Mikroekonomia B by Mikolaj Czajkowski

Test 6 – Competitive supply

Name_____

Group _____

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

1) Which of following is a key assumption of a perfectly competitive market? 1) _____

A) Firms can influence market price

B) It is difficult for new sellers to enter the market.

C) Commodities have few sellers

D) Each seller has a very small share of the market.

E) none of the above.

2) The textbook for your class was not produced in a perfectly competitive industry because 2) _____

A) there are so few firms in the industry that market shares are not small, and firms' decisions have an impact on market price.

B) it is not costless to enter or exit the textbook industry.

C) upper–division microeconomics texts are not all alike.

D) of all of the above reasons.

3) The demand curve facing a perfectly competitive firm is 3) _____

A) downward–sloping and more flat than the market demand curve.

B) downward–sloping and less flat than the market demand curve.

C) the same as the market demand curve.

D) perfectly horizontal.

E) perfectly vertical.

4) A firm maximizes profit by operating at the level of output where 4) _____

A) average revenue equals average variable cost.

B) marginal revenue exceeds marginal cost by the greatest amount.

C) average revenue equals average cost.

D) total costs are minimized.

E) marginal revenue equals marginal cost.

5) At the profit–maximizing level of output, marginal profit 5) _____

A) is also maximized.

B) is zero.

C) is positive.

D) may be positive, negative or zero.

E) is increasing.

6) The demand curve facing a perfectly competitive firm is 6) _____

A) the same as its marginal revenue curve, but not its average revenue curve.

B) not defined in terms of average or marginal revenue.

C) the same as its average revenue curve, but not the same as its marginal revenue curve.

D) not the same as either its marginal revenue curve or its average revenue curve.

E) the same as its average revenue curve and its marginal revenue curve.

7) If a graph of a perfectly competitive firm shows that the MR = MC point occurs where MR is above AVC but below ATC, 7) _____

A) the firm is still earning positive profit, as long as variable costs are covered.

B) the firm is earning negative profit, and will shut down rather than produce that level of output.

C) the firm can cover all of fixed costs but only a portion of variable costs.

D) the firm is earning negative profit, but will continue to produce where MR = MC in the short run.

E) the firm is covering explicit, but not implicit, costs.

8) If a competitive firm has a U–shaped marginal cost curve then 8) _____

A) the profit maximizing output will always generate positive economic profit.

B) the profit maximizing output is found where MC = MR and MC is increasing.

C) the profit maximizing output is found where MC = MR and MC is decreasing.

D) the profit maximizing output will always generate positive producer surplus.

E) the profit maximizing output is found where MC = MR and MC is constant.

9) In the short run, a perfectly competitive profit maximizing firm that has not shut down 9) _____

A) is operating at the minimum of its AVC curve.

B) is operating on the upward–sloping portion of its AVC curve.

C) is operating on the downward–sloping portion of its AVC curve.

D) can be at any point on its AVC curve.

E) is not operating on its AVC curve.

10) Higher input prices result in 10) _____

A) increased demand for the good the input is used for.

B) upward shifts of MC and increases in output.

C) downward shifts of MC and reductions in output.

D) upward shifts of MC and reductions in output.

E) downward shifts of MC and increases in output.

11) An industry has 1000 competitive firms, each producing 50 tons of output. At the current market price of $10, half of the firms have a short run supply curve with a slope of 1; the other half each have a short run supply curve with slope 2. The short run elasticity of market supply is 11) _____

A) 2/5

B) 1/50

C) 1/5

D) 3/20

E) none of the above

Scenario 2:

Yachts are produced by a perfectly competitive industry in Dystopia. Industry output (Q) is currently 30,000 yachts per year. The government, in an attempt to raise revenue, places a $20,000 tax on each yacht. Demand is highly, but not perfectly, elastic.

12) Refer to Scenario 2. The result of the tax in the long run will be that 12) _____

A) Q falls from 30,000; P rises by less than $20,000.

B) Q stays at 30,000; P rises by less than $20,000.

C) Q falls from 30,000; P rises by $20,000.

