

Quiz #2

Points for each problem are shown out of 100 points. Each subsection in a problem is weighted equally. Try to allocate your time accordingly.

A. (20 pts) Answer True, False, or Uncertain, and briefly explain your answer.

- (1) Linear programming assumes decreasing returns to scale.
- (2) Economic rent is producer's surplus.
- (3) If supply is completely elastic and demand is completely inelastic, the consumers will pay both the full amount of a tax and the full amount of deadweight loss caused by a tax out of their consumer surplus.
- (4) Monopolists always operate where the demand curve is elastic.

B. (20 pts) Short answers.

- (1) What is the short-run shutdown condition if costs are $C(y) = 13y^3 - 26y^2 + 15y - 14$?
- (2) What is the elasticity of demand (expressed as a function of price) if $Q_d = 30 - 3P$?
- (3) If a consumer has the utility function $U(X_1, X_2) = X_1 + aX_2$, $a > 0$, and $P_1 = 1$, what is his reservation price for good 2 as a function of P_2 and M (income)?
- (4) Write down the firm's cost minimization problem if the firm uses three inputs, K , L , and M to produce the level of output Q^* .

C. (10 pts) Pick two of the oligopoly models discussed in class. Discuss their similarities and differences and compare their outcomes to those of perfect competition and monopoly.

For the following problems, please show the calculations used to arrive at your answers. Draw graphs neatly and label axes and points clearly. Round answers to the first decimal place if necessary.

D. (30 pts) Bill operates Bill's Beer Bust, which sells six-packs of beer. Bill is the only beer retailer in town, but other sellers outside of town give him considerable competition, so he regards the market as highly competitive. Bill regards the current price of \$2.50 per six-pack as beyond his control. Bill's cost function is $C(Q) = 2000 + 0.0005Q^2$, where Q = number of six-packs sold each week. Included in the fixed cost figure is a \$750/week salary for Bill, which he considers to be his opportunity cost.

- (1) Calculate the profit-maximizing output for Bill.
- (2) What is Bill's profit?
- (3) Is this an economic profit or an accounting profit? Explain.
- (4) Under what condition could this level of profit be a long-run equilibrium?

A nuclear explosion wipes out all of Bill's out-of-town competitors. Market demand is $Q_d = 30,000 - 1000P$.

- (5) Now what is Bill's profit-maximizing price and output?
- (6) What is Bill's profit? What condition would have to exist for Bill to be able to continue making this level of profit?

E. (20 pts) The U.S. market for horseshoes is perfectly competitive. Market demand is $Q_d = 250,000 + 4H - 50,000P$, where P is the price per horseshoe and H is the number of horses in the U.S. Market supply is $Q_s = \{ 0 \text{ if } P < \$2.00; 200,000P - 400,000 \text{ if } P \geq \$2.00 \}$.

- (1) If there are 200,000 horses in the U.S., what are the equilibrium price and quantity?

Half the horses die from hoof disease caused by a bad bunch of horseshoes.

- (2) Now what are the equilibrium price and quantity?
- (3) The government decides to penalize the horseshoe makers for causing these deaths by putting a 25% value tax on horseshoes. Now what are the equilibrium prices and quantity?
- (4) Draw a diagram of the market, labelling the equilibria before and after the tax, and indicate the areas of tax revenue, consumer deadweight loss, and producer deadweight loss.