

Celebration # 2 (CHEMICAL) **ANSWERS**

Part One Directions: Choose best answers for each question, fill in neatly on ANSWE SHEET. USE CAPITAL LETTERS for multiple choice, write neat answers with proper significant figures and units where appropriate.

- If 48.6 g Mg metal reacts completely with 32.0 grams of oxygen, how much magnesium oxide is produced in grams? **80.6 g**
- Three elements, carbon, titanium, and tungsten, have three different boiling points. Which is the CORRECT ORDER for these for LOWEST to HIGHEST BP?
 A. C, Ti, W **B. Ti, C, W** C. Ti, W, C D. W, C, Ti
- You measure a chunk of metal that is 2.0 x 2.0 x 3.0 cm in size and find its mass to be 32.4 grams. What metal is this? **2.7 g/cm³ = Al**
- Which would be considered to be a CHEMICAL change?
 A. bending of iron B. magnetizing of iron
 C. melting of iron **D. rusting of iron**
- An example of a substance that can be decomposed by chemical change is:
A. water B. tin C. helium D. Silicon
- Which of these materials is a MIXTURE?
 A. water B. methane **C. air** D. water

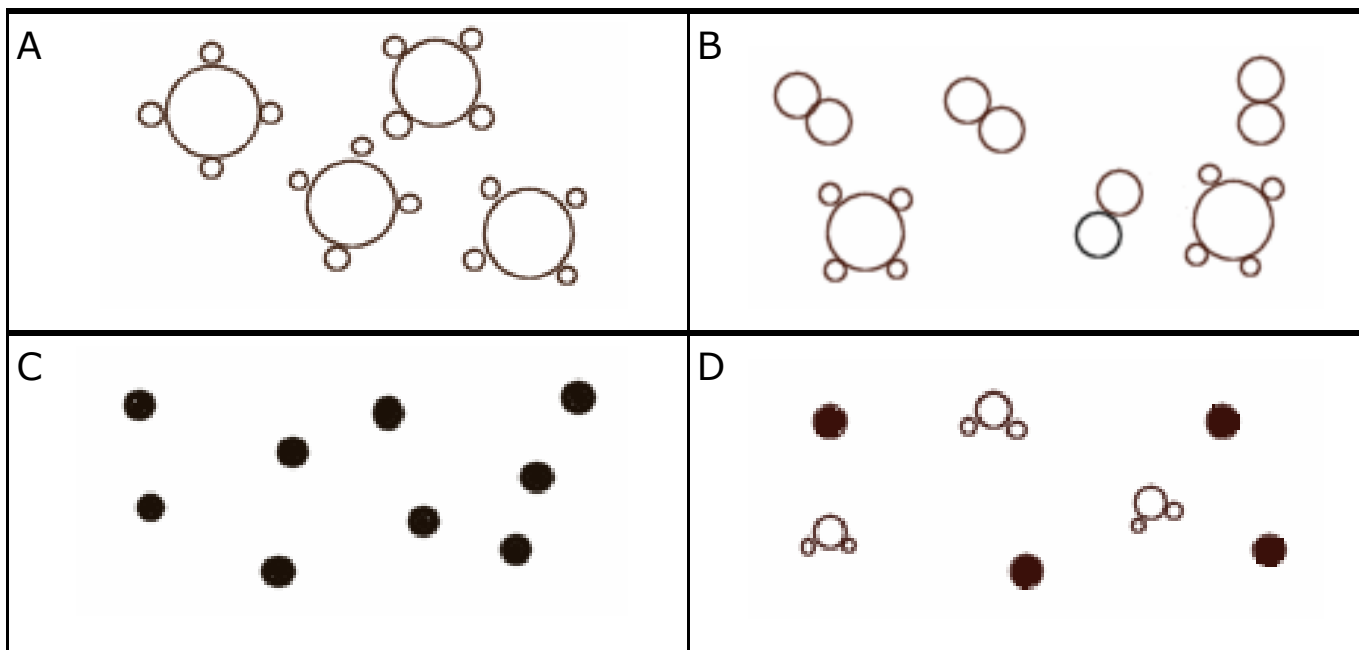
Numbers SEVEN through FOURTEEN are matching. Choose the best word at right that describes what is written on the left.



7. everything that has mass and takes up space C	A. homogeneous B. phase of matter C. matter D. heterogeneous E. element F. chemical change G. physical change H. chemical symbol I. conservation of mass J. chemical reaction K. mixture
8. a physical blend of substances K	
9. the same throughout, as sugar dissolved into water A	
10. a pure substance is made of one kind of atom only E	
11. the process of the evaporation of water B	
12. not the same throughout, like sand & water mixed D	
14. the combustion of natural gas is an example of F	

15. There is a compound called ammonium chloride and its chemical symbol is written as: NH_4Cl
 How many atoms are in one ammonium chloride molecule? **SIX**
16. NH_4Cl can be considered a
 A. mixture **B. compound** C. element D. heterogeneous substance
17. When you combine four grams of hydrogen with thirty two grams of oxygen, they completely combine into water. How many grams of water? **36 g**
18. When sugar is dissolved into water, the resulting solution is classified as a
 A. heterogeneous mixture **B. homogeneous mixture**
 C. heterogeneous compound D. homogeneous compound

FOR numbers 19, 20, and 21, use these boxes which contain particle diagrams, to answer the questions

19. Which of the particle diagrams represents an element?
 A B **C** or D
20. Which of the particle diagrams represents both an element AND a compound?
 A B C or **D**
21. Which of the particle diagrams represents a MIXTURE?
 A **B** C or **D two answers to this one**



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Matter Celebration name: _____

version: CHEMICAL

Put ALL part one answers in the boxes at left.
20 questions x 4 points each = 80 total points.

For Part 2 - CHOOSE ANY TWO from A, B, and C
Use the chart below to provide you with data
to answer part A, B and C.
Each is worth 10 points = 20 total points.

substance name	freezing point °C	boiling Point °C	density g/cm ³
ethanol	-117	+78	0.789
water	0	+100	1.00
sucrose	+185	decomposes upon heating	1.59
sodium chloride	+801	+1413	2.17

ON THE BACK... choose only two of these three problems to discuss.

Part A: Using the chart above, describe how to separate a solution of ethanol and water if you DID NOT have a distillation apparatus.

Part B: Explain why you would need to pay careful attention to the thermometer in the distillation apparatus to separate a mixture of ethanol and water if you did have access to this device.

Part C: You are given 50.0 cubic centimeters of two different white crystal powders and are told that one is sodium chloride (table salt), and the other is sucrose (table sugar). Describe how you could prove which one is sugar and which one is salt using equipment that we have in our chem lab. You may destroy either or both samples if necessary. You may not use taste, of course!

A. To separate ethanol and water you look for a difference in physical properties and take advantage of them. Freezing points for these two are wide apart. If you chilled this solution (homogeneous mixture) to say a temperature less than zero centigrade but not as cold as ethanol's freezing point, only the water would freeze. You could lift out the solid ice from the liquid ethanol.

Or you could heat the solution to above 78 centigrade and the ethanol would boil away, leaving behind hot but liquid water. If the temperature got too high, there is a chance water would boil too. Increased temperature leads to more evaporation, so this is less controlled than freezing technique.

B. If you did distill this solution, you need to keep the distillation flask under 100 but over 78 centigrade. This way only the ethanol boils, but not the water.

C. Put one in a pan over heat. Salt will get hot but remain as it was. Sugar would decompose to black carbon and give off steam (and stink). You could carefully measure out equal volumes in identical beakers. The heavier beaker would have to be the denser of the two which is the salt.