Name KEY N (Print last name in CAPS)

SECTION _____(same as your lab section)

1.	Read each question carefully before answering.
2.	Mark the choice that best answers the question or completes the statement.
3.	Use the scantron provided. Use a no. 2 pencil and clearly mark your choice. If you change an answer, completely erase your previous mark.
4.	Answer each question. There is no penalty for guessing. However, multiple answers are graded as incorrect, and blank answers are graded as incorrect.
5.	On the scantron, fill in your last name, first name and initial. Blacken the corresponding letters.
6.	Fill in the department=CHEM, Course no. = 101, and Section= your lab section.
7.	If you want your score posted by a portion of your ID# mark A under the option column.
8.	Use the test for scratch paper.
9.	Mark your answers in the test as well as on the answer sheet so you can check your score with the key after the test.
10.	Turn in both the scantron and the exam, have your ID and your calculator ready to be checked.
11.	The key will be posted on my class web page sometime tomorrow.
12.	You may pick up your exams outside of room 410 HELD Friday AM, 27th Sep.'02

There are 30 questions for 125 points.
Good Luck!

Possibly Useful Information

1 cal = 4.184 J $q = \text{mass} \times \text{sp ht} \times \Delta T$ d = mass/vol

Volume = $\ell \times h \times w$

N

Q.1 In the compound $BaCrO_4$, the mol ratio of barium to oxygen,O, is,

a) 1 to 1
b) 4 to 1
c) 1 to 4 ← 1:4 (M15)
d) 2 to 1
e) 1 to 2

Q.2 How many grams of Li_2O are needed to produce 25.0 g of LiOH in the following reaction. [Water is in excess.]

$$Li_2O + H_2O \rightarrow 2\ LiOH$$

a) 15.6 g ← (M14)
b) 7.8 g
c) 31.2 g
d) 6.2 g
e) 14.0 g

Q.3 When sodium reacts with water, hydrogen gas and aqueous sodium hydroxide are produced. This is an example of ...

a) an inert element
b) a physical property
c) a chemical property ← (M4)
d) all of these
e) none of these

Q.4 What is the molarity of a solution of KIO_3 prepared by dissolving 655 mg KIO_3 in enough water to make 75.0 mL of solution? Molar mass KIO_3=214 g/mol.

a) 4.08 M
b) 0.0408 M ← vs (M24)
c) 0.00408 M
d) 40.8 M
e) 0.408 M

$$\frac{655\ mg\ KIO_3 \times \frac{10^{-3}\ g}{1\ mg} \times \frac{mol\ KIO_3}{214\ g\ KIO_3}}{0.075\ L} = \underbrace{0.040809}_{0.0408\ M}$$

Q.5 The basic SI unit of time is ...

a) seconds ←
b) 1/seconds
c) hours (M5)
d) minutes
e) years

Q.6 $^{23}_{11}Na$ and $^{24}_{11}Na$ are examples of (M6)

a) split atoms
b) molecular formulas
c) isotopes ←
d) more than one of these
e) none of these

Q.7 Xe -133 is a beta-emitter and has a half-life of 5.25 days. How many neutrons are there in Xe-133?

a) 187 b) 133 c) 79 d) 50 e) 25 (M7)

Q.8 The proton to neutron ratio, p/n, in the element rubidium-87 is

a) 0.74 b) 1 c) 50 d) 0.425 e) 2.35 (M8)

Q.9 Benzene has a density of 0.876 g/mL at 20°C. What volume is occupied by 258 grams of benzene at that temperature?

258g / 0.876 g/mL = 294.5 mL

mass / density = vol ≈ 295 mL

a) 3.00 L
b) 295 mL ←
c) 226 mL
d) 3.4×10^{-3} mL
e) 3.40 L

(ISM9)

Q.10 Do the following calculation and report your answer to the proper number of significant figures.

$2.0\ cm^3 \times 5.0\ mm^3$ (M29)

a) $1.0\ cm^6$
b) $1.0 \times 10^6\ cm^3$
c) $1.0 \times 10^{-2}\ cm^6$ ←
d) $1.0\ cm^3$
e) $1.0\ mm^6$

Q.11 If it were possible to measure samples of cadmium and cesium weighing exactly 11.24 g of cadmium and 13.29 g of cesium, each sample would contain,

(M10) $\frac{11.24}{112.4} = 0.1$ mol $\frac{13.29}{132.9} = 0.1$ mol

a) 10 atoms
b) 0.10 atoms
c) 1 mole
d) 10 moles
e) 0.10 moles ←

Q.12 When the following chemical equation is balanced with the smallest integer coefficients, the sum of the coefficients in the balanced equation is,

$$4\ NH_3 + 5\ O_2 \rightarrow 4\ NO + 6\ H_2O$$ (M3)

a) 6 b) 19 c) 10 d) 9 e) 7

Q.13 Consider the reaction of sodium metal with chlorine gas to form sodium chloride solid. If you start out with 8.40 g Na and 3.70 g Cl_2, what is the mass of product formed? [Hint: Write the balanced equation.]

(M22)

a) 1.52 g
b) 0.762 g
c) 3.65 g
d) 6.10 g ←
e) 7.30 g

Q.14 A 100-g sample of a compound was analyzed and found to contain: 14.29 g C, 1.20 g H, 27.37 g Na, and 57.14 g O. What is the empirical formula of this compound?

