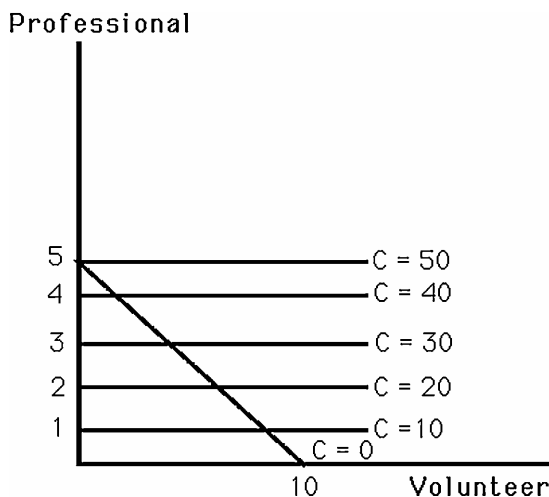


Intermediate Microeconomics 301
Practice Exam # 2

1. A local non-profit group prints a weekly newsletter. Professional typists earn \$10 per hour and can type 2 pages per hour. Unpaid volunteers can type only 1 page per hour. Measuring hours of professional typist services on the vertical axis and hours of unpaid volunteer typist services on the horizontal axis, draw the relevant isoquant and isocost curves if the newsletter is 10 pages long. What input mix is chosen by the non-profit group if they wish to minimize the cost of the newsletter? If the group will reimburse volunteers for expenses (lunch, driving), how much must the reimbursement be for your answer to change?



The isoquant is a straight line with a slope of $1/2$. The group can use either 5 pros, 10 volunteers, or some combination of the two. The isocost curves are horizontal since volunteers are free. As a result, the lowest isocost curve is achieved by hiring all volunteers. If the group reimbursed volunteers for expenses (lunch, driving, etc.) then the group will still hire all volunteers as long as they do not cost more than \$5 per hour.

2. Explain why the marginal cost curve intersects a U-shaped average cost curve at its minimum point.

At low quantities, the average cost curve declines as the quantity increases. The marginal cost is below the average cost. The marginal cost represents the cost of an additional unit of production. Thus, as the marginal cost curve declines, this pulls the average cost down from its previous level. Then, the marginal cost curve will begin to rise. However, the marginal cost is still below the average cost, which will continue to lower the average cost. When the two costs are equal the marginal cost will leave the average cost unchanged. Then, the marginal cost will be above the average cost so it will start to pull up the average cost. Thus, the marginal cost curve will intersect the average cost curve at its minimum point.

3. In short run, how would an increase in cost of building a new plant affect firms optimal output? Profit? Will this increase change the shut down decision?

In short run, an increase in cost of building a new plant is considered **as fixed cost**. Hence, it will not affect the optimal output level but it will reduce the profit of the firm. However, since the AVC is not affected, the shut down decision will still be the same.

4. Suppose a production function is given by $q = KL^{1/3}$, and that the price of capital (r) is \$10 and the price of labor (w) is \$16. Imagine that the capital is fixed at the level $K = 4$ in short run. Derive the firm's short run supply curve (hint: start by finding the TC function) and inverse supply curve.

As we already know that the short run supply curve is the MC starting from the minimum of the AVC. One way to cope with this problem is to start from the TC function.

$$TC = w*L + r*K = 16*L + 10*4$$

From production function, plug in $K = 4$, we'll have $q = 4*L^{1/3}$ So, $L = (1/64)*q^3$
 Plug back into TC function:

$$TC = 16*(1/64)*q^3 + 40 = (1/4)q^3 + 40$$

Since we also know that, $P = MC$ in short run, therefore $p = \frac{3}{4} q^2$
 And the inverse supply curve is $p = \frac{3}{4} q^2$ for $p \geq \min AVC$,
 hence the supply curve is $q = ((23^{1/2})/3)*p^{1/2}$

5. The domestic supply and demand curves for Jolt coffee beans are given by $P = 10 + Q$ and domestic demand $P = 100 - 2Q$, respectively, where P is the price in dollars per bushel, and Q is the quantity in millions of bushels per year. There is perfect competition in the world market and thus the total world supply is $P = 10$.

a) In absence of government policy, the U.S. supply is the world supply. What is the consumer surplus at the equilibrium price? What is the producer surplus?

$S = D$ where supply is the world supply. Thus $Q^* = 45$ and $P^* = 10$.
 $CS = (100-10)45/2 = 2025$ and $PS = 0$

b). Imagine now that the Congress restricts the importation of Jolt coffee beans. It is very drastic policy and no importation is allowed. The only relevant supply is now the domestic supply. What is the consumers' surplus? What is the producers' surplus?

New equilibrium price and quantity: $Q = 30$ and $P = 40$. Thus
 $CS = (100-40)30/2 = 900$ and $PS = (40-10)30/2 = 450$.

c) What is the effect of this policy on the total welfare? what is the deadweight loss?

Welfare before is $W_{\text{before}} = 2025$ and welfare after is $W_{\text{after}} = 900 + 450 = 1350$.
Thus the $DWL = 2025 - 1350 = 675$.