Chem 1121
Spring 2012
Exam 1A

Name: KEY

Please write your full name, and which exam version (1A) you have on the scantron sheet.

Multiple Choice. [3 points each.] Record your answers to the multiple choice questions on the scantron sheet.

Q1. Vaporization is the process where:
a) solid → liquid b) liquid → gas c) solid → gas d) gas → liquid e) liquid → solid

Q2. Which of the following is a chemical change:
a) water freezing b) alcohol evaporating c) iron rusting
d) salt dissolving in water e) benzene boiling

Q3. Which of the following substances is a compound:
a) aluminum b) beer c) saline d) water e) flour

Q4. The SI prefix meaning x 10^{-3}
a) micro b) mega c) milli d) centi e) deci

Q5. The element symbol Ca refers to:
a) Carbon b) Copper c) Californium d) Chlorine e) Calcium

Q6. The element symbol for potassium is:
a) P b) Po c) Pt d) Na e) K

Q7. Which of the following elements is a metalloid?
a) Na b) Zn c) As d) Cl e) He

Q8. The SI base unit for mass is the:
a) gram, g b) kilogram, kg c) pound, lb d) ounce, oz e) milligram, mg

Q9. What is the relationship between the milliliter and the liter?
a) 1000 L = 1 mL b) 1000 mL = 1 L c) 1 mL = 1 L d) 100 L = 1 mL e) 1 L = 100 mL

Q10. The number of neutrons in an atom of aluminum-20 is:
a) 7 b) 13 c) 20 e) 27 e) 33

Q11. Element 63, Europium (Eu) is an example of a(n):
a) Main group element b) Transition Metal c) Inner-Transition Metal
d) s-block element e) p-block element

Q12. Which element has the electron configuration of: 2-8-3?
a) Al b) C c) B d) Cl e) Sc

Q13. Positively charged ions are best called:
a) Atoms b) Cations c) Anions d) Polyatomic Ions e) Electrolytes

Q14. What is the charge on the common ion of magnesium?
a) 2+ b) 1+ c) 0 d) 1– e) 2–

Q15. What is the atomic weight of an element that consists of two isotopes: X-25 (relative abundance of 30.0 %) and X-28 (relative abundance of 70.0 %)?

a) 25.0 u b) 26.5 u c) 27.1 u d) 27.6 u e) 28.0 u

Short Response.

Show all work to receive credit. You must use the factor-label (conversion-factor) method for all conversions. Be sure to show all units and write your answers using the correct number of significant figures or decimal places.

Q16. [12 pts.] Calculate the following to the correct number of digits:

a) 10.232 – 1.19 = 9.04 (2d.p.)

b) 21.0928 ÷ 0.0302 = 698 (3s.f.)

c) $(2.10 \times 10^{12}) \times (3.0 \times 10^{-9})$ = 6300 (2s.f.) or 6.3×10^3

d) 123.10091 + 9.802 = 132.903 (3d.p.)

Q17. [12 pts.] Using the factor-label method, convert 2.3 furlongs/hogshead to miles/gallon, given the following exact conversions: 1 hogshead = 2 barrels, 1barrel = 3 ½ firkins, 1 firkin = 9 gallons, 8 furlongs = 1 mile.

$$\frac{2.3 \text{ furlongs}}{\text{hogshead}} \left| \frac{1 \text{ hogshead}}{2 \text{ barrels}} \right| \frac{1 \text{ barrel}}{3\frac{1}{2} \text{ firkins}} \left| \frac{1 \text{ firkin}}{9 \text{ gallons}} \right| \frac{1 \text{ mile}}{8 \text{ furlongs}} = 0.0046 \frac{\text{miles}}{\text{gallon}} \text{ (2s.f.)}$$

Q18. [12 pts.] Write formulas for the following compounds:

a) sodium bromide $NaBr$

b) calcium nitride Ca_3N_2

c) iron(III) sulfide Fe_2S_3

d) potassium oxide K_2O

e) cuprous fluoride CuF

Q19. [9 pts.] Name the following compounds:

a) $MgCl_2$ magnesium chloride

b) Al_2O_3 aluminum oxide

c) K_3N potassium nitride

Q20. [10 pts.] The density of human bones is about 1.52 g/cm³. What volume would a 430 g bone sample occupy?

$$430\,g \times \frac{cm^3}{1.52\,g} = 280\,cm^3 \quad (2\,sf)$$

OR

$$d = m/V \Rightarrow V = m/d = \frac{430\,g}{1.52\,g/cm^3} = 280\,cm^3$$

Chem 1121
Spring 2012
Exam 1B

Name: KEY

Please write your full name, and which exam version (1B) you have on the scantron sheet.

