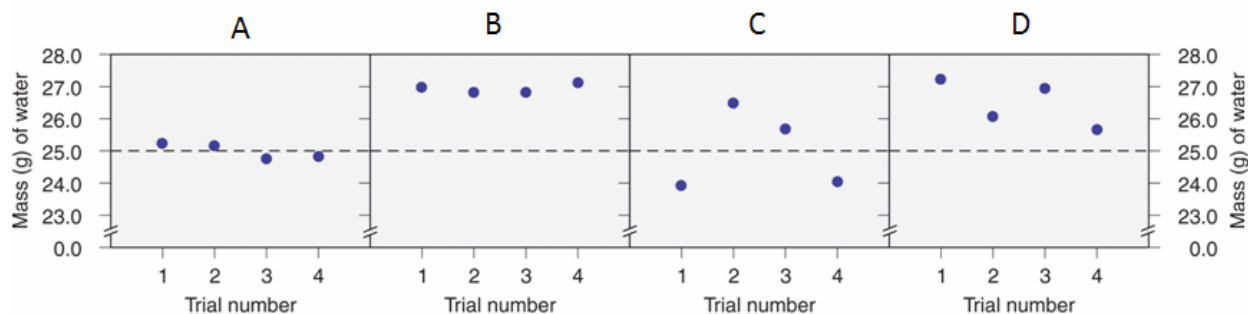


Spring 2012
CHEM 1110.20784
Test 1, Form A

Name: _____

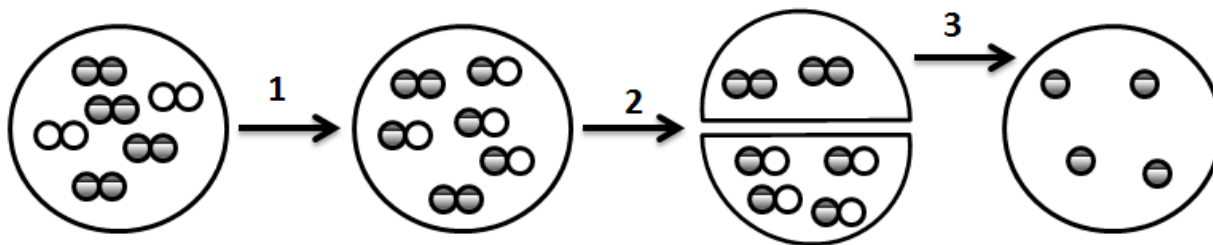
Part 1. Multiple Choice: Clearly indicate the best answer on the scantron form. (60 pts)

- Which of these materials are usually poor conductors of heat and electricity?
A) metals B) alkali metals C) nonmetals D) metalloids E) alkaline earth metals
- Two isotopes of an element differ only in their
A) mass number. D) number of electrons.
B) symbol. E) atomic number.
C) number of protons.
- The SI prefixes *milli* and *mega* represent, respectively:
A) 10^3 and 10^{-6} B) 10^{-3} and 10^9 C) 10^6 and 10^{-6} D) 10^{-3} and 10^6 E) 10^{-6} and 10^{-3}
- Scientists follow a set of guidelines known as the
A) quantitative analysis. D) law.
B) qualitative analysis. E) theory.
C) scientific method.
- The elements in Group 7A are known by what name?
A) alkaline earth metals B) noble gases C) alkali metals D) transition metals E) halogens
- Which is the correct notation for an isotope of iron, Fe, with 34 neutrons?
A) ^8Fe B) ^{60}Fe C) ^{26}Fe D) ^{34}Fe E) ^{55}Fe
- Bromine, Br, is the only nonmetal that is a liquid at room temperature. Consider the isotope bromine-81. Select the combination which lists the correct atomic number, neutron number, and mass number, respectively.
A) 46, 81, 35 B) 81, 46, 35 C) 35, 81, 116 D) 35, 81, 46 E) 35, 46, 81
- The alkali metal elements are found in _____ of the periodic table.
A) Period 7 B) Group 2A C) Group 3A D) Period 1 E) Group 1A
- Which of these is an example of a *physical* property?
A) Lead becomes a liquid when heated to 601°C D) Toxicity of cyanide
B) Corrosiveness of sulfuric acid E) Flammability of gasoline
C) Neutralization of stomach acid with an antacid
- A sample of water weighs 25.0g. Which of the data show measurements that have good precision, but poor accuracy?



