

Chem 1141

Exam 1A (Fall 2008)

Name: _____

Multiple Choice. 2 Points each.

1. Which one of these represents a *physical* change?

- A. water, when heated, forms steam
- B. bleach turns hair yellow
- C. sugar, when heated, becomes brown
- D. milk turns sour
- E. apples, when exposed to air, turn brown

2. The SI prefixes *milli* and *mega* represent, respectively:

- A. 10^6 and 10^{-6} .
- B. 10^{-3} and 10^6 .
- C. 10^3 and 10^{-6} .
- D. 10^{-3} and 10^9 .
- E. 10^{-6} and 10^{-3} .

3. 6.0 km is how many micrometers?

- A. $6.0 \times 10^6 \mu\text{m}$
- B. $1.7 \times 10^{-7} \mu\text{m}$
- C. $6.0 \times 10^9 \mu\text{m}$
- D. $1.7 \times 10^{-4} \mu\text{m}$
- E. $6.0 \times 10^3 \mu\text{m}$

4. The number 1.050×10^9 has how many significant figures?

- A. 2
- B. 3
- C. 4
- D. 9
- E. 13

5. Do the indicated arithmetic and give the answer to the correct number of significant figures.

$$(1.5 \times 10^{-4} \times 61.3) + 2.01 =$$

- A. 2.0192
- B. 2.0
- C. 2.019
- D. 2.02
- E. 2.019195

6. A piece of metal with a mass of 125 g is placed into a graduated cylinder that contains 25.00 mL of water, raising the water level to 56.00 mL. What is the density of the metal?

- A. 5.00 g/cm^3
- B. 4.03 g/cm^3
- C. 2.23 g/cm^3
- D. 1.51 g/cm^3
- E. 0.25 g/cm^3

7. The density of lead is 11.4 g/cm^3 at 25°C . Calculate the volume occupied by 25.0 g of lead.

- A. 2.19 cm^3
- B. 0.456 cm^3
- C. 285 cm^3
- D. 1.24 cm^3
- E. 6.05 cm^3

8. A person walking fast requires 5.0 kcal of energy per minute. How many minutes of such exercise are required to consume 520 kcal, the energy in a large bag of French fries?

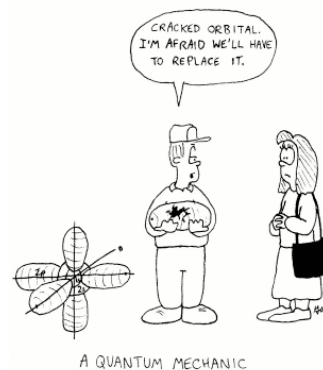
- A. 0.0096 min
- B. 100 min
- C. 130 min
- D. 520 min
- E. 2,600 min



