



DO NOT OPEN

UNTIL INSTRUCTED TO DO SO

CHEM 140 – Dr. McCorkle – Exam #1A

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. Grade corrections for incorrectly marked or incompletely erased answers will not be made.

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

- Which statement about the scientific method is TRUE?
 - The scientific method emphasizes reason as the way to understand the world.
 - The scientific method emphasizes observation and reason as the way to understand the world.
 - The scientific method emphasizes observation and experimentation as the way to understand the world.
 - The scientific method emphasizes scientific laws as the way to understand the world.
 - All of the above statements are false.
- How would you correctly express the measurement 0.0000043 m using scientific notation?
 - 4.3×10^{-7} m
 - 4.3×10^{-6} m
 - 4.3×10^6 m
 - 0.43×10^{-5} m
 - 4.3 m
- How would you write 4.06×10^{-2} kg as a standard number?
 - 0.04060 kg
 - 406 kg
 - 0.406 kg
 - 406.0 kg
 - 0.0406 kg
- How many significant digits are in 0.00300210 mL?
 - 5
 - 6
 - 7
 - 8
 - 9
- Perform the following calculation and give the answer with the correct significant digits:
 $42.0 \times 0.070 \div 2.010 =$
 - 2
 - 1.4
 - 1.5
 - 1.46
 - 1.463
- Perform the following calculation and give the answer with the correct significant digits:
 $38.10 \text{ in.} + 2 \text{ in.} - 23.069 \text{ in.} =$
 - 20 in.
 - 17 in.
 - 17.0 in.
 - 17.03 in.
 - 17.031 in.
- Perform the following calculation and give the answer with the correct significant digits
$$\frac{3.14 \times 10^{-5} \times 0.080}{7.20 \times 10^3} =$$
 - 3×10^{-10}
 - 3.5×10^{-10}
 - 3.49×10^{-10}
 - 3.5×10^{-4}
 - 3.49×10^{-4}

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

$$8.1 \times 10^2 + 9.60 \times 10^3$$

- A) 1×10^4 B) 1.0×10^4 C) 1.04×10^4
D) 1.041×10^4 E) 1.0410×10^4

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

$$(8.50 \times 10^4 + 9.7 \times 10^3) \div 2.18 \times 10^{-2}$$

- A) 4.4×10^6 B) 4.36×10^6 C) 4.3×10^6
D) 4.34×10^6 E) 4.344×10^6

10. Which of the following equalities is correct?

- A) $10^{-6} \mu\text{g} = 1 \text{ g}$ B) $10^3 \text{ kg} = 1 \text{ g}$ C) $10^{-2} \text{ g} = 1 \text{ dg}$
D) $10^{12} \text{ g} = 1 \text{ Tg}$ E) $10^9 \text{ g} = 1 \text{ Mg}$

11. The correct multiplier for pico is:

- A) 10^{-6} B) 10^{12} C) 10^{-9} D) 10^{-12} E) 10^{-15}

12. The mass of an electron is only $9.1 \times 10^{-31} \text{ kg}$. What is this mass in fg?

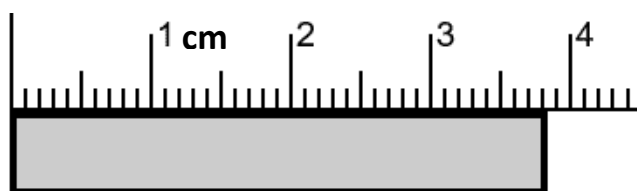
- A) $9.1 \times 10^{-13} \text{ fg}$ B) $9.1 \times 10^{-49} \text{ fg}$ C) $9.1 \times 10^{-16} \text{ fg}$
D) $9.1 \times 10^{-43} \text{ fg}$ E) $9.1 \times 10^{-19} \text{ fg}$

13. Convert $6.7 \times 10^4 \text{ PL}$ to μL .

- A) $6.7 \times 10^{13} \mu\text{L}$ B) $6.7 \times 10^{25} \mu\text{L}$ C) $6.7 \times 10^{-5} \mu\text{L}$
D) $6.7 \times 10^{-17} \mu\text{L}$ E) $6.7 \times 10^{-2} \mu\text{L}$

14. Read the length of the gray bar to the right with the correct number of significant digits.

- A) 3.8 cm B) 3.80 cm
C) 3.08 cm D) 3.800 cm
E) 4.20 cm



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.

15. Define the following three terms: [2 points each]

a. hypothesis:

b. theory:

c. scientific law:

16. Consider the following four data sets:

A 74.8 mL 69.7 mL 72.1 mL <i>Avg = 72.2 mL</i>

B 70.3 mL 70.7 mL 69.9 mL <i>Avg = 70.3 mL</i>

C 72.6 mL 72.3 mL 72.5 mL <i>Avg = 72.5 mL</i>

D 67.4 mL 75.3 mL 71.0 mL <i>Avg = 71.2 mL</i>

Assuming the correct value is 72.4 mL, choose the letter that matches the criteria below:
[2 points each]

a. Accurate & imprecise _____

b. Inaccurate & precise _____

17. Wild fresh Coho salmon fillets are on sale at Sprouts for \$9.99 per pound. What is the cost in dollars of 2.50 kg of fillets? [3 points]
18. A sculptor has prepared a mold for casting a bronze figure. The figure has a volume of 46.3 L. If bronze has a density of 7.8 g/mL, how many pounds of bronze are needed in the preparation of the bronze figure? [4 points]

19. Dentists often administer “laughing gas” or nitrous oxide to patients. A dentist has 5.0×10^2 gal of nitrous oxide on hand. If the flow rate of the gas is 5.5 L/min and the average procedure takes 25 minutes, how many procedures can the dentist perform before he runs out of laughing gas? [4 points]
20. Platinum is a rare, silvery-white metal used in catalytic converters. Due to its rarity, it’s very expensive, costing \$783 per ounce as of last Friday, September 7, 2018. Assuming a typical catalytic converter contains around 5.0 g of platinum, how many catalytic converters would you need to recycle to make \$5,000.? The density of platinum is 21.45 g/cm^3 . [4 points]

21. The Gulfstream g650 is the best private jet \$65 million can buy. It has a range of 8,053 miles, a top speed of 610 mph (miles per hour), and a cruising speed of 594 mph.



- a. You decide to jet off to Paris this weekend for a spur of the moment trip. Leaving from your hangar at McClellan-Palomar Airport in Carlsbad, the distance to Charles de Gaulle Airport in Paris is 9,111 km. Assuming you reach your cruising speed instantly, how many hours will it take? [3 points]
- b. The g650 can hold 44,200 lb of jet fuel. If the price is \$6.23 per gallon, how much will it cost to fill up your private jet? The density of jet fuel is 840 kg/m^3 . [7 points]

Extra Credit: Other than the US, which two countries still use the English or British system of measurement? [1 point each]

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

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

$$1 \text{ lb} = 453.6 \text{ g}; 1 \text{ lb} = 16 \text{ oz}$$

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

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

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

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

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

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

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

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

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

$$q = m \times C \times \Delta T$$

Scratch Page
(to be handed in)