Exam 1
Chem 121
Spring 2007

Name:_____

Show all work to receive credit.

Q1. When a block of ice melts in a warm room, is this a chemical or physical change? (3 pts.)

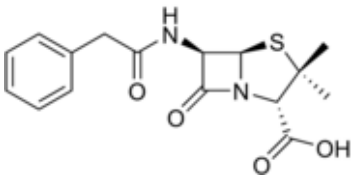
Q2. Is iced tea a compound, element, or a mixture? Explain. (3 pts.)

Q3. Is table salt a compound, element, or a mixture? Explain. (3 pts.)

Q4. Fill in the blanks: (You must spell the name correctly for full credit.) (20 pts.)

Element Name	Element Symbol
carbon	
	Fe
potassium	
	N
phosphorus	
	Au
lead	
	Sn
magnesium	
	Ba

Q5. Write the formula of penicillin G, used in the treatment of bacterial infections, if the molecule contains sixteen carbon atoms, eighteen hydrogen atoms, two nitrogen atoms, four oxygen atoms and one sulfur atom. (5 pts.)



Q6. Give three properties of (6 pts.)

(A) Metals

i)

ii)

iii)

(B) Non-metals

i)

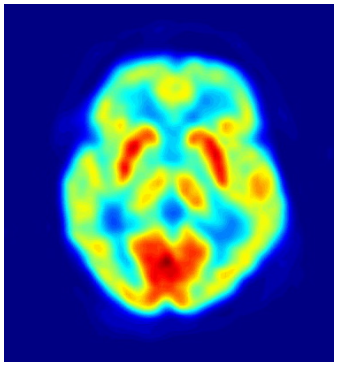
ii)

iii)

Q7. Fill in the blanks: (20 pts.)

Prefix	**Symbol**	**Meaning**
centi		
	d	
		$x10^{-6}$
	M	
Kilo		

Q8. Positron emission tomography (PET) is a nuclear medicine medical imaging technique which produces a three-dimensional image or map of functional processes in the body.



PET scan of a human brain.

To conduct the scan, a short-lived radioactive tracer isotope (which has been chemically incorporated into a metabolically active molecule) is injected into the living subject. There is a waiting period while the metabolically active molecule becomes concentrated in tissues of interest; then the research subject or patient is placed in the imaging scanner.

The molecule most commonly used for this purpose is fluorodeoxyglucose (FDG), a sugar, for which the waiting period is typically an hour.

The fluorine atom in FDG is normally the fluorine-18 isotope.

How many protons and neutrons are there in an atom of fluorine-18? (6 pts.)

Q9. How many significant figures do the following measurement contain? (10 pts.)

a) 0.0010 m
b) 5.0 s
c) 1201.560 kg
d) 3.50×10^5 mL
e) 410 m^3

Q10. Write the electron configuration of the following atoms: (10 pts)

a) Na (component of body fluids; necessary for nerve action)

b) Si (helps form connective tissue and bone)

c) S (component of proteins; necessary for blood clotting)

Q11. A patient who weighs 175 lbs requires 45.4 mg of methylprednisolone. Using the conversion-factor method, how many milligrams of methylprednisolone would a 215 lbs patient require? How many 8-mg tablets is this equivalent to? (No credit unless the conversion-factor method is used.) (10 pts.)

Q12. What is the name commonly given to elements in group IIA of the periodic table? (2 pts.)

Q13. What is the name commonly given to elements in group VIIA of the periodic table? (2 pts.)

BONUS QUESTION:
Gold has a density of 19.3 g/mL. What volume of gold would a 544.1 g sample occupy?

Periodic Table of the Elements

IA	*IIA*											*IIIA*	*IVA*	*VA*	*VIA*	*VIIA*	*VIIIA*
1 H 1.00794																	2 He 4.002602
3 Li 6.941	4 Be 9.012182											5 B 10.811	6 C 12.0107	7 N 14.00674	8 O 15.9994	9 F 18.998403	10 Ne 20.1797
11 Na 22.989770	12 Mg 24.3050											13 Al 26.981538	14 Si 28.0855	15 P 30.973762	16 S 32.066	17 Cl 35.4527	18 Ar 39.948
19 K 39.0983	20 Ca 40.078	21 Sc 44.95591	22 Ti 47.867	23 V 50.9415	24 Cr 51.9961	25 Mn 54.938049	26 Fe 55.845	27 Co 58.9332	28 Ni 58.6934	29 Cu 63.546	30 Zn 65.39	31 Ga 69.723	32 Ge 72.61	33 As 74.92160	34 Se 78.96	35 Br 79.904	36 Kr 83.80
37 Rb 85.4678	38 Sr 87.62	39 Y 88.90585	40 Zr 91.224	41 Nb 92.90638	42 Mo 95.94	43 Tc [98]	44 Ru 101.07	45 Rh 102.9055	46 Pd 106.42	47 Ag 107.8682	48 Cd 112.411	49 In 114.818	50 Sn 118.71	51 Sb 121.76	52 Te 127.60	53 I 126.90447	54 Xe 131.29
55 Cs 132.90545	56 Ba* 137.327	71 Lu 174.967	72 Hf 178.49	73 Ta 180.9479	74 W 183.84	75 Re 186.207	76 Os 190.23	77 Ir 192.217	78 Pt 195.078	79 Au 196.96655	80 Hg 200.59	81 Tl 204.3833	82 Pb 207.2	83 Bi 208.98038	84 Po [210]	85 At [210]	86 Rn [222]
87 Fr [223]	88 Ra** [226]	103 Lr [262]	104 Rf [261]	105 Db [262]	106 Sg [266]	107 Bh [264]	108 Hs [265]	109 Mt [268]	110 [269]	111 [272]	112 [277]	113	114 [285]	115	116 [289]	117	118 [293]

	57 La 138.9055	58 Ce 140.116	59 Pr 140.90765	60 Nd 144.24	61 Pm [145]	62 Sm 150.36	63 Eu 151.964	64 Gd 157.25	65 Tb 158.92534	66 Dy 162.50	67 Ho 164.93032	68 Er 167.26	69 Tm 168.93421	70 Yb 173.04
*														
	89 Ac [227]	90 Th 232.0381	91 Pa 231.03588	92 U 238.0289	93 Np [237]	94 Pu [244]	95 Am [243]	96 Cm [247]	97 Bk [247]	98 Cf [251]	99 Es [252]	100 Fm [257]	101 Md [258]	102 No [259]
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