1. How many moles are in 44 g of CO_2 (molar mass 44 g/mol)?

   _____ mol

2. An element is 60% of mass 10 and 40% of mass 11. Its average atomic mass (in u)?

   _____ u

3. In water (H_2O, molar mass 18), what percent of the mass is oxygen (16)? (to nearest whole %)

   _____ %

4. A 200 g solution is 15% sugar by mass. The mass of sugar (in g)?

   _____ g

5. What is the electron configuration of oxygen (8 electrons)?

   ☐ $1s^2\ 2s^4\ 2p^2$

   ☐ $1s^2\ 2s^2\ 2p^4$

   ☐ $1s^2\ 2s^2\ 2p^6$

6. In a PES spectrum, the height of a peak is proportional to...

   ☐ the number of electrons in that subshell

   ☐ the temperature of the sample

   ☐ the mass of the atom's nucleus

7. Across a period from left to right, the atomic radius...

   ☐ stays the same

   ☐ increases

   ☐ decreases

8. For a main-group atom, valence electrons are the electrons in the...

   ☐ nucleus

   ☐ outermost shell

   ☐ innermost shell

9. One mole of any substance contains how many particles?

   ☐ 1000

   ☐ 6.022×10^{-23}

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10. In a mass spectrum, the height of a peak shows the isotope's relative _____.

    _____

1. **1 mol**

   $n = m/M = 44/44 = 1$ mol.

2. **10.4 u**

   $0.60(10) + 0.40(11) = 6.0 + 4.4 = 10.4$ u.

3. **89 %**

   Oxygen contributes 16 of the 18 g in one mole of water. Its mass percent is $(16/18) \times 100 = 88.89\% \approx 89\%$.

4. **30 g**

   Convert 15% to the mass fraction $15/100 = 0.15$. Then $m_{\text{sugar}} = (0.15)m_{\text{solution}} = 0.15 \times 200 = 30$ g.

5. $1s^2\ 2s^2\ 2p^4$

   2 + 2 + 4 = 8 electrons, filling 1s, 2s, then 2p.

6. **the number of electrons in that subshell**

   More electrons in a subshell means a taller peak.

7. **decreases**

   More protons pull the same shell in tighter, shrinking the atom.

8. **outermost shell**

   Valence electrons are the outermost ones and drive bonding.

9. 6.022×10^{23}

   A mole is Avogadro's number of particles, 6.022×10^{23}.

10. **abundance**

    Peak height is the relative abundance; peak position is the mass.

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