

Chem 1141

Fall 2014

Exam 1A

Name: _____

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

Multiple Choice: _____ /30

Q11: _____ /10

Q12: _____ /10

Q13: _____ /10

Q14: _____ /10

Q15: _____ /10

Q16: _____ /10

Q17: _____ /10

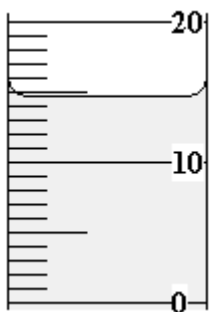
BONUS: _____ /3

TOTAL: _____ /100



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

- Q1. Water has a boiling point of 100 °C. This is an example of a(n):
 a) Chemical Property b) Physical Property c) Intensive Property
 d) Extensive Property e) Both (b) and (c)
- Q2. How much water is contained in the 20-mL measuring cylinder shown below:



- a) 10.5 mL b) 15 mL c) 16.0 mL
 d) 14.8 mL e) 10.48 mL
- Q3. Isotopes are:
 a) Atoms that only differ in the number of electrons they contain
 b) Atoms that only differ in the number of neutrons they contain
 c) Atoms that only differ in the number of protons they contain
 d) Atoms that only differ in the number of nuclei they contain
 e) Atoms that only differ in the number of electrons in the valence shell
- Q4. The nuclide symbol for the species that has the same number of electrons as $^{37}_{17}\text{Cl}^-$ is
 a) $^{37}_{17}\text{Cl}$ b) $^{35}_{16}\text{S}^{2-}$ c) $^{32}_{16}\text{S}$ d) $^{31}_{15}\text{P}^{3+}$ e) $^{34}_{14}\text{Si}$
- Q5. The formulas of the nitrite, phosphide, and nitrate ions are represented, respectively, as:
 a) NO_2^- , PO_4^{3-} , NO_4^- b) N^{3-} , PO_3^{3-} , NO_3^-
 c) NO^- , P^{5-} , NO_3^- d) NO_2^- , P^{3-} , NO_3^- e) NO_3^- , PO_2^- , N^{3-}
- Q6. An irregularly shaped object was weighed by the following difference:

$$\begin{array}{rcl} \text{Watch glass + metal} & = & 56.7813 \text{ g} \\ \text{Watch glass} & = & 35.4725 \text{ g} \end{array}$$

The volume of the metal was determined by placing the metal in a graduated cylinder that had water in it and measuring the volume difference.

$$\begin{array}{rcl} \text{Graduated cylinder + water + metal} & = & 14.15 \text{ mL} \\ \text{Graduated cylinder + water} & = & 11.24 \text{ mL} \end{array}$$

The density should be reported as:

- a) 1.90 g/mL b) 19.5 g/mL c) 7.32 g/mL d) 7.3 g/mL e) 7.3226 g/mL

- Q7. How many significant figures are in the following measurement: 6.080×10^4 mL water?
a) 2 b) 3 c) 4 d) 5 e) 6
- Q8. Which of the following is a mixture?
a) beer b) steam c) iron d) table sugar e) sodium chloride
- Q9. Which of the following doesn't exist as a diatomic molecule (i.e. which is wrong as written)?
a) F_2 b) C_2 c) O_2 d) Cl_2 e) H_2
- Q10. Which of the following elements is most likely to form an ion with a 2- charge?
a) O b) Mg c) Na d) Cl e) Li

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.

- Q11. [10 pts.] The world record for the 100-meter dash is 9.58 seconds, ran by Usain Bolt in 2009. Convert this to miles per hour. Note: 1.000 mile = 1.603 km.

- Q12. [10 pts.] a) Give the name of group IIA of the periodic table: _____
- b) Give the name of group VIIA of the periodic table: _____
- c) Name an element in the second period of the periodic table: _____
- d) Name an element that is a metalloid: _____
- e) Name an element that is a transition metal: _____

Q13. [10 pts.] Provide the results of the following calculations with the correct number of significant figures:

a) $18.125 + 0.00213 + 71.9 =$ _____

b) $(3.771 \times 3.27) / 2.00 =$ _____

c) $0.0004760 \times 0.27615 =$ _____

d) $80.321 - 79.783 =$ _____

e) $(1.230 + 2.17) / (34.0 - 13.0) =$ _____

Q14. [10 pts.] Write formulas for the following compounds:

a) copper(I) sulfide _____

b) heptanitrogen decoxide _____

c) ferric sulfate _____

d) magnesium cyanide _____

e) tetrabromine hexachloride _____

Q15. [10 pts.] One isotope of a metallic element has the mass number of 63, and 33 neutrons. The cation derived from this isotope has 28 electrons. Write the nuclide symbol for this isotope. Be sure to include the charge.
Hint: see one of the multiple choice questions for an example of a nuclide symbol.

