



# **DO NOT OPEN**

## **UNTIL INSTRUCTED TO DO SO**

*CHEM 100 – Dr. McCorkle – Exam #1*

While you wait, please complete the following information:

**Name:** \_\_\_\_\_

**Student ID:** \_\_\_\_\_

*Turn off cellphones and stow them away. No headphones, mp3 players, hats, sunglasses, food, drinks, restroom breaks, graphing calculators, programmable calculators, or sharing calculators.*



**Multiple Choice – Choose the answer that best completes the question. Use an 815-E Scantron to record your response. [2 points each]**

1. How would you write 83,000 ft in proper scientific notation?

- A)  $8.3000 \times 10^4$  ft                      B)  $8.30 \times 10^4$  ft                      C)  $0.83 \times 10^5$  ft  
D)  $8.3 \times 10^{-4}$  ft                      E)  $8.3 \times 10^4$  ft

2. How would you write  $7.12 \times 10^{-3}$  kg as a standard number?

- A) 7120 kg                      B) 712 kg                      C) 0.0712 kg  
D) 0.00712 kg                      E) 0.07120 kg

3. How many significant digits are in 0.0081020 mL?

- A) 4                      B) 5                      C) 6                      D) 7                      E) 8

4. Perform the following calculation and give the answer with the correct significant digits:

$$34.6 \div 15.80 \times 0.020 =$$

- A) 0.04                      B) 0.043                      C) 0.044                      D) 0.0438                      E) 0.04380

5. Perform the following calculation and give the answer with the correct significant digits:

$$25.43 \text{ s} + 105.2 \text{ s} - 0.017 \text{ s} =$$

- A) 130 s                      B) 131 s                      C) 130.6 s                      D) 130.61 s                      E) 130.613 s

6. Perform the following calculation and give the answer with the correct significant digits

$$\frac{0.073 \times 6.21 \times 10^{-7}}{1.040 \times 10^5} =$$

- A)  $4.4 \times 10^{-13}$                       B)  $4.35 \times 10^{-13}$                       C)  $4.4 \times 10^{-3}$   
D)  $4.35 \times 10^{-3}$                       E)  $4.4 \times 10^{-12}$

7. Which of the following equalities is correct?

- A)  $10^{-3} \text{ mg} = 1 \text{ g}$                       B)  $1 \text{ Mg} = 10^{-6} \text{ g}$                       C)  $1 \text{ g} = 10^{-2} \text{ cg}$   
D)  $10^{-12} \text{ g} = 1 \text{ ng}$                       E)  $10^{-1} \text{ g} = 1 \text{ dg}$

8. The correct multiplier for femto is:

- A)  $10^{12}$                       B)  $10^{15}$                       C)  $10^{-9}$                       D)  $10^{-12}$                       E)  $10^{-15}$

9. A watermelon has a mass of 4.2 kg. What is this mass in mg?

- A)  $4.2 \times 10^6 \text{ mg}$                       B)  $4.2 \times 10^9 \text{ mg}$                       C)  $4.2 \times 10^{-6} \text{ mg}$   
D)  $4.2 \times 10^{-3} \text{ mg}$                       E) 4.2 mg



**Calculations – Write your initials in the upper-right corner of every page that contains work. For full credit show all work and write neatly; give answers with correct significant figures and units. Place a box around your final answer.**

16. For the following pairs, circle the one that is larger in value. If both values are equal, then circle BOTH responses. [1 point each, no partial credit]

a. 3.8 miles *or* 3.8 kilometers

b. 27 in. *or* 27 cm

c. 450 nutritional calories *or* 450 kcal

d. 75 lb. *or* 75 kg

17. Today the high temperature in Oceanside is supposed to be 93 °F. (Yikes!)

a. What is this temperature in Celsius? [2 points]

b. What is this temperature in Kelvin? [2 points]

18. In England, a person is weighed in stones. If one stone has a mass of 14.0 lb, what is the mass in kilograms of a person who weighs 12.0 stones? [3 points]

19. A 1.0 lb. bag of trail mix contains 23.6% peanuts. How many grams of peanuts are in the bag? [3 points]

20. Chalcopyrite is an ore that contains copper, iron, and sulfur. A particular sample has a volume of 20.8 L and a density of 4.1 g/mL. What is its mass in micrograms? [4 points]

21. During a late night study session you binge on 5 shame-filled bags of Doritos, each containing 150 Cal. If walking burns 210 Cal/hour, how many minutes will you have to walk to burn off the Doritos? [4 points]
22. A parked car with a set of sweet magnesium wheels sits in the sun all day as the temperature rises from 22 °C to 35 °C. If one wheel has a mass of 6.8 kg and the specific heat of magnesium is 1.02 J/g·°C, how much heat in kilojoules did the one wheel absorb? [4 points]

23. A doctor has ordered 500. mg of ampicillin every 6.0 hours to a patient over 7.0 days. The pharmacy has 250.-mg capsules in stock. How many capsules will you need on hand for the entire run? [4 points]

24. **Challenge Question:** An aluminum panel on the wing of a Boeing 777 sits parked outside on a hot tarmac where it absorbs  $4.5 \times 10^3$  kJ of heat, increasing its temperature from 22 °F to 38 °F. If the specific heat of aluminum is 0.215 cal/g·K, what is the mass of the panel in lbs.? [5 points]

**Extra Credit:** How does a scientific theory differ from a law? [2 points]



**Formulas & Constants  
(you may or may not need)**

$$1 \text{ inch} = 2.54 \text{ cm (exact)}$$

$$1 \text{ lb} = 453.6 \text{ g}$$

$$T_K = T_{\text{C}} + 273.15$$

$$1 \text{ cal} = 4.184 \text{ J}$$

$$1 \text{ mile} = 5280 \text{ ft} \approx 1.609 \text{ km}$$

$$1 \text{ gal} = 4 \text{ qt} = 8 \text{ pt} \approx 3.785 \text{ L}$$

$$T_{\text{F}} = 1.8 \times T_{\text{C}} + 32$$

$$1 \text{ Cal} = 1000 \text{ cal}$$

$$1 \text{ kg} \approx 2.205 \text{ lb}$$

$$1 \text{ L} = 1000 \text{ cm}^3$$

$$T_{\text{C}} = (T_{\text{F}} - 32)/1.8$$

$$\text{heat} = m \times \text{SH} \times \Delta T$$

**Scratch Page**  
(to be handed in)