
- 4) Your score will be the total number of correct answers; therefore, it is to your advantage to answer every question.
- 5) There are 20 QUESTIONS. They are equally weighted.
- 6) You will be given 60 MINUTES to complete the exam.
- 7) TAKE THE TIME TO READ EACH QUESTION CAREFULLY.

UNDER NO CIRCUMSTANCES are you to make marks on the bubble sheet except in the appropriate bubbles for marking an answer you believe to be correct.
You may write on the exam sheets themselves for the purpose of doing calculations.

THE PERIODIC TABLE OF THE ELEMENTS is on PAGE 7 of this exam.
THERE IS A SCRATCH SHEET on PAGE 8 of this exam.

Check the front blackboard for TIME REMAINING, LAST-MINUTE CORRECTIONS and ADDITIONAL INFORMATION.

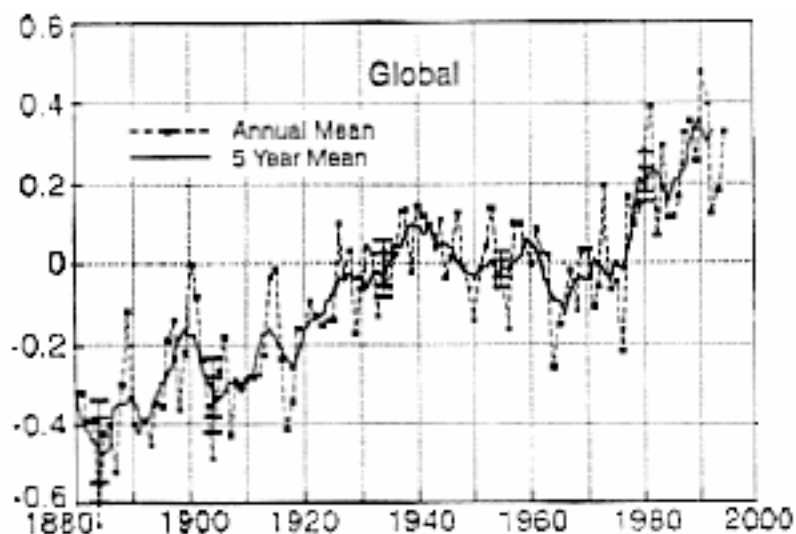
WHEN YOU HAVE FINISHED THE EXAM or at the end of the allowed time, deposit the exam and the bubble sheet in the separate boxes provided at the front of the room.

DO NOT FORGET! Print your first and last names in the box provided on the bubble sheet, and on the front page of the 8 page exam.

REMEMBER! It is your responsibility to ensure that your bubble sheet and exam sheets are properly identified. BOTH MUST BE HANDED IN BEFORE YOU LEAVE.

1. Based on the data recorded in the following graph of global mean temperature versus time, the best conclusion one could draw is that

- a) there has been global warming
- b) there has been global warming between 1930-1980
- c) **there has been global warming since 1880**
- d) global warming has been greater than any time in the past 10,000 years
- e) there has not been global warming



2. A ice cube measuring 10.0 cm on an edge melts into a puddle whose volume is....:
($d_{\text{ice}}=0.917\text{g/cm}^3$; $d_{\text{water}}=0.997\text{g/mL}$)

- a) 100. mL
- b) 917. mL
- c) **920. mL**
- d) 1000. mL
- e) 1090. mL

3. 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.....

- a) **the original solid is not an element**
- b) at least one of the products is an element
- c) both products are elements
- d) none of the products are elements
- e) the original solid and both products are not elements.

4. Which of the following could NOT be an empirical formula?
- a) $\text{C}_{17}\text{H}_{25}\text{NO}_3$
 - b) $\text{C}_{14}\text{H}_{10}\text{CuO}_4$
 - c) **$\text{C}_9\text{H}_{15}\text{N}_3\text{O}_6$**
 - d) $\text{C}_8\text{H}_{18}\text{O}_3$
 - e) All of the above could be empirical formulas.
5. If 1.083 g of element M combine with 1.000 g of oxygen in forming MO_3 then M is most probably....
- a) **chromium**
 - b) vanadium
 - c) molybdenum
 - d) rhenium
 - e) tungsten
6. The mass of one carbon monoxide molecule is...
- a) 12.0000 g
 - b) 28.0 g
 - c) 44.0 g
 - d) **$4.65 \times 10^{-23} \text{g}$**
 - e) $1.66 \times 10^{-24} \text{g}$
7. The most likely formula for the principal oxide of aluminum is...
- a) AlO
 - b) Al_2O
 - c) **Al_2O_3**
 - d) AlO_2
 - e) Al_3O_4
8. The element that is most reactive toward water is....
- a) Li
 - b) Na
 - c) K
 - d) Rb
 - e) **Cs**

