My apologies for the late submission, I forgot that this homework was due today! Finished my exams for the week and just figured I was done!

1. The physical difference between different waves on the EM spectrum is wavelength. X-rays are a high energy, short wavelength form of EM radiation, but not as high energy as gamma rays. Each different type of wave interacts with tissue differently. Low energy waves like microwaves interact with molecules in the body vibrationally. IR carries heat, visible light and near-UV is absorbed by tissue. High energy EM waves are ionizing radiation, and can cause damage to DNA.
2. See attached.
3. Higher voltage means higher energy imparted to the photon. Higher energy photons, as we know, have smaller wavelength, so increasing voltage decreases wavelength.
4. See attached
5. Should we compress single images? Yes. Especially in the case of mammogram, for two main reasons. First, a thinner object requires a lower X-ray dose to image, and for breast X-rays a low dose is crucial, especially when breast cancer risk is already something on the horizon for the patient. Additionally, compressing the breast provides a more uniform thickness for the X-rays to pass through, normalizing resolution and dynamic range.
6. Does drinking OJ help reduce radiation risk? This is a tough question. I looked up a number of articles from a number of cancer journals and it seems like antioxidants (including orange juice) don’t really seem to help neutralize the effects of ionizing radiation in any meaningful way.