# ECNS 432 – Old Midterm Questions

**1.)** Consider a section of freeway that is uncongested during off-peak hours, but congested during rush hour. Suppose the trip to and from work takes 40 min. when the freeway is uncongested. Also, supposed that taking the side streets to and from work **always** takes 60 min.

On the freeway, assume congestion effects occur only after the 3rd car. After the 3rd car, each additional car that enters the freeway adds 5 minutes of travel time to all freeway commuters.

Lastly, assume that all commuters value their time at $12/hour (or, equivalently $.20/min).

**a.)** Given the open access to the freeway, how many cars will travel on the freeway?

**b.)** Suppose the freeway is now privately owned. What toll would be charged by the owner and how many cars would now travel on the freeway?

**c.)** Which situation is efficient (i.e. open access freeway vs. privately owned freeway)? WHY?

**2.)** Suppose we have an efficiently operating market for cigarettes (our primary market good). Also, consider the secondary markets for chewing tobacco and whiskey. Cigarettes and chewing tobacco are substitutes, while cigarettes and whiskey are complements.

Now assume the government imposes a tax of $t_x$ per unit (e.g., a pack) on sellers in the cigarette market.

**a.)** Suppose the supply schedule in the market for whiskey is perfectly elastic and this market operates efficiently. Do we count changes in surplus that occur in the market for whiskey (due to the tax in the primary market) in our welfare analysis of the primary market? Why or why not? Keep your answer to a sentence or two.

**b.)** Suppose the supply schedule in the market for chewing tobacco is upward sloping. Furthermore, suppose there exists a government-maintained price support (aka price floor) in this market. **Illustrate graphically** what happens in this market when the tax in the primary market is imposed (assume the demand for chewing tobacco shifts such that the price floor is still binding). Do we count any changes in this secondary market in our welfare analysis of the primary market?

**3.)** To finance a policy, the government will impose a per unit tax on either cigarettes or apples. The government wishes to minimize leakage when imposing the tax. Given this, which good do you think the government should tax? Make sure to briefly explain your answer. No explanation, no points.

**4.)** Suppose that the current market equilibrium for a good is such at $p^* = \$50$ and $q^* = 10$. Also suppose that the elasticity of supply is 2.5 and the supply curve is linear.

**a.)** Use the price elasticity of supply and market equilibrium to solve for the supply curve.

**b.)** Suppose a policy is enacted such that the price falls from \$50 to \$40. By how much does producer surplus fall? Show this graphically and calculate the actual $\Delta$ps.

**5.) (10 points)** The initial cost of constructing a temporary dam that is expected to last for 5 years is \$100 million. The annual net benefits will depend on the amount of rainfall: \$18 million in a "dry" year, \$29 million in a "wet" year, and \$52 million in a "flood" year. Meteorological records indicate that over the last 100 years there have been 86 "dry" years, 12 "wet" years, and 2 "flood" years. Assume the annual benefits, measured in real dollars, begin to accrue at the end of the first year. Using the meteorological records as a basis for prediction, what are the net benefits of the dam if the real discount rate is 5 percent?

**6.) (15 points total)** The initial cost of constructing a temporary dam that is expected to last for 3 years is \$100 million. The expected net benefits for each year are as follows:

yr. 1: \$28 million
yr. 2: \$34 million
yr. 3: \$42 million

Under which of the following scenarios should we construct the dam? (make sure to show your work)

**a.) (5 points)** Benefits accrue at the end of each year and the real discount rate is 5%.

**b.) (5 points)** Benefits accrue at the beginning of each year and the real discount rate is 5%.

**c.) (5 points)** Benefits accrue at mid-year and the real discount rate is 2%.

**7.) (10 points)** A recent publication in the *American Journal of Epidemiology* entitled "Trends in Alcohol and Other Drugs Detected in Fatally Injured Drivers in the United States, 1999-2010" assessed trends in alcohol and other drugs detected in drivers who were killed in motor vehicle crashes in 6 U.S. states. During the study period, the prevalence of positive results for marijuana increased from 4.2% in 1999 to 12.2% in 2010. The authors conclude that their results suggest that driving under the influence of marijuana is playing an increasing role in fatal motor vehicle crashes. To control the ongoing "epidemic of drugged driving", their recommendation is to strengthen and expand drug testing and intervention programs for drivers.

Based on these findings, is there enough evidence to conclude that increases in marijuana use have caused more traffic fatalities? Why or why not? Stay short and concise in your answer...I don't want to read anything more than a few sentences.