9. Some molecules move with speeds approaching the "escape velocity" from Earth, which is 7.0 miles per second. What is this speed in cm/h? (1 mile = 1609 m)
- A. 313 cm/h B. 4.1×10^5 cm/h C. 4.1×10^9 cm/h
 D. 1.1×10^6 cm/h E. 1.6×10^9 cm/h
10. The elements in a column of the periodic table are known as
- A. metalloids. B. a period. C. noble gases. D. a group. E. nonmetals.
11. Which of these materials are usually poor conductors of heat and electricity?
- A. metals B. metalloids C. nonmetals
 D. alkaline earth metals E. alkali metals
12. Atoms of the same element with different mass numbers are called
- A. ions. B. neutrons. C. allotropes. D. chemical families.
 E. isotopes.
13. How many neutrons are there in an atom of lead whose mass number is 208?
- A. 82 B. 126 C. 208 D. 290 E. none of them
14. Give the number of protons (p), electrons (e), and neutrons (n) in one atom of chlorine-37.
- A. 37 p, 37 e, 17 n B. 17 p, 17 e, 37 n C. 17 p, 17 e, 20 n
 D. 37 p, 17 e, 20 n E. 17 p, 37 e, 17 n
15. An aluminum ion, Al^{3+} , has:
- A. 13 protons and 13 electrons B. 27 protons and 24 electrons C. 16 protons and 13 electrons
 D. 13 protons and 10 electrons E. 10 protons and 13 electrons
16. What is the formula for the ionic compound formed by calcium ions and nitrate ions?
- A. Ca_3N_2 B. $\text{Ca}(\text{NO}_3)_2$ C. Ca_2NO_3 D. Ca_2NO_2 E. CaNO_3
17. What is the formula for the ionic compound formed by magnesium and iodine?
- A. MgI B. Mg_2I C. MgI_2 D. MgI_3 E. Mg_3I
18. Which is the correct formula for copper(II) phosphate?
- A. Cu_2PO_4 B. $\text{Cu}_3(\text{PO}_4)_2$ C. Cu_2PO_3 D. $\text{Cu}(\text{PO}_4)_2$ E. $\text{Cu}(\text{PO}_3)_2$
19. The correct name for NH_4NO_3 is
- A. ammonium nitrate. B. ammonium nitrogen trioxide. C. ammonia nitrogen oxide.
 D. hydrogen nitrogen oxide. E. hydrogen nitrate.
20. Which is the correct formula for lead(IV) chloride?
- A. Pb_4Cl B. PbCl_2 C. PbCl_3 D. PbCl_4 E. Pb_2Cl_4
21. Which of these elements is chemically similar to oxygen?
- A. sulfur B. calcium C. iron D. nickel E. sodium

22. [16 pts.] Name the following compounds:

- i) MgCl_2 _____
- ii) FeBr_3 _____
- iii) Cl_4O_7 _____
- iv) CuO _____
- v) N_2F_6 _____
- vi) NH_4NO_3 _____
- vii) N_9O_{10} _____
- viii) LiHCO_3 _____



23. [16 pts.] Write formulas for the following compounds:

- i) sodium hydroxide _____
- ii) potassium sulfate _____
- iii) trinitrogen pentoxide _____
- iv) heptachlorine octafluoride _____
- v) magnesium nitrate _____
- vi) calcium sulfite _____
- vii) sodium carbonate decahydrate _____
- viii) sulfuric acid _____

Show all work to receive credit on the following problems.

24. [6 pts.] What volume would 45.60 g of gold occupy? The density of gold is 19.3 g/cm^3 .

25. [8 pts.] Convert a density of 3.4 mg/cL into units of $\text{ng}/\mu\text{L}$. Use the conversion-factor method.

26. [6 pts.] How many protons, neutrons, and electrons are there in an atom of beryllium-9?

27. [6 pts.] How many significant figures do the following measurements have:

i) 0.00102 kg _____

ii) 23.0×10^{27} s _____

iii) 1200 mol _____

iv) 1.000 A _____

v) 230.01 m _____

vi) 1.29 mg _____

Periodic Table of the Elements

IA		IIA										IIIA		IVA	VA	VIA	VIIA	VIIIA																	
1																			18																
1	H																		He																
1.01																			4.00																
3	Li	4											5	6	7	8	9	10																	
6.94		Be											B	C	N	O	F	Ne																	
													10.81	12.01	14.01	16.00	19.00	20.18																	
11	Na	12											13	14	15	16	17	18																	
22.99		Mg											Al	Si	P	S	Cl	Ar																	
													26.98	28.09	30.97	32.07	35.45	39.95																	
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	47.87	50.94	52.00	54.94	55.85	58.93	58.69	63.55	65.39	69.72	72.61	74.92160	78.96	79.90	83.80																		
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]	101.07	102.91	106.42	107.87	112.41	114.82	118.71	121.76	127.60	126.90	131.29																		
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																		
132.91	137.33	174.97	178.49	180.95	183.84	186.21	190.23	192.22	195.08	196.97	200.59	204.38	207.20	208.98	[210]	[210]	[222]																		
87	88	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118																		
Fr	Ra**	Lr	Rf	Db	Sg	Bh	Hs	Mt																											
[223]	[226]	[262]	[261]	[262]	[266]	[264]	[265]	[268]	[269]	[272]	[277]		[285]		[289]		[293]																		