Lab 10 solutions

Part I

1) G3 = 196 Hz, C7 = 2093 Hz (from frequencies of the piano keys, back page of the Course Guide)

Part II

1) No, the resonant frequencies are not harmonically related to one another since these frequencies are not simply integer multiples of the fundamental frequency.

2) The Chladni figures become more complex (more nodal lines and more complicated nodal line shapes) as the frequency increases.

Part III

1) The two response curves in Figure 6 have broad peaks around similar frequencies. But the response curve for the front plate (red curve) has an additional sharp peak at around 280 Hz.

2) The peak in the red curve around 280 Hz is the air resonance. One can be sure that this is the air resonance since it only shows up in the response for the front plate of the violin, not the back plate.

Part IV

1) From Figure 7, one clearly sees the air resonance at ~280 Hz, the W' resonance at ~90 Hz and the W resonance at ~480 Hz.

2) Our violin is not as good as the violin shown in Figure 3(a) since the W' and W wood resonances are not nearly as strong as the air resonance around 280 Hz.

3) Based on the response curves in Figures 6 and 7, one would expect the D4 string to sound loudest since its frequency (294 Hz) is closest to the air resonance (which is the strong of the three resonances).