

## CHE 105 Spring 2019 Exam 1

Your Name: \_\_\_\_\_

Your ID: \_\_\_\_\_

### Question #: 1

Which one is **not** a state of matter?

- A. liquid
  - B. plasma
  - C. solution
  - D. solid
- 

### Question #: 2

Which choice includes **only** mixtures?

- A. water, salad dressing, bourbon whiskey, copper
  - B. carbon dioxide, platinum, sweet tea, air
  - C. iced tea, concrete, air, sea water
  - D. coffee, nicotine, table sugar, ice cream
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### Question #: 3

Which **two** illustrate chemical properties of matter?

- A. A freshly cut apple turns brown.
  - B. Milk turns sour on standing.
  - C. Water boils on heating.
  - D. Sugar dissolves in tea.
  - E. Nitrogen can be separated from air.
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Question #: 4

Which one is **not** an SI base unit?

- A. kilogram
  - B. liter
  - C. ampere
  - D. meter
  - E. kelvin
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Question #: 5

How many millimeters is 2.4 km?

- A. 2400 mm
  - B.  $2.4 \times 10^4$  mm
  - C.  $2.4 \times 10^6$  mm
  - D.  $2.4 \times 10^{-4}$  mm
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Which one is **not** a valid expression of volume?

- A.  $1.5 \times 10^{-5}$  L
  - B.  $2.7 \text{ m}^{-3}$
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  - E.  $1770 \text{ dm}^3$
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- A. 53.2 kg
  - B. 32.0 kg
  - C.  $3.13 \times 10^{-5}\text{ g}$
  - D. 413 Mg
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How many significant figures are shown in 1009.630 mL?

- A. 4
  - B. 5
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What answer should be reported, with the **correct** number of significant figures, for the following calculation?

$$(965.43 \times 3.911) + 9413.4136 = ?$$

- A. 13189
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  - C.  $1.32 \times 10^4$
  - D.  $1.3 \times 10^4$
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If an object has a density of  $8.65 \text{ g/cm}^3$ , what is its density in units of  $\text{kg/m}^3$ ?

- A.  $8.65 \times 10^{-3} \text{ kg/m}^3$
  - B.  $8.65 \times 10^{-7} \text{ kg/m}^3$
  - C.  $8.65 \times 10^3 \text{ kg/m}^3$
  - D.  $8.65 \times 10^1 \text{ kg/m}^3$
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It has been estimated that  $8.0 \times 10^4$  tons of gold have been mined. What is the total value of this gold if it is valued at \$1657 per ounce? (1 ton = 2000 pounds; 1 lb = 16 ounces)

- A.  $\$1.0 \times 10^{10}$
  - B.  $\$3.3 \times 10^8$
  - C.  $\$2.1 \times 10^{14}$
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When Dalton proposed his atomic theory, he was aware of all of the following **except**

- A. the law of conservation of mass.
  - B. the properties of cathode rays.
  - C. the law of multiple proportions.
  - D. the law of definite proportions.
  - E. the existence of chemical elements.
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Rutherford interpreted the results of alpha-particle scattering by a gold foil to establish that

- A. electrons have negative charge.
  - B. atoms are composed of protons, electrons, and neutrons.
  - C. neutrons must exist in the nucleus of the atom.
  - D. protons are not uniformly distributed throughout an atom.
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The atomic nucleus contains

- A. neutrons, protons, and electrons.
  - B. most of the mass of the atom.
  - C. protons, electrons, and gluons.
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The atomic number

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  - B. cannot be determined if the number of electrons in the atom is not known.
  - C. cannot exceed the number of neutrons in an atom.
  - D. is the same as the number of electrons in a neutral atom.
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**Question #: 16**

A neutral atom of the isotope  $^{31}\text{P}$  contains

- A. 15 protons, 16 neutrons, 15 electrons
  - B. 16 protons, 15 neutrons, 16 electrons
  - C. 15 protons, 31 neutrons, 16 electrons
  - D. 31 protons, 31 neutrons, 31 electrons
  - E. 16 protons, 16 neutrons, 15 electrons
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Silver has two stable isotopes and an atomic mass of 107.868 amu.  $^{109}\text{Ag}$  is 48.16% of natural silver and has an isotopic mass of 108.905 amu. What is the isotopic mass of the other stable silver isotope?