D) Q stays at 30,000; P rises by $20,000.

E) Q falls from 30,000; P does not change.

13) An increasing–cost industry is so named because of the positive slope of which curve? 13) _____

A) Each firm's long–run average cost curve

B) Each firm's long–run marginal cost curve

C) The industry's long–run supply curve

D) Each firm's short–run marginal cost curve

E) Each firm's short–run average cost curve

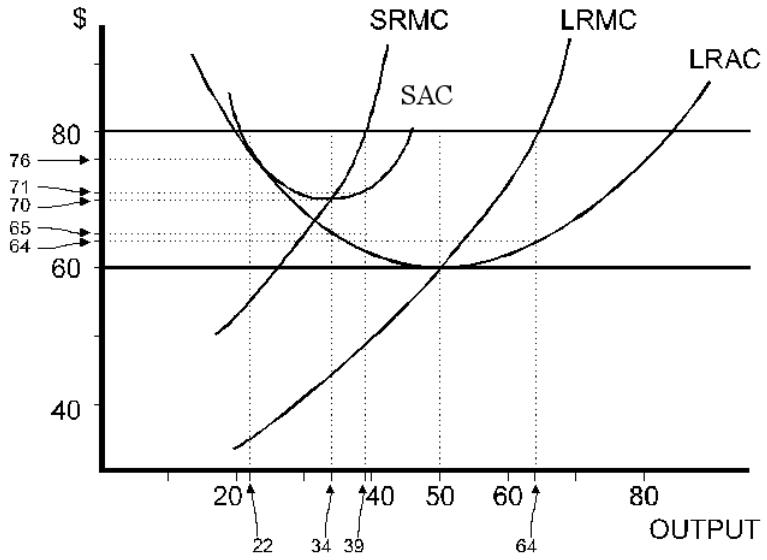

Figure 8.2

14) Refer to Figure 8.2. As the firm makes its long–run adjustment, which must be true? 14) _____

A) It takes advantage of diseconomies of scale.

B) It takes advantage of increasing returns to scale.

C) It takes advantage of increasing marginal product.

D) It suffers from decreasing returns to scale.

E) It takes advantage of economies of scale.

15) Consider the following statements when answering this question 15) _____

I. In the long run, if a firm wants to remain in a competitive industry then it needs to own resources that are in limited supply."

II. "In this competitive market our firm's long run survival depends only on the efficiency of our production process."

A) I is true, and II is false.

B) I is false, and II is true.

C) I and II are false.

D) I and II are true.

ESSAY. Write your answer in the space provided or on a separate sheet of paper.

16) The squishy industry is competitive and the market price is \$0.80. Apu's long–run cost function is: $C(q, r) = \frac{0.436}{3} r^{3/2} q^{3/2}$, where r is the price Apu pays to lease a squishy machine and q is squishy output. The long–run marginal cost curve is: $MC(r, q) = 0.218 r^{3/2} q^{1/2}$. What is Apu's optimal output if the price Apu pays to lease a squishy machine is \$1.10? Suppose the lease price of squishy machines falls by \$0.55. What happens to Apu's optimal output if the market price for a squishy remains at \$0.80? Did profits increase for Apu when the lease rate of squishy machines fell?

17) The long-run cost function for LeAnn's telecommunication firm is: $C(q) = 0.03q^2$. A local telecommunication tax of \$0.01 has been implemented for each unit LeAnn sells. This implies the marginal cost function becomes: $MC(q, t) = 0.06q + t$. If LeAnn can sell all the units she produces at the market price of \$0.70, calculate LeAnn's optimal output before and after the tax. What effect did the tax have on LeAnn's output level? How did LeAnn's profits change?

18) The manufacturing of paper products causes damage to a local river when the manufacturing plant produces more than 1,000 units in a period. To discourage the plant from producing more than 1,000 units, the local community is considering placing a tax on the plant. The long-run cost curve for the paper producing firm is: $C(q, t) = \frac{q^2}{1500} + tq$, where q is the number of units of paper produced and t is the per unit tax on paper production. The relevant marginal cost curve is: $MC(q, t) = \frac{q}{750} + t$. If the manufacturing plant can sell all of its output for \$2, what is the firm's optimal output if the tax is set at zero? What is the minimum tax rate necessary to ensure that the firm produces no more than 1,000 units? How much are the firm's profits reduced by the presence of a tax?