(M12)

a) $CHNaO_3$ ←
b) C_3H_3NaO
c) CH_3NaO_3
d) CHNaO
e) none of the above

Q.15 When the following chemical equation is balanced with the smallest integer coefficients, the sum of the coefficients in the balanced equation is,

$$Cu_2S + O_2 \rightarrow 2\,Cu + SO_2$$

(M13)

a) 4 b) 2 c) 3 (d) 5 e) 6

Q.16 The correct chemical name for the compound $Sr(OH)_2$ is ...

a) Strontium oxyhydride
b) Strontium dioxyhydride
(c) Strontium hydroxide ← (M1)
d) Strontium(II)dihydroxide
e) Strontium(II) oxyhydride

Q.17 A 364.4 g - sample of an element , is found to contain 4.615 moles of the element. What is the element?

a) Erbium, Er
b) Gallium, Ga (M16)
c) Germanium, Ge
(d) Selenium, Se ←
e) sulfur, S

Q.18 The dye Purpurin, also called Natural red has the formula, $C_{14}H_8O_5$. What is the % O in purpurin? (M17)

a) 11.78 %
b) 76.42 %
c) 88.22 %
(d) 31.22 % ←
e) 23.56 %

molar mass = 256.20 g/mol

$$\%\,O = \frac{5(16.00)}{256.20} \times 100 = 31.22\,\%$$

Q.19 Which of the following is a physical change?

a) dissolving sugar in water
b) Melting ice (M18)
c) Burning gasoline
d) all of these
(e) more than one of these ←

Q.20 Acute lymphatic leukemia is sometimes treated with the drug Purinethiol. The initial dose for adults is 2.5 mg/kg of body weight per day. The drug is supplied in scored tablets containing 50 mg of Purinethol, An adult patient weighing 154.33 lbs will use how many tablets of this drug in a 25-day period?
[1 lb = 454 g]

(M11)

a) 105 tablets
b) between 60 and 65 tablets
c) between 85 and 95 tablets ←
d) 25.5 tablets
e) 50 tablets

Q.21 Solid sodium chloride is a(n) ...

(M19)

a) element
b) heterogeneous mixture
c) homogeneous mixture
d) compound ←
e) polymer

Q.22 How many significant figures are there in the number 0.006502840?

a) 10 b) 7 ← c) 6 d) 8 e) 5 (M20)

Q.23 Consider the reaction: CH_4 (g) + 4S (g) → CS_2 (g) + 2 H_2S (g)
If the % yield of this reaction is 78.0%, how many grams of sulfur are needed to make 125 grams of carbon disulfide?

(M21)

a) 78.0 g
b) 160 g
c) 270 g ←
d) 97.5 g
e) 8.41 g

Q.23 One mol of solid $(NH_4)_2SO_4$ contains,

a) one mole of N
b) 6.022×10^{23} atoms of O
c) two moles of N ←
d) eight moles of N
e) two mole of sulfate

Q.24 A 648.3-mg sample of KIO_3 is dissolved in enough water to make 50.0 mL of solution. What is the molarity of this solution? Molar mass KIO_3 = 214 g/mol

a) 3.03×10^{-3}M
b) 6.06 M
c) 0.0606 M ←
d) 6.06×10^{-5}M
e) 3.03 M

$$M = \frac{mol}{L}$$

$$\frac{648.3\ mg \times \frac{10^{-3}\ g}{1\ mg} KIO_3 \times \frac{mol\ KIO_3}{214\ g\ KIO_3}}{0.050\ L} = 6.058\times10^{-2}\ M$$

0.0606 M

Q.25 150.0 mL of a 5.0 M NaOH stock solution is diluted in a volumetric flask with enough distilled water to make a final volume of exactly 500 mL, What is the molarity of the diluted solution?

a) 17 M
b) 1.5 M ←
c) 2.5 M
d) 1.0 M
e) 0.50 M

$$(150.0\ mL)(5.0\ M) = 500\ mL \times X$$

$$\frac{(150.0)(5.0)}{500} = X = 1.5\ M$$

Q.26 Magnesium metal and molecular oxygen react to form magnesium oxide. If 46.5 g of magnesium and 37.2 g of molecular oxygen are caused to react, which reactant is limiting? [Hint: Write the balanced equation.]

a) Mg ←
b) O_2
c) both
d) none

$$2Mg + O_2 \rightarrow 2MgO$$

For Mg: $46.5\ g\ Mg \times \frac{mol\ Mg}{24.305\ g\ Mg} \times \frac{2\ mol\ MgO}{2\ mol\ Mg} = 1.91\ mol\ MgO$ ← smallest ∴ Mg limiting

for O_2: $37.2\ g\ O_2 \times \frac{mol\ O_2}{32.00\ g\ O_2} \times \frac{2\ mol\ MgO}{1\ mol\ O_2} = 2.33\ mol\ MgO$

Q.28 Magnesium metal and molecular oxygen react to form magnesium oxide. If 46.5 g of magnesium and 37.2 g of molecular oxygen are caused to react, which reactant is limiting? [Hint: Write the balanced equation.]

a) O_2
b) Mg ← (M26)
c) both
d) none

Q.29 The formula mass of sulfanilamide, $C_6H_4SO_2(NH_2)_2$, is ...

a) 156.2 amu
b) 48.00 amu
c) 58.00 amu
d) 172.3 amu ← (M27)

Q.30 The chemical formula for the ionic compound formed between the potassium ion and the sulfite ion is ...

a) KSO_3 b) KSO_4 c) K_2SO_3 d) K_2SO_4 e) $K(SO_3)$

vs (M30)

K^+ SO_3^{2-}

9 need 2

End of Test

KEY Ex1 FORM N Magnuson 101 26 Sep 2002

1	C
2	A
3	C
4	B
5	A
6	C
7	C
8	A
9	B
10	C
11	E
12	B
13	D
14	A
15	D
16	C
17	D
18	D
19	E
20	C
21	D
22	B
23	C
24	C
25	E
26	E
27	B
28	B
29	D
30	C

TOTAL= 125

Each Question = 4.167