

Cerritos College Practice (Diagnostic) Exam for Chemistry

Purpose:

To determine which class (CHEM110 vs. CHEM111) is best for each individual student.

Materials you need for taking this test: Scratch paper

A non-graphing scientific calculator Pencil and eraser

Instruction:

1. Print out this exam.
2. Complete the 25 questions on this exam in 1 hour. Do not use any additional references while you are taking exam. (You can use the information provided at the end of the 25 questions. You will find a periodic table along with other useful information there.)
3. Grade your responses using the key provided on the last page.
4. Read the recommendation based on your score.

Column 1	Column 2
<p>1. A small pizza has a diameter of 7.50 inches. Its diameter in centimeter is (note: 1 inch = 2.54 cm):</p> <p>A) 19.1 cm B) 12.0 cm C) 4.65 cm D) 2.95 cm E) 0.169 cm</p> <p>2. Every atom of the same element has</p> <p>A) the same mass B) the same atomic number C) the same number of neutrons D) the same weight</p> <p>3. Which element is an alkaline earth metal?</p> <p>A) Potassium B) Strontium C) Argon D) Copper E) Fluorine</p> <p>4. Identify this element: $^{133}_{55}\text{X}$</p> <p>A) Cesium B) Barium C) Xenon D) Arsenic E) Boron</p> <p>5. How many atoms of oxygen are in one formula unit of $\text{Ca}(\text{NO}_3)_2$?</p> <p>A) 3 B) 2 C) 6 D) 1 E) None of these</p>	<p>6. Identify the anion in the compound $\text{Ca}(\text{IO}_3)_2$.</p> <p>A) Ca^{2+} B) IO_3^{2-} C) $\text{I}_2\text{O}_6^{2-}$ D) O^{2-} E) IO_3^{3-}</p> <p>7. What is the empirical formula of a compound containing 0.347 mole P to 1.031 mole Cl?</p> <p>A) PCl_3 B) PCl_5 C) P_2Cl_5 D) P_2Cl_6 E) None of these</p> <p>8. How many atoms of chromium are in 2.35 g $\text{Na}_2\text{Cr}_2\text{O}_7$?</p> <p>A) 2.14×10^{22} B) 5.39×10^{21} C) 1.08×10^{22} D) 9.27×10^{-22}</p> <p>9. For the reaction, $_ \text{Na}(\text{s}) + _ \text{H}_2\text{O}(\text{l}) \Rightarrow _ \text{NaOH}(\text{aq}) + _ \text{H}_2(\text{g})$ what are the coefficients of Na, H_2O, NaOH and H_2 in the balanced equation?</p> <p>A) 1,1,2,2 B) 2,2,2,1 C) 1,1,1,2 D) 2,1,1,2 E) none of these</p>

Column 1	Column 2
<p>10. Name the products in the reaction between KHCO_3 and HI.</p> <p>A) KI and H_2CO_3 B) KH and ICO_3 C) KHI and HCO_3 D) KI, CO_2 and H_2O E) none of these</p> <p>11. How much copper is needed to make 12.20 g CuCl_2 in the equation, $\text{Cu} + \text{Cl}_2 \Rightarrow \text{CuCl}_2$?</p> <p>A) 10.36 g B) 2.87 g C) 11.54 g D) 5.77 g E) 12.20 g</p> <p>12. Calculate the heat required to raise 150.00g of H_2O from 2.0000 °C to 85.0000 °C where the heat capacity is 4.1840 J/(g °C).</p> <p>A) 5200.9 J B) 52091 J C) 2894.0 J D) 28950.0 J E) 520.1 J</p> <p>13. How many electrons are in a S^{2-} ion?</p> <p>A) 18 B) 16 C) 14 D) 10 E) -2</p>	<p>14. The electronic configuration for the K atom is:</p> <p>A) $1s^2 2s^2 2p^6 3s^2 3p^6 3d^1$ B) $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2$ C) $1s^2 2s^2 2p^6 3s^2 3p^6 3d^6 4s^1$ D) $1s^2 2s^2 2p^6 3s^2 3p^6 4s^1$ E) none of the above</p> <p>15. Which of the following molecules has an ionic bond?</p> <p>A) N_2 B) H_2O C) CH_3OH D) CH_4 E) KCl</p> <p>16. The shape of NH_4^+ ion is best described by:</p> <p>A) linear B) trigonal planar C) trigonal pyramidal D) tetrahedral E) bent</p> <p>17. Find the final pressure of a sample of gas at 1.3 atm and 1.9 L that is compressed to 158 mL.</p> <p>A) 0.16 atm B) 1.56 atm C) 10.6 atm D) 5.61 atm E) 15.6 atm</p>

Column 1	Column 2
<p>18. Calculate the number of moles there are when a gas occupies a volume of 3.95 L at 37.0 °C and 0.985 atm.</p> <p>A) 1.28 mole B) 0.153 mole C) 0.201 mole D) 23.3 mole E) 75.3 mole</p> <p>19. Which of the following molecules will have the strongest intermolecular forces?</p> <p>A) N₂ B) F₂ C) H₂O D) Ne E) C₂H₂</p> <p>20. Which of the following molecules would have hydrogen bonding?</p> <p>A) HF B) CH₄ C) H₂S D) CH₃CH₃ E) C₅H₁₂</p> <p>21. How many grams of Mg(NO₃)₂ are required to produce 250.0 mL of a 0.0750 M solution?</p> <p>A) 1.61 g B) 1.39 g C) 2.78 g D) 0.800 g E) 2.19 g</p>	<p>22. A 50.0 mL sample of a 6.0M solution of HCl is diluted to 200.0 mL. What is the new concentration?</p> <p>A) 24.0 M B) 6.0 M C) 2.10 M D) 2.00 M E) 1.50 M</p> <p>23. Which of the following are strong electrolytes?</p> <p>A) NH₄C₂H₃O₂ B) Mg(OH)₂ C) HNO₂ D) H₂SO₃ E) PbCl₂</p> <p>24. Which of the following is a strong acid?</p> <p>A) H₂SO₄ B) H₂SO₃ C) HClO D) HClO₂ E) H₃PO₄</p> <p>25. What is the systematic name of ICl₃?</p> <p>A) iodine chloride B) iodine (III) chloride C) triiodine chloride D) iodine trichloride E) tri(iodine chloride)</p>