19) Consider a competitive market in which the market demand for the product is expressed as

$$P = 75 - 1.5Q,$$

and the supply of the product is expressed as

$$P = 25 + 0.50Q.$$

Price, P, is in dollars per unit sold, and Q represents rate of production and sales in hundreds of units per day. The typical firm in this market has a marginal cost of

$$MC = 2.5 + 10q.$$

a. Determine the equilibrium market price and rate of sales.
b. Determine the rate of sales of the typical firm, given your answer to part (a) above.
c. If the market demand were to increase to $P = 100 - 1.5Q$, what would the new price and rate of sales in the market be? What would the new rate of sales for the typical firm be?
d. If the original supply and demand represented a long-run equilibrium condition in the market, would the new equilibrium (c) represent a new longrun equilibrium for the typical firm? Explain.

20) Conigan Box Company produces cardboard boxes that are sold in bundles of 1000 boxes. The market is highly competitive, with boxes currently selling for \$100 per thousand. Conigan's total and marginal cost curves are:

$$TC = 3{,}000{,}000 + 0.001Q^2$$
$$MC = 0.002Q$$

where Q is measured in thousand box bundles per year.

a. Calculate Conigan's profit maximizing quantity. Is the firm earning a profit?
b. Analyze Conigan's position in terms of the shutdown condition. Should Conigan operate or shut down in the shortrun?

21) A competitive market is made up of 100 identical firms. Each firm has a short–run marginal cost function as follows:

MC = 5 + 0.5Q,

where Q represents units of output per unit of time. The firm's average variable cost curve intersects the marginal cost at a vertical distance of 10 above the horizontal axis. Determine the market shortrun supply curve. Calculate the price that would make 2,000 units forthcoming per time period. Note the minimum price at which any quantity would be placed on the market.

22) The market demand for a type of carpet known as KP–7 has been estimated as:

P = 40 – 0.25Q,

where P is price ($/yard) and Q is rate of sales (hundreds of yards per month). The market supply is expressed as:

P = 5.0 + 0.05Q.

A typical firm in this market has a total cost function given as:

$C = 100 - 20.0q + 2.0q^2$.

a. Determine the equilibrium market output rate and price.
b. Determine the output rate for a typical firm.
c. Determine the rate of profit (or loss) earned by the typical firm.

23) The demand curve and long–run supply curve for carpet cleaning in the local market are: $Q_D = 1{,}000 - 10P$ and $Q_S = 640 + 2P$. The long–run cost function for a carpet cleaning business is: $C(q) = 3q^2$. The long–run marginal cost function is: $MC(q) = 6q$. If the carpet cleaning business is competitive, calculate the optimal output for each firm. How many firms are in the local market? Is the carpet cleaning industry an increasing, constant, or decreasing cost industry?

24) The market demand for a type of carpet known as KS–12 has been estimated as

P = 75 – 1.5Q,

where P is price ($/yard), and Q is output per time period (thousands of yards per month). The market supply is expressed as P = 25 + 0.50Q. A typical competitive firm that markets this type of carpet has a marginal cost of production of

MC = 2.5 + 10q.

a. Determine the market equilibrium price for this type of carpet. Also determine the production rate in the market.
b. Determine how much the typical firm will produce per week at the equilibrium price.
c. If all firms had the same cost structure, how many firms would compete at the equilibrium price computed in (a) above?
d. Determine the producer surplus the typical firm has under the conditions described above. (Hint: Note that the marginal cost function is linear.)

25) Homer's Boat Manufacturing cost function is: $C(q) = \frac{75}{128}q^4 + 10{,}240$. The marginal cost function is: $MC(q) = \frac{75}{32}q^3$. If Homer can sell all the boats he produces for $1,200, what is his optimal output? Calculate Homer's profit or loss.

