These questions are multiple-choice questions that ask you to select only **one** answer choice from a list of four choices. Each correct answer gives you one point.

CHEMISTRY

31. The electrons with principle energy level n = 2 of a stable atom of boron (atomic number = 5) would have an electron arrangement of:

    A. [ ] [↑] [↑] [↑]
    B. [ ] [↑↓] [↑] [ ]
    C. [↑] [↑] [↑] [ ]
    D. [↑↓] [↑] [ ] [ ]

32. In group 18, He (helium) is unique because:

    A. it does not have an octet configuration in its ground state
    B. it has a higher reactivity than the other noble gases
    C. it forms a stable salt containing the $[He_3]^+$ ion
    D. it has an extremely high melting point

33. The value of ΔH^0 for the following reaction is —3352 kJ:
    $4\ Al_{(s)} + 3\ O_{2\ (g)} \rightarrow 2\ Al_2O_{3\ (s)}$
    The value of ΔH^0_f for $Al_2O_{3\ (s)}$ is:

    A. —3352 kJ
    B. —1676 kJ
    C. +3352 kJ
    D. —16.43 kJ

34. What is the empirical formula for an oxide of nitrogen which is found to contain 63.2% oxygen by mass? (M_N = 14 g/mol, M_O = 16 g/mol)

    A. N_2O
    B. N_2O_3
    C. NO_2
    D. N_2O_5

35. A piece of stone has a mass of 24.595 grams and a volume of 5.34 cm^3. What is the density of the stone? Pay attention to the number of significant figures and precision of your calculation!
    A. 0.217 cm^3/g
    B. 4.61 g/cm^3
    C. 0.22 cm^3/g
    D. 4.606 g/cm^3

36. Uranium isotopes have different

    A. atomic numbers
    B. atomic masses
    C. numbers of protons
    D. numbers of electrons

37. The total number of electrons allowed in a l = 1 sublevel is:

    A. 2 electrons
    B. 6 electrons
    C. 8 electrons
    D. 14 electrons

38. How many unshared pairs of electrons does water have?

    A. one
    B. two
    C. three
    D. four

39. In the reaction, $CO_{(g)} + NO_{2\,(g)} \Leftrightarrow CO_{2\,(g)} + NO_{(g)}$, which of the following changes would result in the formation of more products at equilibrium?

    A. increasing the pressure of the reaction mixture
    B. removing $CO_{(g)}$ from the reaction mixture
    C. adding $NO_{2\,(g)}$ to the reaction mixture
    D. adding $CO_{2\,(g)}$ to the reaction mixture

40. How many mL of water must be added to 450 mL of 0.8 M glucose to dilute the solution to 0.4 M?

    A. 900 mL
    B. 600 mL
    C. 300 mL
    D. 450 mL