ITEP Midterm Fall 2014

This is a closed-book, closed-notes exam. You may use a calculator. For each problem, justify your answer, where applicable.

1. Local TV stations have a number of sources of income. Please describe the major sources briefly.
2. (a) Define an interface. (b) Provide one example each of a physical and a virtual (information) interface.
3. (a) Describe key protocol layers of the modern Internet briefly. (b) What layer is Wi-Fi (IEEE 802.11) classified as?
4. Consider the interaction of an eyeball network and a content distribution network. Is data flow symmetric (equal in both directions) or not? Why? Is there a payment flow? Who pays whom, typically?
5. Early TV remote controls used ultrasound instead of infrared to transmit their signals, much to the annoyance of dogs. Imagine using ultrasound to transmit data, e.g., for Internet access. The ultrasound transmitter had a frequency range from 38 to 40 kHz. Using common bit efficiency assumptions (justify!), how much data would you be able to transmit each second?
6. Why aren't the FM radio bands used for cellular data?
7. Can you classify spectrum in terms of its rivalry characteristics? (Hint: There may be several options; justify your answers.)
8. Is the market for wedding photographers a good example of (near) perfect competition? What conditions are met or not met?
9. Assume that as the price of gasoline rises from $3 to $4, that Alice decreases her driving from 100 to 90 miles a week. What is her price elasticity?
10. We'll look at a simplified pricing model, **without** price discrimination and decreasing marginal cost and demand functions. Would a monopolist produce more or less than the total produced by a set of competitive producers? Why?