CHEM 120—Chemistry Review

Please learn/review the following topics before taking the CHEM 120 Placement Exam.

The names and symbols for the first 20 elements in the periodic table [hydrogen (H) through calcium (Ca)].

1. Which of the following is the chemical symbol for helium?

    (A) H   (B) He   (C) Hf   (D) Hg

2. The symbol Cl represents the element:

    (A) carbon   (B) calcium   (C) chlorine   (D) cesium

3. Which of the following represents a pure element?

    (A) CO   (B) NH_3 (C) HCN   (D) Na

The classification of elements in the periodic table: alkali metals, alkaline earth metals, transition metals, halogens, and noble gases.

4. Which of the following elements is a transition metal?

    (A) Li   (B) Fe   (C) Ne   (D) Br

The formulas for the following polyatomic ions: bicarbonate ion (HCO_3^-), carbonate ion (CO_3^{2-}), and hydroxide ion (OH^-).

5. Which of the following represents the bicarbonate ion?

    (A) CO_3^{2-} (B) C^{2-} (C) CO^- (D) HCO_3^-

The structure of the atom—location and charge of electrons, neutrons, and protons.

6. Negatively-charged particles found outside the nucleus of an atom are known as:

    (A) electrons.   (B) neutrons.   (C) photons.   (D) protons.

Writing the chemical formula for simple ionic compounds.

7. Which of the following is the chemical formula for calcium oxide?

    (A) CO   (B) CaO   (C) COs   (D) CaOs

Using the metric system; know the following prefixes and what they mean: kilo (k), centi (c), and milli (m).

8. Which of the following statements is true?

    (A) 1000 mg = 1 g   (B) 1 mg = 1000 g
    (C) 10 cg = 1 g   (D) 10 mg = 1 g

Properties of different states of matter—gas, liquid, solid.

9.   Characteristics of the liquid state are:

   (A) the particles are far apart from each other.
   (B) retention of volume but not shape.
   (C) retention of volume and shape.
   (D) the particles have little or no freedom of motion.

Conversions between metric and English units, such as centimeters to inches or vice versa.

10.   How many inches (in) are in 10.4 cm? [*1 inch = 2.54 cm*]

   (A) 4.09 in   (B) 0.244 in   (C) 7.86 in   (D) 26.4 in

How to correctly balance a chemical equation.

11.   Which of the following is a correctly balanced equation?

   (A) $CH_4 + O_2 \rightarrow CO_2 + 2 H_2O$
   (B) $CH_4 + 3 O_2 \rightarrow CO_2 + 2 H_2O$
   (C) $LiCl + Pb(NO_3)_2 \rightarrow LiNO_3 + PbCl_2$
   (D) $2 LiCl + Pb(NO_3)_2 \rightarrow 2 LiNO_3 + PbCl_2$

How to calculate the molar mass of a compound given its formula.

12.   Calculate the molar mass of magnesium bromide [$MgBr_2$].

                        [atomic mass of Mg = 24.31 g/mol; of Br = 79.90 g/mol]

   (A) 104.21 g/mol   (B) 128.52 g/mol
   (C) 184.11 g/mol   (D) 208.42 g/mol

Determine the number of grams in a given number of moles of a substance or vice versa.

13.   How many grams are in 1.70 moles of phosphorus?

                        [atomic mass of P = 30.97 g/mol]

   (A) 31.0 g   (B) 5.49 x 10^{-2} g   (C) 52.6 g   (D) 18.2 g

Understand proportional and inversely proportional relationships.

14.   The volume and pressure of a gas are inversely proportional. If the pressure on
        a 2-L balloon is increased from 1 atm to 2 atm, what is the new volume of the
        balloon?

        *[As an example, if you increase the pressure of a gas by a factor of 2, the volume
        decreases 2-fold (the final volume is ½ of what the original volume was).]*

   (A) 1-L   (B) 2-L   (C) 4-L   (D) 8-L

Answers: 1. B; 2. C; 3. D; 4. B; 5. D; 6. A; 7. B; 8. A; 9. B; 10. A; 11. D; 12. C; 13. C; 14. A