

Department of economics essay sample

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Question 1 – Perfect Competition and Monopolistic Competition

Superior Metals Company has seen its sales volume DECLINE over the last few years as the result of rising foreign imports. In order to INCREASE sales (and hopefully, profits), the firm is considering a price reduction on uranium, a metal that it produces and sells. The firm currently sells 60, 000 kilos of uranium a year at an average price of \$10 per kilo. Fixed costs of producing uranium are \$250, 000. Current variable costs per kilo are \$5. The firm has determined that the variable cost per kilo could be reduced by \$0. 50 if production volume could be increased by 10 percent (fixed costs would remain constant). The firm’s marketing department has estimated the arc elasticity of demand for uranium to be - 1. 5.

(a) How much would Superior Metals have to reduce the price of uranium in order to achieve a 10 percent increase in the quantity sold? (b) What would the firm’s (i) total revenue, (ii) total cost, and (iii) total profit be before and after the price cut?

Question 2 – Monopoly

Zar Island Gas (ZIG) Company is the sole producer of natural gas in the remote island country of Zar. The firm’s operations are regulated by the local Energy Commission. The demand function for gas in Zar has been estimated as: $P = 1, 000 - 0. 2Q$ where Q is output (measured in units) and P is price (measured in dollars per unit). ZIG’s cost function is:

$$TC = 300, 000 + 10Q$$

This total cost function does NOT include a “ normal” return on the firm’s invested capital of \$4 million.

(a) In the absence of any government price regulation, determine ZIG’s optimal (i) output level, (ii) selling price, (iii) total profits, and (iv) rate of return on its asset base.

(b) The Energy Commission has ordered the firm to charge a price which will provide it with NO more than a 12 percent return on its total assets.

Determine ZIG’s (i) output level, (ii) selling price, and (iii) total profits under this constraint. Hint: The roots of the quadratic equation:

are

Question 3 – Oligopoly

Two companies (A and B) are duopolists that produce identical products.

Demand for the products is given by the following demand function:

$$P = 10,000 - Q_A - Q_B$$

where Q_A and Q_B are the quantities sold by the respective firms and P is the selling price. Total cost functions for the two companies are:

$$TCA = 500,000 + 200Q_A + 0.5Q_A^2$$

$$TCB = 200,000 + 400Q_B + Q_B^2$$

Assume that the two firms act independently as in the Cournot model (that is, each firm assumes that the other firm’s output will not change).

Determine the long-run equilibrium output and selling price for each firm.

Question 4 – Price Leadership – Monopolistic Competition and Oligopoly.

Over the last century, The Boeing Co. has grown from building planes in an old, red boathouse to become the largest aerospace company in the world. Boeing's principal global competitor is Airbus, a French company jointly owned by Eads (80%) and BAE Systems (20%). Airbus was established in 1970 as a European consortium of French, German and later, Spanish and U.K companies. In 2001, thirty years after its creation, Airbus became a single integrated company. Though dominated by Boeing and Airbus, smaller firms have recently entered the commercial aircraft industry. Notable among these is Embraer, a Brazilian aircraft manufacturer. Embraer has become one of the largest aircraft manufacturers in the world by focusing on specific market segments with high growth potential. As a niche manufacturer, Embraer makes aircraft that offer excellent reliability and cost effectiveness. To illustrate the price leadership concept, assume that total and marginal cost functions for Airbus (A) and Embraer (E) aircraft are as follows:

$$TCA = \$10,000,000 + \$35,000,000QA + \$250,000QA^2$$

$$MCA = \$35,000,000 + \$500,000QA$$

$$TCE = \$200,000,000 + \$20,000,000QE + \$500,000QE^2$$

$$MCE = \$20,000,000 + \$1,000,000QE$$

Boeing's total and marginal cost relations are as follows:

$$TCB = \$4,000,000,000 + \$5,000,000QB + \$62,500Q^2B$$

$$MCB = \Delta TCB / \Delta QB = \$5,000,000 + \$125,000QB$$

The industry demand curve for this type of jet aircraft is:

$$Q = 910 - 0.000017P$$

Assume throughout this problem that the Airbus and Embraer aircraft are perfect substitutes for Boeing's Model 737-600, and that each total cost function includes a risk-adjusted normal rate of return on investment. A. Determine the supply curves for Airbus and Embraer aircraft, assuming that the firms operate as price takers. B. What is the demand curve faced by Boeing?

C. Calculate Boeing's profit-maximizing price and output levels. (Hint: Boeing's total and marginal revenue relations are $TR_B = \$50,000,000Q_B - \$50,000Q_B^2$, and $MR_B = \Delta TR_B / \Delta Q_B = \$50,000,000 - \$100,000Q_B$.) D. Calculate profit-maximizing output levels for the Airbus and Embraer aircraft. E. Is the market for aircraft from these three firms in short-run or long-run equilibrium?