Answer Key
Testname: COMPETITIVE SUPPLY

1) D
2) D
3) D
4) E
5) B
6) E
7) D
8) B
9) B
10) D
11) D
12) A
13) C
14) E
15) B
16) The profit maximizing output level is where the market price equals marginal cost (providing the price exceeds the average cost). To determine the optimal output level, we need to first equate marginal cost to the market price. That is,

$MC(q, 1.10) = 0.218(1.10)^{3/2}q^{1/2} = P = 0.8 \Leftrightarrow q = 10.12$. The average variable cost at this output level is:
$AC(10.12) = \frac{0.436}{3}(1.1)^{3/2}10.12^{1/2} = 1.69$. Since $P < AC(10.12)$, Apu will maximize profits by producing 0 units. Apu's profits will also be zero. If the lease rate of squishy machines fall by \$0.55, the optimal output will be determined by:
$MC(q, 0.55) = 0.218(0.55)^{3/2}q^{1/2} = P = 0.8 \Leftrightarrow q = 17.65$. The average variable cost at this output level is:
$AC(17.65) = \frac{0.436}{3}(0.55)^{3/2}17.65^{1/2} = 1.05$. Since $P < AC(17.65)$, Apu will maximize profits at 0 units. Apu's profits remain at zero even though squishy machines have fallen in price by 50%.

17) The profit maximizing output level is where the market price equals marginal cost (providing the price exceeds the average variable cost). To determine the optimal output level, we need to first equate marginal cost to the market price. That is,

$MC(q,0) = 0.06q + (0) = P = 0.7 \Leftrightarrow q = 11\frac{2}{3}$.

The average variable cost at this output level is:
$AVC\left(11\frac{2}{3}\right) = 0.03\left(11\frac{2}{3}\right) = 0.35$. Since $P > AVC\left(11\frac{2}{3}\right)$, LeAnn will maximize profits at $11\frac{2}{3}$ units. LeAnn's profits are:
$\pi = Pq - C(q) = 0.70\left(11\frac{2}{3}\right) - \left\{0.03\left(11\frac{2}{3}\right)^2\right\} = 4\frac{1}{12}$.
With the tax, LeAnn's optimal output level requires:
$MC(q, 0.01) = 0.06q + (0.01) = P = 0.7 \Leftrightarrow q = 11.5$. The average variable cost at this output level is:
$AVC(11.5) = 0.03(11.5) + .01 = 0.355$. Since $P > AVC(11.5)$, LeAnn will maximize profits at units. LeAnn's profit with the tax is:
$\pi = Pq - C(q) = 0.70(11.5) - \left\{0.03(11.5)^2 + 0.01(11.5)\right\} = 3.9675$. The tax reduces LeAnn's output and profit.

18) In the absence of a tax, we know the plant will maximize profits where marginal cost is equal to the price (given average costs exceed the market price). That is,

$MC(q, 0) = \frac{q}{750} + (0) = 2 \Rightarrow q = 1{,}500$. Thus, without a tax, we know the plant will produce at a level that will cause damage to the river. The firms profits at this level are:

$\pi = 2(1{,}500) - \left\{\frac{(1{,}500)^2}{1{,}500} + 0\ (1{,}500)\right\} = 1{,}500$. To ensure that the plant doesn't go beyond 1,000 units of production, the community needs to make sure the firm's marginal cost is equivalent to the market price at 1,000 units or less. That is, $MC(1000, t) = \frac{1000}{750} + t = 2 \Rightarrow t = 2 - 1\frac{1}{3} = \frac{2}{3}$. A tax of $2/3$ or greater will ensure the plant will not produce beyond 1,000 units. If we set the tax rate at $2/3$, the firm's profits will be: $\pi = 2(1{,}000) - \left\{\frac{(1{,}000)^2}{1{,}500} + \frac{2}{3}(1{,}000)\right\} = 666\frac{2}{3}$.

Implementation of a tax equal to 2/3 will result in profits declining by 55.6%.

19) ***a.***

The equilibrium price and rate of sales are computed by equating supply to demand.

