Solutions Atomic Physics for FYSC11 180820.

1a. The first line is from Ne and the second from Fe, from their Doppler widths and wavenumbers.

1b. $T = 986$ K

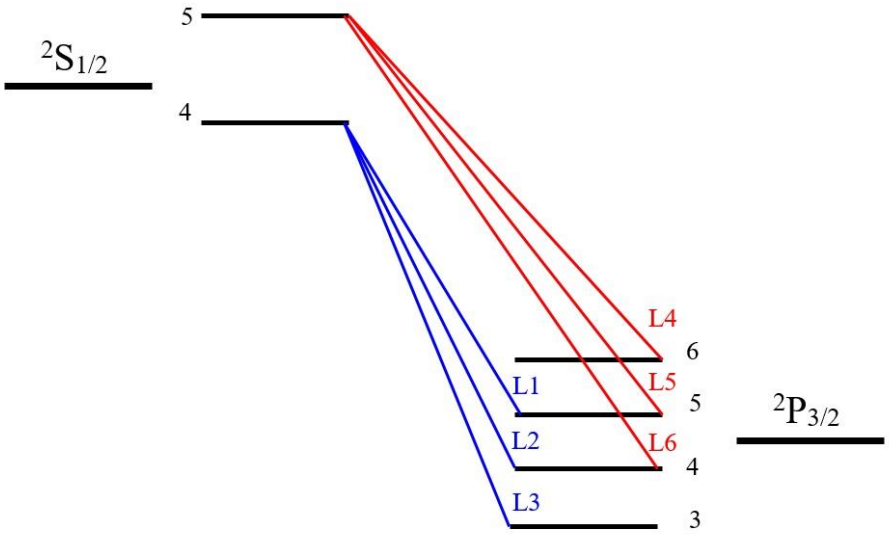
2. See "summary" on home page

3. Be: ground state $1s^2 2s^2\ {}^1S_0$, first excited configuration $1s^2 2s2p\ {}^1P_1,\ {}^3P_{0,1,2}$.
See "summary" on home page

4. $A = 10.36 \cdot 10^6\ \text{s}^{-1} \Rightarrow \tau = 96.6$ ns

5. λ(4s - 4p) =2,17 μm. The experimental value is 2.026 μm.

6a. Large hfs in 7s.



6b. $A_{6p} = (0.017/6 + 0.013/5 + 0.013/5 + 0.010/4)/4 = 0.0026\ \text{cm}^{-1}$
from L5-L4, L6-L5, L2-L1 and L3-L2
$A_{7s} = (0.090/5 + 0.090/4)/2 = 0.018\ \text{cm}^{-1}$ from L5-L1 and L6-L2.