LECTURE 7

1. **(a)** Sketch the radial probability distribution for a 5d orbital in a carbon atom. You should label the axes, but do not need to include numbers. Use arrows to indicate the radial nodes.
    (b) Label the most probable radius, r_{mp}, on your 5d radial probability distribution with an *.

2. Provide the ground state electron configuration expected for:
    (a) Ca   **(c)** Cu   **(e)** Fe^{2+}
    (b) V   **(d)** Br^{1-} **(f)** Hf
    Note that you may always use the shorthand (noble gas) configuration unless specifically asked otherwise.

3. The binding energy for a 3s electron in technetium (Z = 43) is -1090 eV.
    (a) Calculate the effective nuclear charge, Z_{eff}, experienced by a 3s electron in technetium.
    (b) Identify the most likely binding energy for a 3s electron in ruthenium (Z = 44) from the following three options: -980 eV, -1090 eV, or -1140 eV. Explain your reasoning.

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