- A. 106.905 amu
  - B. 106.909 amu
  - C. 106.901 amu
  - D. 106.913 amu
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**Question #: 18**

What is the mass number of  $^{136}\text{Xe}$ ?

- A. 54
  - B. 82
  - C. 136
  - D. 190
  - E. 218
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Of the types of radiations emitted in radioactive decay, which is **most** penetrating in matter?

- A. cathode rays
  - B. beta particles
  - C. gamma rays
  - D. alpha particles
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Question #: 20

A sulfide ion,  $S^{2-}$ , has:

- A. 16 protons and 16 electrons.
  - B. 32 protons and 16 electrons.
  - C. 16 protons and 14 electrons.
  - D. 16 protons and 18 electrons.
  - E. 32 protons and 18 electrons.
- 

Question #: 21

Which **two** elements are metals?

- A. magnesium
  - B. chlorine
  - C. oxygen
  - D. titanium
  - E. argon
-

Question #: 22

Which one is **not** a property of a nonmetal?

- A. poor conductor of heat
  - B. gain electrons in reactions of become anions
  - C. occur in the upper right of the periodic table
  - D. good conductor of electricity
- 

Question #: 23

Which pair of elements when reacted with each other would be most likely to form an ionic compound?

- A. P and Br
  - B. Cu and K
  - C. C and O
  - D. O and Zn
  - E. Al and Rb
- 

Question #: 24

What would be the expected charge on an ion formed from selenium?

- A. 1-
  - B. 6+
  - C. 3-
  - D. 4+
  - E. 2-
- 

Question #: 25



What is the formula for the ionic compound formed by potassium and nitrogen?

- A. KN
  - B.  $K_2N$
  - C.  $NK_2$
  - D.  $K_3N$
  - E.  $KN_3$
- 

**Question #:** 26

What is the systematic name of the compound  $Cl_2O$ ?

.

- A. chlorine oxide
  - B. dichlorine monoxide
  - C. chlorine (I) oxide
  - D. chlorine (II) oxide
  - E. chlorate
- 

**Question #:** 27

What is the correct chemical formula for titanium(II) sulfate?

- A.  $TiSO$
  - B.  $Ti(SO_4)_2$
  - C.  $TiSO_4$
  - D.  $Ti_2(SO_4)_3$
  - E.  $Ti(SO_3)_2$
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**Question #: 28**

How many magnesium atoms are in 1.00 ng of magnesium?

- A.  $4.11 \times 10^{-11}$  atoms
  - B.  $2.48 \times 10^{13}$  atoms
  - C.  $6.02 \times 10^{14}$  atoms
  - D.  $1.46 \times 10^{34}$  atoms
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**Question #: 29**

What is the molar mass of  $\text{H}_2\text{CO}_3$ ?

- A. 29.018 g/mol
  - B. 60.008 g/mol
  - C. 62.024 g/mol
  - D. 74.035 g/mol
  - E. 91.182 g/mol
- 

**Question #: 30**

How many  $\text{C}_2\text{H}_4$  molecules are in 45.8 mg of  $\text{C}_2\text{H}_4$  (molar mass = 28.05 g/mol)?

