

Lab Three (Python 2.7.13)

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It should be noted that the code submitted for this lab refrains from the use of VPython's graphical features and instead uses Matplotlib.

1 Question 61

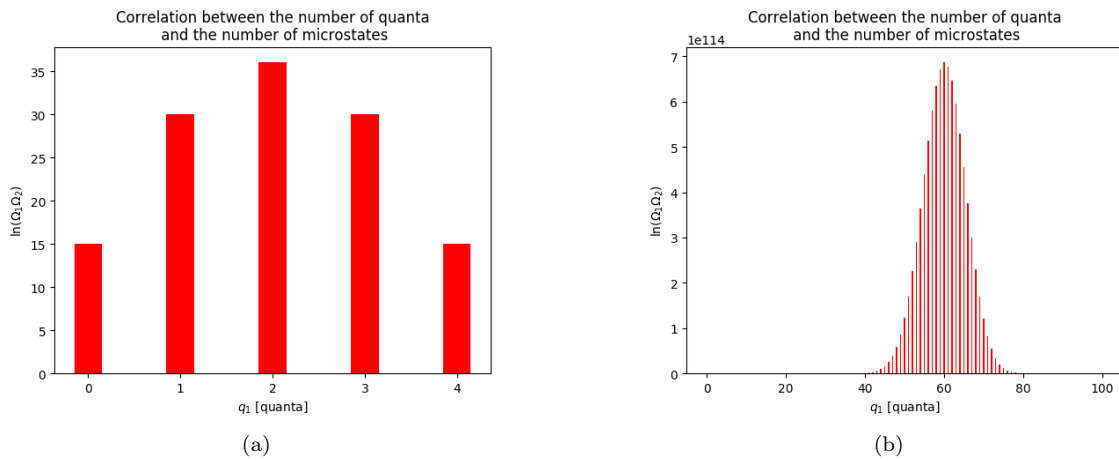


Figure 1: Outputs for Question 61

The number of quanta associated with the probability that is half as large as the most probable 60-40 distribution is $q_1 = 54$ and $q_2 = 46$.

2 Question 62

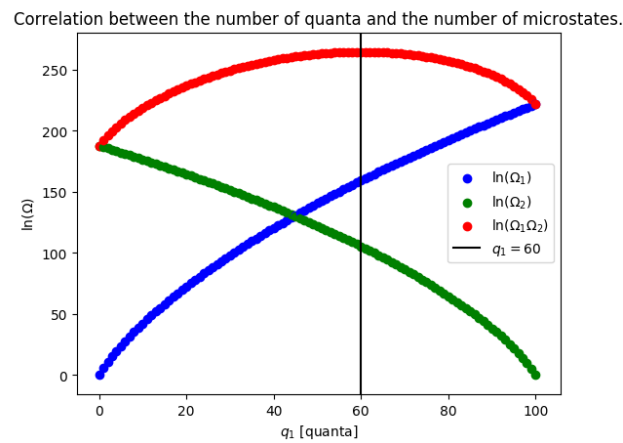


Figure 2: Outputs of Question 62

The maximum value of q_1 is 60 quanta. This is significant because this is also the point at which the change in entropy is equal to zero.

3 Question 63

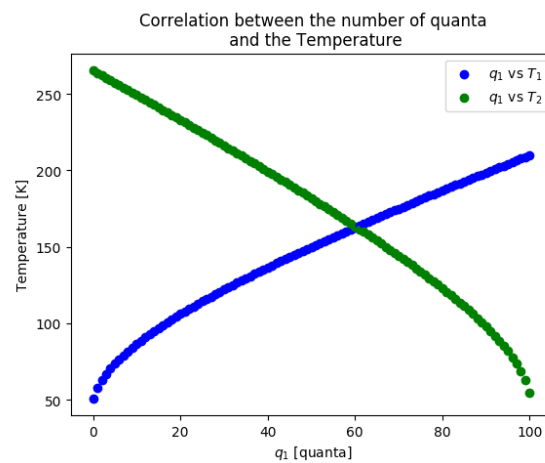


Figure 3: Outputs of Question 63

The values of q_1 and q_2 at the point of intersection are about 60 and 40 quanta respectively. This is significant because this is the point of thermal equilibrium.

4 Question 64

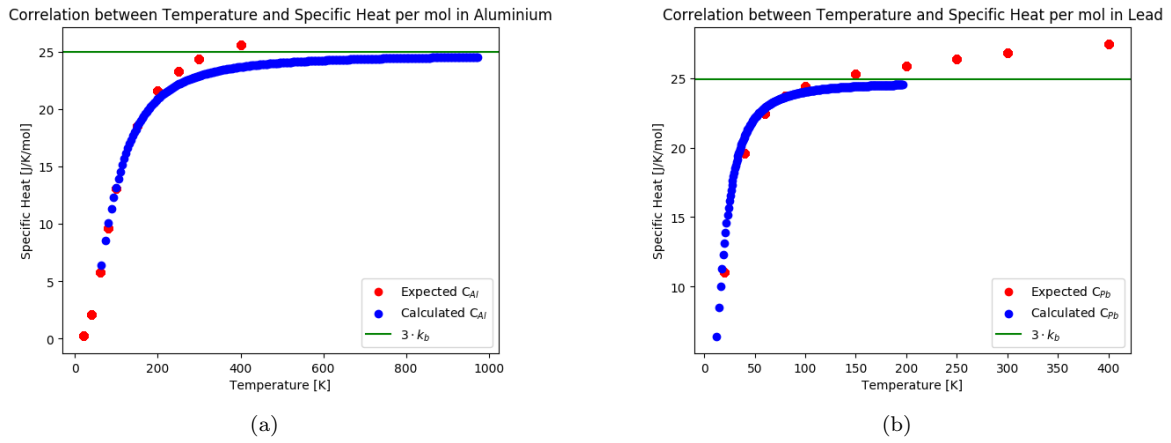


Figure 4: Outputs for Question 64

Using the defined effective spring stiffness for Aluminum and Lead, 16 N/m and 5 N/m, the data was fit fairly well up to the $3k_B$ line. Even the lead data was fitted reasonably well if the calculated values of the specific heat were extrapolated.