Q16. [10 pts.] Name the following compounds:

a) Na_2SO_4 _____

b) CuNO_3 _____

c) Cl_3O_9 _____

d) $\text{K}_3\text{PO}_4 \cdot 2\text{H}_2\text{O}$ _____

e) CCl_4 _____

Q17. [10 pts.] The density of mercury is 13.6 g/cm^3 . How many quarts (qt) does 121 g of Hg occupy?
($1.000 \text{ L} = 1.057 \text{ qt}$)

BONUS: The white blood cell concentration in normal blood is approximately $12,000 \text{ cells/mm}^3$ of blood. How many white blood cells does a normal adult with 5-L of blood have? Express the answer in scientific notation.

1		18									
IA		VIIIA									
1	2	2									
H	He										
1.01	4.00										
IIA		VIIA									
3	4										
Li	Be										
6.94	9.01										
IIIB		IIIA									
11	12										
Na	Mg										
22.99	24.31	13									
IIIB		IIIA									
3	4										
K	Ca										
39.1	40.08										
IIIB		IIIA									
37	38										
Rb	Sr										
85.47	87.62										
IIIB		IIIA									
55	56										
Cs	Ba										
132.9	137.3										
IIIB		IIIA									
87	88										
Fr	Ra										
(223)	(226)										
IIIB		IIIA									
89	90										
Ac^	Th										
(227)	(232)										
IIIB		IIIA									
91	92										
Pa	U										
(231)	(238)										
IIIB		IIIA									
93	94										
Np	Pu										
(237)	(244)										
IIIB		IIIA									
95	96										
Am	Cm										
(241)	(247)										
IIIB		IIIA									
97	98										
Bk	Cf										
(247)	(251)										
IIIB		IIIA									
99	100										
Lr	101										
(262)	(261)										
IIIB		IIIA									
101	102										
Db	Sg										
(262)	(263)										
IIIB		IIIA									
103	104										
Bh	Hs										
(264)	(265)										
IIIB		IIIA									
105	106										
Bh	Hs										
(264)	(265)										
IIIB		IIIA									
107	108										
Bh	Hs										
(264)	(265)										
IIIB		IIIA									
109	110										
Mt	Ds										
(268)	(271)										
IIIB		IIIA									
111	112										
Rg	Uut										
(272)	(273)										
IIIB		IIIA									
113	114										
Uuh	Uuq										
(289)	(292)										
IIIB		IIIA									
115	116										
Uut	Uuq										
(295)	(298)										
IIIB		IIIA									
117	118										
Uuh	Uuq										
(315)	(318)										
IIIB		IIIA									
119	120										
Uuh	Uuq										
(317)	(320)										
IIIB		IIIA									
121	122										
Uuh	Uuq										
(321)	(324)										
IIIB		IIIA									
123	124										
Uuh	Uuq										
(323)	(326)										
IIIB		IIIA									
125	126										
Uuh	Uuq										
(325)	(328)										
IIIB		IIIA									
127	128										
Uuh	Uuq										
(327)	(330)										
IIIB		IIIA									
129	130										
Uuh	Uuq										
(329)	(332)										
IIIB		IIIA									
131	132										
Uuh	Uuq										
(331)	(334)										
IIIB		IIIA									
133	134										
Uuh	Uuq										
(333)	(336)										
IIIB		IIIA									
135	136										
Uuh	Uuq										
(335)	(338)										
IIIB		IIIA									
137	138										
Uuh	Uuq										
(337)	(340)										
IIIB		IIIA									
139	140										
Uuh	Uuq										
(339)	(342)										
IIIB		IIIA									
141	142										
Uuh	Uuq										
(341)	(344)										
IIIB		IIIA									
143	144										
Uuh	Uuq										
(343)	(346)										
IIIB		IIIA									
145	146										
Uuh	Uuq										
(345)	(348)										
IIIB		IIIA									
147	148										
Uuh	Uuq										
(347)	(350)										
IIIB		IIIA									
149	150										
Uuh	Uuq										
(349)	(352)										
IIIB		IIIA									

58	59	60	61	62	63	64	65	66	67	68	69	70	71
Ce	Pr	Nd	Pm	Sm	Eu	Gd	Tb	Dy	Ho	Er	Tm	Yb	Lu
140.1	140.9	144.2	(145)	150.4	152.0	157.3	158.9	162.5	164.9	167.3	168.9	173.0	175.0
90	91	92	93	94	95	96	97	98	99	100	101	102	103
Th	Pa	U	Np	Pu	Am	Cm	Bk	Cf	Es	Fm	Md	No	Lr
232.0	(231)	238.0	(237)	(244)	(243)	(247)	(247)	(251)	(252)	(257)	(258)	(259)	(260)