9. All of the following are true of water EXCEPT...

- a) **Reacts vigorously with phosphorus**
- b) Is a product of the reduction of tungstic oxide (WO_3) with hydrogen (H_2)
- c) Is less dense than $\text{D}_2\text{O}(\text{s})$.
- d) Generates hydrogen in reactions with Na.
- e) Is a product of the reaction of sucrose with sulfuric acid

10. Which of the following pairs are isomers?

- a) O_2 and O_3
- b) H_2O and H_2O_2
- c) $^1\text{H}_1$ and $^2\text{H}_1$
- d) **CH_3OCN and CH_3CNO**
- e) g? ? ? ? ? ? ? ? ? ? ? ? ? ?

11. If the atom composition of the entire universe is essentially 93% H atoms and 7% He atoms, then the weight-percentage of hydrogen atoms in the universe must be.....

- a) 20%
- b) 23%
- c) **77%**
- d) 87%
- e) 93%

12. For a factory assembling six-cylinder cars which has on hand 10,000 tires (5 tires per car), 18,000 spark plugs (one spark plug per cylinder) and unlimited supplies of other parts, the number of cars that can be assembled is.....

- a) 1000
- b) **2,000**
- c) 3,000
- d) 10,000
- e) 18,000

13. A binary compound of silicon (Si) and nitrogen (N) contains 2.00g Si/g N. A second binary compound of the same elements contains 1.50 g Si/g N. If the second compound has the empirical formula Si_3N_4 , then the empirical formula of the first compound must be..

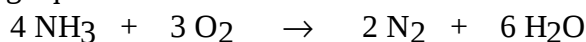
- a) Si_3N_4
- b) Si_3N_3
- c) Si_4N_4
- d) Si_4N_3
- e) **SiN**

14. If a certain oxide of manganese (Mn) is known to be about 50% (by weight) Mn, then

to a close approximation, the empirical (simple) formula for the compound must be.....

- a) $\text{MnO}_{3.5}$
- b) Mn_2O_7**
- c) Mn_2O
- d) MnO_2
- e) MnO

15. If a mixture of 34.0 g of ammonia (NH_3) and 50.0 g of oxygen (O_2) reacts according to the following equation:



then the grams of nitrogen (N_2) formed must be.....

- a) 28.0 g**
- b) 29.2 g
- c) 51.0 g
- d) 54.0 g
- e) 56.2 g

16. If equal weights of zinc and iodine are mixed together and the iodine is completely



converted to zinc iodide, then the fraction of the zinc originally present that remains unreacted must be...

- a) 0.20
- b) 0.50
- c) 0.57
- d) 0.74**
- e) 0.77

17. When hydrogen sulfide is burned in an atmosphere of sulfur dioxide, elemental sulfur and water are the products. The sum of the coefficients that balances the equation is.....



- a) 4
- b) 5
- c) 6
- d) 7
- e) 8**

18. The contents of the sugar bowl have been purposely adulterated with table salt (NaCl)

and it isn't even Halloween. Who would do such a thing? Anyway, chemical analysis reveals the mixture to be 35.45 % Cl by weight. So, the percent sugar in the bowl must be.....

- a) 25.0 %
- b) 29.4 %
- c) 35.5 %
- d) 41.5 %**
- e) 58.5 %

19. One gram of a gaseous compound of carbon and hydrogen gives upon combustion 3.30 g of carbon dioxide and 0.899 g of water. In a separate experiment, the density of a gaseous sample of the compound is found to be 3.57 g/L under conditions of STP. What is the molecular (true) formula?

- a) C_3H_3
- b) C_3H_4
- c) C_3H_6
- d) C_6H_6
- e) C_6H_8**

20. A mixture of KBr and NaBr weighing 0.560 gram was treated with aqueous silver nitrate and all the bromide ion was recovered as 0.970 gram of pure AgBr. What was the fraction (by weight) of NaBr in the original sample? (At. wts: Br=79.904; K=39.0983; Na=22.9898; Ag=107.87).

- a) 0.21
- b) 0.35
- c) 0.38
- d) 0.41
- e) 0.62**

PERIODIC TABLE

SCRATCH SHEET