

Instructions: 1) Put **your name** on the exam. 2) Put your **TA's** name and section on the exam. 3) You must answer **two** questions in each of the three sections of the exam. You will *not* get extra credit for answering more than two questions in any given section (only the first two will be counted if more than 2 are answered). 4) To get full credit on answers, you must be clear and rigorous. That is, you should use a graph for most problems, the graph should be clearly LABELLED, and you should interpret the answer in words as well. Be succinct. 5) You cannot get credit unless you write something down. Therefore, give partial answers if you cannot give complete answers. Note: problems 3 and 5 were answered in lecture.

Short Questions: Answer two of the following questions (each is worth 10 points)

- Suppose a \$1 specific tax is placed on energy. A firm uses energy and labor to produce its output. Energy and labor are imperfect substitutes with the usual-shaped isoquants. How does this tax affect the firm's long-run expansion path?
- As the result of a patent, only one company produces the drug AZT (which combats AIDS). This company was accused of *price gouging*: using its position as the sole producer of the drug to act as a monopolist and charge very high prices. An economist estimates that the price elasticity of demand for AZT at its current price is -0.5. Does this evidence support or contradict the contention that the firm is a profit-maximizing monopoly? Why or why not?
- Suppose technological progress shifts the soybean supply curve out by 20% from  $S^1$  to  $S^2$ . What happens to equilibrium quantity and price if
  - there is no price support (5)
  - there is a binding price support at  $\bar{p}$ ? (5)

Medium Questions: Answer two of the following questions (each is worth 15 points)

- A company produces ice cream,  $q$ , using only milk,  $M$ , and sugar,  $S$ , according to the following production function:  $q = MS^2$ .
  - Does this production function exhibit constant, increasing, or decreasing returns to scale? (6)
  - If the cost of sugar is \$1 and the cost of milk is \$2, how many units of milk and sugar would the firm use to minimize its cost of producing  $q = 128$ ? Why? [Hint:  $MP_m = S^2$  and  $MP_s = 2MS$ .] (9)
- In a competitive market with an upward-sloping supply curve, what are the welfare effects if the government gives firms a subsidy of  $s$  per unit? [Compare welfare, consumer surplus, and producer surplus with and without a subsidy.] Use a graph to illustrate your answer and interpret your results.
- The government places a \$1 specific tax on a monopoly. What is the incidence (share) of the tax that falls on the monopoly and the incidence that falls on consumers? You may answer this question using a graph (that is, a formula is not required).

Long Questions: Answer two of the following (each is worth 25 points)

- In a competitive labor market, the supply curve of labor is  $w = 5L$ , where  $w$  is the wage rate per day and  $L$  is the number of days of labor (in thousands) supplied. The demand curve is  $w = 60 - 5L$ .
  - What are the equilibrium wage rate and the level of employment in this market? (5)
  - Now suppose that the workers unionize (monopolize the labor market). What is the new quantity of labor employed and the wage rate? (8)
  - Compare welfare (defined as usual), producer surplus, and consumer surplus under the two scenarios. Explain who gains and who loses from a labor union. (7)
  - Calculate the dead weight loss to society (number). (5)
- A firm has a U-shaped, long-run AC curve.

- A. If the firm is competitive, is it ever willing to operate in the downward sloping section of its  $AC$  curve in the short run? In the long run? Why or why not? (15)
  - B. If the firm is a monopoly, is it ever willing to operate in the downward sloping section of its  $AC$  curve in the long run? Why or why not? (10)
9. A competitive industry with an upward-sloping supply curve sells  $Q_h$  of its product in its Home country and  $Q_f$  in a Foreign country, so that the total quantity that it sells is  $Q = Q_h + Q_f$ . No one else produces this product. There is no cost of shipping.
- A. Using graphs, show the prices and quantities in the two countries. (8)
  - B. Now, the Foreign government imposes a binding quota,  $Q^*$  ( $< Q_f$  at the original price). What happens to prices and quantities in both the home and foreign market? (17)