11. After carrying out the operations below, how many significant figures are appropriate to show in the result?
 $(13.7 + 0.027) \div 8.221$
A) 5 B) 2 C) 4 D) 3 E) 1
12. Which is correct if 0.01234 is rewritten in scientific notation?
A) 1.234×10^2 B) 12.3×10^4 C) 1.234×10^{-3} D) 1×10^{-1} E) 1.234×10^{-2}
13. Rutherford's experiment with alpha particle scattering by gold foil established that
A) protons weigh the same as electrons.
B) protons are concentrated in the center of an atom.
C) electrons have a negative charge.
D) electrons have a positive charge.
E) atoms are made of protons, neutrons, and electrons.
14. Which one of the following statements about atoms and subatomic particles is correct?
A) The proton and the neutron have identical masses.
B) Rutherford discovered the atomic nucleus by bombarding gold foil with electrons
C) The neutron's mass is equal to that of a proton plus an electron.
D) An atomic nucleus contains equal numbers of protons and neutrons.
E) A neutral atom contains equal numbers of protons and electrons.
15. How many significant figures are in 0.006570?
A) 5 B) 3 C) 6 D) 7 E) 4
16. What is the name used to represent the number of protons in the nucleus of each atom of an element?
A) Mass-to-charge ratio D) Atomic number
B) Atomic mass units E) Mass number
C) Isotope number
17. Which one of these represents a *chemical* change?
A) Turning hair yellow with bleach
B) Mixing powdered charcoal and oxygen at room temperature
C) Boiling water to form steam
D) Cutting a bar of sodium metal into pieces with a knife
E) Melting butter
18. If a liquid contains 60% sugar and 40% water throughout its composition then what is it called?
A) Homogeneous mixture B) Heterogeneous mixture C) Compound D) Solvent E) Solute
19. How many neutrons are there in an atom of lead, Pb, whose mass number is 208?
A) 290 B) 126 C) 82 D) 208 E) none of them
20. Which of the following does not have a uniform composition throughout?
A) Compound B) Homogeneous mixture C) Heterogeneous mixture D) Solvent E) Element
21. Which element has properties similar to germanium, Ge?
A) Ga B) Si C) Y D) Sc E) Se
22. How many micrograms are in 65.3kg?
A) $0.653 \mu\text{g}$ B) $6.53 \times 10^4 \mu\text{g}$ C) $6.53 \times 10^{10} \mu\text{g}$ D) $6.53 \times 10^{-8} \mu\text{g}$ E) $6.53 \times 10^7 \mu\text{g}$
23. The elements in Group 2A are known by what name?
A) transition metals B) alkaline earth metals C) halogens D) alkali metals E) noble gases

24. The boiling point for liquid helium is 4 K, what is the temperature in degrees Celsius?
 A) -452.5°C B) 4°C C) 530.9°C D) 131.8°C E) -269°C
25. Which of these elements is chemically similar to oxygen?
 A) iron B) nickel C) potassium D) sulfur E) calcium
26. When the value of something does not depend on the amount of the matter then what is this called?
 A) Empirical property D) Intensive property
 B) Exclusive property E) Extensive property
 C) Inclusive property
27. Select the answer with the correct number of decimal places for the following sum:
 $13.914\text{ cm} + 243.1\text{ cm} + 12.00460\text{ cm} =$
 A) 269.02 cm B) 269.01860 cm C) 269.0 cm D) 269.019 cm E) 269.0186 cm
28. A(n) _____ is the smallest quantity of matter that still retains the properties of matter.
 A) compound B) atom C) molecule D) proton E) electron
29. The molecules below are undergoing several physical and chemical changes. Which correctly identifies the changes occurring in steps 1, 2 and 3?



