**King Abdul Aziz University**

**Faculty of science**

**Chemistry department**

**Model (B)**

**Chem.110**

**First exam of 1st term 1432-1433H**

**Time: 90 minutes**

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| --- | --- |
| **Student name:** |  |
| **Student number** |  |
| **Section** |  |

**Useful information**

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With the best wishes

***General Chemistry Team work***

**Directions:** For each of the following questions, choose the letter that **best** answers the question and place it on your answer sheet.

1-Which of the following is NOT an *empirical formula*?

* + 1. C3H8
    2. CH4
    3. **C6H12N3**
    4. C4H10O

2- Which pair of atoms constitutes a pair of **isotopes** of the same element?



3- How many protons and electrons are in a S2− anion?

* + 1. 14 protons, 16 electrons
    2. 16 protons, 14 electrons
    3. **16 protons, 18 electrons**
    4. 18 protons, 16 electrons

4- What is the *molar mass* of C3H9O3?

* + 1. **93.12 g/mol**
    2. 180.16 g/mol
    3. 29.02 g/mol
    4. 30.03 g/mol

5- Which of the following contains the **greatest number of moles**?

1. 1.0 gram of O2
2. 1.0 gram of Cl2
3. **1.0 gram of H2**
4. 1.0 gram of CO2

6- The SI unit of luminous intensity is ……..

1. **candela**
2. Kelvin
3. ampere
4. moles

7- Which of the following is **the lowest** possible temperature?

1. **–273.15 K**
2. 273.15 K
3. –273.15 °C
4. 0 °C

8- If gold occupies a volume of 5.40x10-3 L, and mass 104 g what would be its density?

1. 0.019 g/mL
2. 3.57 g/mL
3. **19.3 g/mL**
4. 0.279 g/mL

9- If the diameter of a cell is 9.0 x10−6 meter, its diameter can also be reported as \_\_\_\_\_\_\_.

1. 9.0 x10−3 μm
2. 9.0 x10\3 μm
3. 0.9 μm
4. **9.0 μm**

10- The formulas of the hydroxide ion, the nitrate ion, and the phosphate ion are represented, respectively, as

1. H- , NO2- , P3-
2. **OH- , NO3- , PO43-**
3. OH- , NO2- , PO33-
4. None of these

11- An atom with 25 protons and 30 neutrons has which of the following symbols?

12- An example of a polyatomic cation is

1. **NH4+**
2. Al3+
3. O2-
4. SO4-2

13- The species O2- , Br-, and F- are all

* + - 1. **anions**
      2. halogens
      3. isotopes
      4. cations

14- Boron consists of two isotopes. They are boron-10 and boron-11 with atomic masses of 10.013 amu and 11.009amu, respectively. The average atomic mass of boron is 10.81 amu . Which isotope of boron is more abundant, boron-10 or boron-11?

1. Their abundances are the same.
2. Boron-10
3. **Boron-11**
4. This cannot be determined from data given.

15-The first step in the Ostwald process for producing nitric acid is

4NH3 + 5O2 → 4NO + 6H2O

If the reaction of excess ammonia with 150 g of oxygen gas yields 87 g of nitric oxide (NO), what is the percent yield of this reaction?

1. **77%**
2. 33%
3. 100%
4. 49%

16- What is the *mass percentage* of **oxygen** in Fe2O3?

* + 1. **30.05%**
    2. 69.94%
    3. 66.67%
    4. 34.97%

17-When the equation below is balanced, what is the ***coefficient*** of O2 (g)?

C3H8 (*g*) + O2(*g*) → CO2(*g*) + H2O(*g*).

1. 1
2. 3
3. 10
4. **5**

18- How many oxygen atoms are there in 5 mole of NO2?

1. 3.0 × 1023 atoms
2. **6.02 × 1024 atoms**
3. 4.2 × 10-25 atoms
4. 0.25 atoms

19- What is **the mass** of 1.50 mole of ammonia NH3?

1. **25.5 g**
2. 17.03 g
3. 11.35 g
4. 0.0881 g

20- Calculate the molarity of a solution consisting of 60.0 g of NaOH in 1.50 L of solution.

1. 1.60 × 103 *M*
2. **1.0 M**
3. 40.0 *M*
4. 1.50 *M*

21- What is the formula for the compound chromium (III) oxide?

1. CrO3
2. Cr3O2
3. Cr3O
4. **Cr2O3**

22- The elements Li, Na, K, Rb, Cs, and Fr are called

* 1. alkaline earth metals
  2. halogens
  3. **alkali metals**
  4. noble metals

23- Calcium can be classified as \_\_\_\_\_\_\_.

1. **a metal**
2. an actinide
3. a transition metal
4. a nonmetal

24- Which pair of elements is most likely to form an ionic compound with each other?

1. oxygen, fluorine
2. sulfur, fluorine
3. calcium, sodium
4. **barium, bromine**

25- Given the following molecular formulas, determine the empirical formula of each compound: N2O5, H2O2, C6H4Cl2.

1. N2O5, H2O, C6H4Cl2
2. **N2O5, HO, C3H2Cl**
3. N2O5, H2O2, C3H2Cl2
4. N2O5, HO, C3HCl

26- A solution is prepared by adding enough water to 1.0 mL of a 2.0 M solution so that the total volume is 20.0 mL. What is the concentration of the diluted solution?

* + 1. 0.20 *M*
    2. 10 *M*
    3. 2.0 *M*
    4. **0.1 *M***

27- Calculate the number of moles of oxygen that are required to completely convert 5.0 mole of FeO to Fe3O4.

6FeO + O2 ---> 2Fe3O4

1. 0.20 moles
2. **0.83 moles**
3. 3.0 moles
4. 0.16 moles

28- Acetic acid consists of 40.00% C, 6.73% H, and 53.28% O. What is the empirical formula of acetic acid?

1. C3H6O3
2. **CH2O**
3. CH3O
4. C2H4O2

29- Phosphine, PH3, a reactive and poisonous compound, reacts with oxygen as follows:

**4PH3(*g*) + 8O2(*g*)→ P4O10(*s*) + 6H2O(*g*)**

If 9.2 moles of phosphine react with 20 moles of oxygen, how many moles of P4O10 will be formed?

1. **2.3 moles**
2. 37 moles
3. 9.2 moles
4. 4.0 moles

30- Which of the following statements about the modern periodic table is **correct**?

1. **Elements in the same group have similar chemical properties.**
2. The periodic table is arranged by increasing atomic mass.
3. Elements in the same vertical column are called a period.
4. A horizontal row of elements is called groups.