Multiple Choice. [3 points each.] Record your answers to the multiple choice questions on the scantron sheet.

Q1. What is the relationship between the milliliter and the liter?
a) 1000 L = 1 mL b) 1000 mL = 1 L c) 1 mL = 1 L d) 100 L = 1 mL e) 1 L = 100 mL

Q2. The number of neutrons in an atom of aluminum-20 is:
a) 7 b) 13 c) 20 e) 27 e) 33

Q3. Element 63, Europium (Eu) is an example of a(n):
a) Main group element b) Transition Metal c) Inner-Transition Metal
d) s-block element e) p-block element

Q4. Which element has the electron configuration of: 2-8-3?
a) Al b) C c) B d) Cl e) Sc

Q5. Negatively charged ions are best called:
a) Atoms b) Cations c) Anions d) Polyatomic Ions e) Electrolytes

Q6. What is the charge on the common ion of fluorine?
a) 2+ b) 1+ c) 0 d) 1– e) 2–

Q7. What is the atomic weight of an element that consists of two isotopes: X-25 (relative abundance of 30.0 %) and X-28 (relative abundance of 70.0 %)?
a) 25.0 u b) 26.5 u c) 27.1 u d) 27.6 u e) 28.0 u

Q8. Vaporization is the process where:
a) solid → liquid b) liquid → gas c) solid → gas d) gas → liquid e) liquid → solid

Q9. Which of the following is a chemical change:
a) water freezing b) alcohol evaporating c) iron rusting
d) salt dissolving in water e) benzene boiling

Q10. Which of the following substances is a compound:
a) silver b) beer c) water d) saline e) flour

Q11. The SI prefix meaning x 10^{-6}
a) micro b) mega c) milli d) centi e) deci

Q12. The element symbol Ca refers to:
a) Carbon b) Copper c) Californium d) Chlorine e) Calcium

Q13. The element symbol for potassium is:
a) P b) Po c) Pt d) Na e) K

Q14. Which of the following elements is a metalloid?
a) Na b) Zn c) As d) Cl e) He

Q15. The SI base unit for mass is the:

a) gram, g b) kilogram, kg c) pound, lb d) ounce, oz e) milligram, mg

Short Response.

Show all work to receive credit. You must use the factor-label (conversion-factor) method for all conversions. Be sure to show all units and write your answers using the correct number of significant figures or decimal places.

Q16. [10 pts.] The density of human bones is about 1.52 g/cm³. What volume would a 210 g bone sample occupy?

$$210\,g \times \frac{cm^3}{1.52\,g} = 140\,cm^3 \text{ (2 s.f.)}$$

OR

$$d = m/V \Rightarrow V = m/d = \frac{210\,g}{1.52\,g/cm^3} = 140\,cm^3$$

Q17. [12 pts.] Calculate the following to the correct number of digits:

a) 10.232 – 3.29 = 6.94 (2 d.p.)

b) 29.0928 ÷ 0.302 = 96.3 (3 s.f.)

c) $(1.10 \times 10^{12}) \times (6.0 \times 10^{-9})$ = 6600 (2 sf) OR 6.6×10^3

d) 123.1 + 9.802 = 132.9 (1 d.p.)

Q18. [12 pts.] Using the factor-label method, convert 5.1 furlongs/hogshead to miles/gallon, given the following exact conversions: 8 furlongs = 1 mile, 1 hogshead = 2 barrels, 1 barrel = 3 ½ firkins, 1 firkin = 9 gallons.

$$5.1\,\frac{\text{furlongs}}{\text{hogshead}} \left| \frac{1\text{ mile}}{8\text{ furlongs}} \right| \frac{1\text{ hogshead}}{2\text{ barrels}} \left| \frac{1\text{ barrel}}{3\frac{1}{2}\text{ firkins}} \right| \frac{1\text{ firkin}}{9\text{ gallons}} = 0.010\,\frac{\text{miles}}{\text{gallon}} \text{ (2 s.f.)}$$

Q19. [9 pts.] Name the following compounds:

a) CaI_2 Calcium iodide

b) Be_3N_2 beryllium nitride

c) $AlBr_3$ aluminum bromide

Q20. [12 pts.] Write formulas for the following compounds:

a) lithium chloride $LiCl$

b) magnesium nitride Mg_3N_2

c) copper(I) sulfide Cu_2S

d) sodium oxide Na_2O

e) cupric fluoride CuF_2