- A) chemical, chemical, physical D) physical, physical, physical
 B) chemical, chemical, chemical E) chemical, physical, chemical
 C) physical, chemical, physical
30. Give the number of protons (p), electrons (e), and neutrons (n) in ^{37}Cl .
 A) 17 p, 17 e, 20 n D) 17 p, 17 e, 37 n
 B) 17 p, 37 e, 17 n E) 37 p, 37 e, 17 n
 C) 37 p, 17 e, 20 n

Part 2. Calculations: Clearly show all work on the blank space on the scantron answer sheet for full credit. (40 pts)

- Neoprene is a synthetic rubber polymer that is commonly used in dry suits. It has a density of 1.23 g/cm^3 . What is the volume (in cm^3) of a neoprene dry suit that weighs 2.56 lb. (1 lb = 453.6 g) Show all work on the scantron for full credit.
- Silicon, which makes up about 25% of Earth's crust by mass, is used widely in the modern electronics industry. It has three naturally occurring isotopes, ^{28}Si , ^{29}Si , and ^{30}Si . Calculate the average atomic mass of silicon. Show all work on the scantron for full credit.

Isotope	Isotopic Mass (amu)	Abundance %
^{28}Si	27.976927	92.23
^{29}Si	28.976495	4.67
^{30}Si	29.973770	3.10

- How many atoms of iron, Fe, are in 32.6 mg of Fe? Show all work on the scantron for full credit.

- What is the mass of 2.560×10^{26} atoms of Al (in kg)? Show all work on the scantron for full credit.

IA																										VIIIA
1	1															2										
	H															He										
	1.008															4.00										
	IIA												IIIA	IVA	VA	VIA	VIIA									
2	3	4											5	6	7	8	9	10								
	Li	Be											B	C	N	O	F	Ne								
	6.94	9.01											10.81	12.01	14.01	16.00	19.00	20.18								
3	11	12											13	14	15	16	17	18								
	Na	Mg											Al	Si	P	S	Cl	Ar								
	22.99	24.31											26.98	28.09	30.97	32.06	35.45	39.95								
			IIIB	IVB	VB	VIB	VIIIB	VIIIIB			IB	IIB														
4	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36								
	K	Ca	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ga	Ge	As	Se	Br	Kr								
	39.10	40.08	44.96	47.90	50.94	52.00	54.94	55.85	58.93	58.71	63.55	65.37	69.72	72.59	74.92	78.96	79.90	83.80								
5	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54								
	Rb	Sr	Y	Zr	Nb	Mo	Tc	Ru	Rh	Pd	Ag	Cd	In	Sn	Sb	Te	I	Xe								
	85.47	87.62	88.91	91.22	92.91	95.94	[98]	101.1	102.9	106.4	107.9	112.40	114.8	118.7	121.8	127.60	126.90	131.30								
6	55	56	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86								
	Cs	Ba	Lu	Hf	Ta	W	Re	Os	Ir	Pt	Au	Hg	Tl	Pb	Bi	Po	At	Rn								
	132.9	137.3	175	178.5	181	183.9	186.2	190.2	192.2	195.1	197	200.59	204.4	207.2	209	[209]	[210]	[222]								
7	87	88	103	104	105	106	107	108	109	110	111	112	113	114	115	116		118								
	Fr	Ra	Lr	Rf	Db	Sg	Bh	Hs	Mt	Ds	Rg	Uub	Uut	Uuq	Uup	Uuh		Uuo								
	[223]	[226]	[262]	[267]	[268]	[271]	[272]	[270]	[276]	[281]	[280]	[285]	[284]	[289]	[288]	[293]		[294]								
8	57	58	59	60	61	62	63	64	65	66	67	68	69	70												
	La	Ce	Pr	Nd	Pm	Sm	Eu	Gd	Tb	Dy	Ho	Er	Tm	Yb												
	138.9	140.1	140.9	144.2	[145]	150.4	152	157.3	158.9	162.5	164.93	167.3	168.9	173												
9	89	90	91	92	93	94	95	96	97	98	99	100	101	102												
	Ac	Th	Pa	U	Np	Pu	Am	Cm	Bk	Cf	Es	Fm	Md	No												
	[227]	232	[231]	238	[237]	[244]	[243]	[247]	[247]	[251]	[252]	[257]	[258]	[259]												