***King Abdul Aziz University***

***Faculty of science***

***Chemistry department***

**Model (D)**

**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. C5H9N3
    2. C5H12
    3. **C3H9O3**
    4. CH4

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



3. How many protons and electrons are in Mg2+ cation?

* + 1. 12 protons, 12 electrons
    2. 12 protons, 14 electrons
    3. **12 protons, 10 electrons**
    4. 10 protons, 12 electrons

4- What is the *molar mass* of C6H12O6?

* + 1. 174.12 g/mol
    2. **180.16 g/mol**
    3. 29.02 g/mol
    4. 30.03 g/mol

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

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

6-Which of the following is the correct name for the compound with the formula, Na2SO4?

1. disodium sulfate
2. sodium sulfide
3. **sodium sulfate**
4. disodium sulfur tetroxide

7- Which of these elements is a noble gas?

* 1. hydrogen , H
  2. Lithium , Li
  3. oxygen , O
  4. **neon , Ne**

8-Which of the following elements would be expected to have chemical properties most similar to phosphorus?

* 1. S
  2. Ar
  3. **Sb**
  4. Ge

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

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

10- Given the following molecular formulas, determine the empirical formula of each compound: N2O, H2O2, C6H4Cl2.

1. N2O , H2O2, C3H2Cl2
2. N2O , H2O, C6H4Cl2
3. NO0.5, HO, C3H2Cl
4. **N2O , HO, C3H2Cl**

11- What is the *mass percentage* of **iron** in Fe2O3?

* + 1. 66.67%
    2. 34.97%
    3. 77.73%
    4. **69.94%**

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

C5H12(l) + O2(g) → CO2(g) + H2O(g)

1. 6
2. 9
3. 7
4. **8**

13- How many oxygen atoms are there in 0.25 mole of CO2?

1. **3.0 × 1023** atoms
2. 4.2 × 10-25 atoms
3. 0.25 atoms
4. 1.5 × 1023 atoms

14- What is **the mass** of 0.50 mole of ammonia NH3?

1. **8.5 g**
2. 25.5 g
3. 11.35 g
4. 17.03 g

15- How many moles of HCl are in 35.0 mL of a 0.100 M HCl solution?

* + 1. 2.86 mol
    2. **3.50×10–3 mol**
    3. 3.50 mol
    4. 0.350 mol

16. An atom with 30 protons and 25 neutrons has which of the following symbols?

17. An example of a polyatomic anion is

1. O2-
2. NH4+
3. Al3+
4. **SO42-**

18. The species Ba2+ , Na+ and Al3+ are all

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

19- Carbon consists of two isotopes. They are Carbon -12 and Carbon -13 with atomic masses of 12.000 amu and 13.003 amu, respectively. The average atomic mass of Carbon is 12.010 amu . Which isotope of Carbon is more abundant, Carbon -12 or Carbon -13?

1. Their abundances are the same.
2. **Carbon -12**
3. Carbon -13
4. This cannot be determined from data given.

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

4NH3 + 5O2 → 4NO + 6H2O

If the reaction of 150 g of oxygen with excess ammonia gas yields 84 g of nitric oxide (NO), what is the percent yield of this reaction?

1. 77%
2. **74.7%**
3. 100%
4. 49%

21- The SI unit of electrical current is ……..

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

22- Which of the following is **the highest** possible temperature?

1. 273.15 K
2. **100 °C**
3. –273.15 °C
4. –273.15 K

23- The density of gold is 19.3 g/mL. What is the **mass** of 0.0100 L of gold, in a unit of grams?

1. 1.93 g
2. **193 g**
3. 1.93x10-6 g
4. 0.193 g

24- If the diameter of a cell is 9.0 μm, its diameter can also be reported as \_\_\_\_\_\_\_.

1. 9.0 x10−3 m
2. **9.0 x10−6 m**
3. 9.0 m
4. 9.0 x10−9 m

25-The formulas of the carbonate ion, the sulfate ion, and the phosphate ion are represented, respectively, as

1. CO22- , SO2- , P3-
2. **CO32- , SO42- , PO43-**
3. CO3- , SO22- , PO33-
4. None of these

26. A solution is prepared by adding enough water to 1.0 mL of a 2.0 M solution so that the total volume is10.0 mL. What is the concentration of the diluted solution?

* + 1. **0.20 *M***
    2. 10 *M*
    3. 2.0 *M*
    4. 1.0 *M*

27. Calculate the number of moles of oxygen that are required to completely convert 0.50 mole of FeO to Fe3O4.

6FeO + O2 ---> 2Fe3O4

1. 0.16 moles
2. 0.20 moles
3. **0.083 moles**
4. 3.0 moles

28. A binary compound of bismuth and oxygen contains 89.7% bismuth, Bi. What is the empirical formula of the compound?

* 1. BiO
  2. Bi2O
  3. **Bi2O3**
  4. BiO2

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

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

If 16 moles of phosphine react with 40 moles oxygen, how many moles of P4O10 will be formed?

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

30. Which of the following statements about the modern periodic table **is incorrect**?

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 groups.
4. A horizontal row of elements is called a period.