- A.  $9.83 \times 10^{20}$   $\text{C}_2\text{H}_4$  molecules
- B.  $7.74 \times 10^{26}$   $\text{C}_2\text{H}_4$  molecules
- C.  $2.71 \times 10^{20}$   $\text{C}_2\text{H}_4$  molecules
- D.  $3.69 \times 10^{23}$   $\text{C}_2\text{H}_4$  molecules
- E.  $4.69 \times 10^{23}$   $\text{C}_2\text{H}_4$  molecules

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Your Name: \_\_\_\_\_

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IUPAC Periodic Table of the Elements																		VIIA		18															
1 H 1.008		2 He 4.0026																13 IIIA		14 IVA		15 VA		16 VIA		17 VIIA		18 VIIIA							
3 Li 6.941		4 Be 9.012		Key: atomic number Symbol atomic weight																5 B 10.81		6 C 12.011		7 N 14.007		8 O 15.999		9 F 18.998		10 Ne 20.180					
11 Na 22.990		12 Mg 24.305		3 IIIB		4 IVB		5 VB		6 VIB		7 VIIB		8 VIII		9 IX		10 XB		11 XI		12 XII		13 Al 26.982		14 Si 28.085		15 P 30.974		16 S 32.06		17 Cl 35.45		18 Ar 39.948	
19 K 39.098		20 Ca 40.078		21 Sc 44.956		22 Ti 47.867		23 V 50.942		24 Cr 51.996		25 Mn 54.938		26 Fe 55.845		27 Co 58.933		28 Ni 58.693		29 Cu 63.546		30 Zn 65.38		31 Ga 69.723		32 Ge 72.630		33 As 74.922		34 Se 78.971		35 Br 79.904		36 Kr 83.798	
37 Rb 85.468		38 Sr 87.62		39 Y 88.906		40 Zr 91.224		41 Nb 92.906		42 Mo 95.95		43 Tc 101.07		44 Ru 101.07		45 Rh 102.91		46 Pd 106.42		47 Ag 107.87		48 Cd 112.41		49 In 114.82		50 Sn 118.71		51 Sb 121.76		52 Te 127.60		53 I 126.90		54 Xe 131.29	
55 Cs 132.91		56 Ba 137.33		lanthanides		72 Hf 178.49		73 Ta 180.95		74 W 183.84		75 Re 186.21		76 Os 190.23		77 Ir 192.22		78 Pt 195.08		79 Au 196.97		80 Hg 200.59		81 Tl 204.38		82 Pb 207.2		83 Bi 208.98		84 Po		85 At		86 Rn	
87 Fr		88 Ra		89-103 actinides		104 Rf		105 Db		106 Sg		107 Bh		108 Hs		109 Mt		110 Ds		111 Rg		112 Cn		113 Nh		114 Fl		115 Mc		116 Lv		117 Ts		118 Og	
57 La 138.91		58 Ce 140.12		59 Pr 140.91		60 Nd 144.24		61 Pm		62 Sm 150.36		63 Eu 151.96		64 Gd 157.25		65 Tb 158.93		66 Dy 162.50		67 Ho 164.93		68 Er 167.26		69 Tm 168.93		70 Yb 173.05		71 Lu 174.97							
89 Ac		90 Th 232.04		91 Pa 231.04		92 U 238.03		93 Np		94 Pu		95 Am		96 Cm		97 Bk		98 Cf		99 Es		100 Fm		101 Md		102 No		103 Lr							

Molar volume of ideal gas at STP = 22.4 L

Faraday constant,  $F = 9.6485 \times 10^4 \text{ C/mol e}$

Avogadro's number,  $N = 6.022 \times 10^{23} \text{ mol}^{-1}$

Planck's constant,  $h = 6.626 \times 10^{-34} \text{ J}\cdot\text{s}$

Ideal gas constant:

$R = 8.314 \text{ J}\cdot\text{K}^{-1}\cdot\text{mol}^{-1}$

$R = 1.987 \text{ cal}\cdot\text{K}^{-1}\cdot\text{mol}^{-1}$

$R = 8.206 \times 10^{-2} \text{ L}\cdot\text{atm}\cdot\text{K}^{-1}\cdot\text{mol}^{-1}$

Speed of light,  $c = 3.00 \times 10^8 \text{ m}\cdot\text{s}^{-1}$

Rydberg constant,  $R_H = 2.18 \times 10^{-18} \text{ J}$

Electron charge,  $e = 1.602 \times 10^{-19} \text{ C}$

Atomic mass unit,  $u = 1.6605 \times 10^{-24} \text{ g}$

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