QUANTUM ATOM QUESTION SHEET - ANSWERS

PART 1

1. 2d
2. 6, 14, 2, 10, 6
3. add energy, remove energy
4. 1 and 2, 3-8, transition metal group 7
5. $1s^2 2s^2 p^6 3s^2 p^2$, $1s^2 2s^2 p^6 3s^2 p^2 d^{10} 4s^2 p^5$, $1s^2 2s^2 p^6 3s^2 p^6 4s^1$
6. B, Mg, V
7. end in: s^1 s^2 p^5 p^6

PART 3

8. B, C, A or C, D, B
9. they have full outer sub-levels; there is nowhere to put that extra electron
10. they have a full outer s sub-level; adding another electron would have to go into the higher p sub-level
11. Ca has a full outer s sub-level; adding another electron would have to go into the higher p sub-level
12. N has a half-full p
13. It has a half-full d
14. Both Mn and Tc have negative electron affinities due to the half-filled sub-level meaning it takes energy to make them hold onto an extra electron; but it takes more energy to make the smaller Mn do so. Re has a slightly positive, but small electron affinity because even though it resists accepting an extra electron due to its half-filled sub-level, the atom is so big that the extra electron is considerably far from other electrons such that electron-electron repulsion is minimized.