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Community College of Rhode Island

Chemistry Department

Basic skills for chemistry

CHEM-1020-150

Hour Exam No. 1

Covering KWL Chapters 1 and 2 and Appendices A, Band C
Wednesday, February 25, 2009

Fourteen Questions, 50 Minutes, 102 Points

Closed book examination, No notes allowed

A periodic table is attached to the back of this exam

Answer the questions in the spaces provided.

For full credit, show all your mathematical setups clearly.

Express your answers with the proper units, the correct number of significant figures and, when appropriate, in proper scientific notation.

1. Carry out each calculation and express your answer in proper scientific notation and to the proper number of significant figures. (12 points)

a) $(4 \times 10^{-5}) \div (8 \times 10^{-5}) =$

b) $(9.699 \times 10^{16}) \times (4.58 \times 10^{-1}) =$

c) $(6.0 \times 10^{-23}) \div (3.0 \times 10^9) =$

2. Convert 49.1 kelvins to °C
Use $K = C + 273.15$ (4 points)

3. Write each quantity in scientific notation. (8 points)

a) 0.107

b) 73.98

c) 0.0000089

d) 45 000 000 000

4. Classify each of the following as a chemical or physical property. (5 points)

a) Aluminum melts at 660 °C

b) Sugar dissolves in water

c) Oil burns, giving off carbon dioxide and water

d) Naphthalene sublimates

e) Mercury (II) oxide forms mercury and oxygen when heated

5. Name the base SI unit for each quantity:

6. +(4 points)

- a) Length
- b) Mass
- c) Chemical quantity
- d) Time

6. Carry out each calculation. express your answer in proper scientific notation and to the proper number of significant figures. (10 points)

a) $5.6 \text{ m} \times 1.445 \text{ m} =$

b) $56.956 \text{ g} - 55.256 \text{ g} =$

c) $465.6 \text{ g/cm} \times 450.0 \text{ cm} =$

7. Express each metric prefix as a power of ten. (8 points)

- a) centi
- b) kilo
- c) milli
- d) micro

8. A research thermometer is marked with lines 1°C apart. To what precision is it properly read? (3 points)

9. A graduated cylinder is marked with lines 0.5 mL apart. To what precision is it properly read? (3 points)

10. A balance beam has markings 0.01 g apart. To what precision is it properly read? (3 points)

11. Solve each algebraic equation for x.

(9 points)

a) $g = x/y$

b) $34 - B = 15x + 3$

c) $1/x = 3a + b$

12. Name each element. Proper spelling counts.

(10 points)

Kr

As

Br

Fe

Sr

Cu

Cr

Mn

Na

Zn

13. Classify the following as either: an element, a compound, a homogeneous mixture or a heterogeneous mixture. (7 points)

Clean sea water

Sodium chloride

Clean air

KNO_3

Selenium

Wet sand

Sugar water

14. An investigator studying rocket flight measures the height of a missile at various times after it is launched and obtains the following data. Plot the information on the graph paper provided. Answer questions a) and b) and clearly show on the graph how you arrive at your answers. Put your name on the back of the graph paper and staple it to the back of this exam. (16 points)

height (km)	Time after launch (s)
0.72	3.0
1.82	7.8
3.77	15.9
5.70	24.6
13.21	55.6
46.72	199.0

- a) By interpolation, determine the missile height at 20.0 s.
- b) By extrapolation, determine how long it would take the missile to reach a height of 240.0 km.