Important Information and Equations:**Avogadro's Number $N_A = 6.022 \times 10^{23}$ Universal Gas Constant $R = 0.0821 \text{ L atm/ mol K}$** **Table of Electronegativity Values**

A 3D bar chart representing the electronegativity values of elements. The elements are arranged in rows corresponding to their periods. Each element is represented by a block with its symbol and electronegativity value. The values generally increase from left to right and bottom to top. Noble gases (He, Ne, Ar, Kr, Xe) are shown in yellow blocks with no numerical value.

Element	Electronegativity
H	2.1
Li	1.0
Na	0.9
K	0.8
Rb	0.8
B	2.0
C	2.5
N	3.0
O	3.5
F	4.0
Be	1.5
Mg	1.2
Ca	1.0
Sr	1.0
Ba	0.9
Al	1.5
Ga	1.6
In	1.7
Tl	1.8
Si	1.8
Ge	1.8
Sn	1.8
Pb	1.9
P	2.1
As	2.0
Sb	1.9
Bi	2.0
S	2.5
Se	2.4
Te	2.1
Cl	3.0
Br	2.8
I	2.5
He	
Ne	
Ar	
Kr	
Xe	

Copyright © 2010 Pearson Prentice Hall, Inc.

PERIODIC CHART OF THE ELEMENTS

IA	IIA	IIIB	IVB	VB	VIB	VIIIB	IB	IIB	IIIA	IVA	VA	VIA	VIIA	VIIIA	INERT GASES		
1 H 1.00797													1 H 1.00797	2 He 4.0026			
3 Li 6.939	4 Be 9.0122												9 F 18.9984	10 Ne 20.183			
11 Na 22.9898	12 Mg 24.312												17 Cl 35.453	18 Ar 39.948			
19 K 39.102	20 Ca 40.08	21 Sc 44.956	22 Ti 47.90	23 V 50.942	24 Cr 51.996	25 Mn 54.9380	26 Fe 55.847	27 Co 58.9332	28 Ni 58.71	29 Cu 63.54	30 Zn 65.37	31 Ga 69.72	32 Ge 72.59	33 As 74.9216	34 Se 78.96	35 Br 79.909	36 Kr 83.80
37 Rb 85.47	38 Sr 87.62	39 Y 88.905	40 Zr 91.22	41 Nb 92.906	42 Mo 95.94	43 Tc (99)	44 Ru 101.07	45 Rh 102.905	46 Pd 106.4	47 Ag 107.870	48 Cd 112.40	49 In 114.82	50 Sn 118.69	51 Sb 121.75	52 Te 127.60	53 I 126.904	54 Xe 131.30
55 Cs 132.905	56 Ba 137.34	*57 La 138.91	72 Hf 178.49	73 Ta 180.948	74 W 183.85	75 Re 186.2	76 Os 190.2	77 Ir 192.2	78 Pt 195.09	79 Au 196.967	80 Hg 200.59	81 Tl 204.37	82 Pb 207.19	83 Bi 208.980	84 Po (210)	85 At (210)	86 Rn (222)
87 Fr (223)	88 Ra (226)	†89 Ac (227)	104 Rf (261)	105 Db (262)	106 Sg (266)	107 Bh (262)	108 Hs (265)	109 Mt (266)	110 ? (271)	111 ? (272)	112 ? (277)						

Numbers in parenthesis are mass numbers of most stable or most common isotope.

Atomic weights corrected to conform to the 1963 values of the Commission on Atomic Weights.

The group designations used here are the former Chemical Abstract Service numbers.

* Lanthanide Series

58 Ce 140.12	59 Pr 140.907	60 Nd 144.24	61 Pm (147)	62 Sm 150.35	63 Eu 151.96	64 Gd 157.25	65 Tb 158.924	66 Dy 162.50	67 Ho 164.930	68 Er 167.26	69 Tm 168.934	70 Yb 173.04	71 Lu 174.97
--------------------	---------------------	--------------------	-------------------	--------------------	--------------------	--------------------	---------------------	--------------------	---------------------	--------------------	---------------------	--------------------	--------------------

† Actinide Series

90 Th 232.038	91 Pa (231)	92 U 238.03	93 Np (237)	94 Pu (242)	95 Am (243)	96 Cm (247)	97 Bk (247)	98 Cf (249)	99 Es (254)	100 Fm (253)	101 Md (256)	102 No (256)	103 Lr (257)
---------------------	-------------------	-------------------	-------------------	-------------------	-------------------	-------------------	-------------------	-------------------	-------------------	--------------------	--------------------	--------------------	--------------------

Solution Key for the Practice Exam

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

Recommendations: Please note that this practice exam is a diagnostic exam for providing a recommendation in determining which class, CHEM110 or CHEM111, is best for each individual student. This is not a prerequisite clearance.

22-25

Students in this category appear to be qualified to bypass CHEM110 and go directly to CHEM111.

18-21

Students in this category may be qualified to bypass CHEM110 and go directly to CHEM111. Students in this category will need to review their prior chemistry to succeed in the chemistry 111 course.

14-17

It is recommended that students in this category take CHEM 110.

0-14

It is strongly recommended that students in this category take CHEM 110.