$25 + 0.5Q = 75 - 1.5Q$

$2Q = 50$

$Q = 25$ (hundreds per day)

The equilibrium price is

$P = 75 - 1.5Q$

$= 75 - 1.5(25)$

$= \$37.5$

b.

Since the firm's supply curve is its MC, we can determine the rate of sales of the firm by inserting \$37.5 for price (MC) into the MC equation to get q for the firm.

$MC = \$37.5 = 2.5 + 10q$.

$q = 3.5$ (hundreds per day)

c.

The new market equilibrium price is

$25 + 0.50Q = 100 - 1.5Q$

$Q = 75 / 2$ (hundreds per day)

$P = 100 - 1.5(37.5) = \$43.75$ / unit

Now the typical firm would sell daily:

$MC = 43.75 = 2.5 + 10q$

$q = 4.126$ (hundred per day)

d.

The original supply and demand represented long-run equilibrium and a breakeven situation for the typical firm. With the new higher demand in (c), the typical firm would likely be earning a positive economic profit because price and output are both higher. This apparent positive profit would encourage more firms to enter the market, which would increase market supply. So, the new equilibrium would not represent a long-run equilibrium for the firm or the market.

20) ***a.***

Given the competitive nature of the industry, Conigan should equate P to MC.

$100 = 0.002Q$

$Q = 50{,}000$

To determine profit:

$\pi = TR - TC$

$TR = PQ$

$TR = \$100 \cdot 50{,}000$

$TR = 5{,}000{,}000$

$TC = 3{,}000{,}000 + 0.001(50{,}000)^2$

$TC = 3{,}000{,}000 + 2{,}500{,}000$

$TC = 5{,}500{,}000$

$\pi = 5{,}000{,}000 - 5{,}500{,}000$

$\pi = -500$

Conigan is losing 500,000 per year.

b.

To determine if the firm should operate or shutdown, we must compare P to AVC.

$$AVC = \frac{TVC}{Q}$$

$TVC = TC - TFC$

$TVC = 5{,}500{,}000 - 3{,}000{,}000$

$TVC = 2{,}500{,}000$

$$AVC = \frac{2{,}500{,}000}{50{,}000} = \$50$$

$AVC = 50; \quad P = \$100$

The firm should operate since P > AVC.

21) The market supply curve is the horizontal summation of the individual firms' MC curves above the intersection with the respective average variable cost curves. We must express the quantity in terms of MC or:

$Q = 2MC - 10.$

Now add the 100 short–run supply curves together:

$Q_1 = 2MC - 10$
$Q_2 = 2MC - 10$
. . .
. . .
. . .
$Q_{100} = 2MC - 10$

$\sum Q = 200MC - 1000$

Now, solve for MC

$$MC = \frac{\Sigma Q + 1000}{200}$$

$MC = 0.005\Sigma Q + 5$ (above MC = 10)

At $\Sigma Q = 2000$, the price would be

$P = MC = 0.005(2000) + 5 = \$15$ per unit.

The lowest point on the supply curve would be just above the intersection with the average variable cost curve (at 10 units above the horizontal axis).

22) ***a.*** Equate supply to demand to get Q.

$40 - 0.25Q = 5.0 + 0.05Q$
$0.30Q = 35$
$Q = 116.7$ (hundreds of yards per month)
$P = 40 - 0.25(116.7) = \$10.825$ / yard

b. The typical firm produces where MC equals P.

$MC = -20 + 4q$
$10.825 = -20 + 4q$
$q = 7.71$ (hundreds of yards per month)

c. The profit rate is as follows:

$R(Q) = PQ = (10.825)(7.71) = 83.461$
$TC = 100 - 20(7.71) + 2(7.71)^2 = 64.69$
Profit = \$18.77 (hundreds / month)

23) To determine optimal firm output, we first must calculate the market price. To do so we set market demand equal to market supply and solve for price. That is:
$Q_D = 1{,}000 - 10P = Q_S = 640 + 2P \Rightarrow P = 30.$ At this market price, 700 carpets will be cleaned. Since the industry is competitive, we know the firms are price takers and will set their marginal costs equal to the market price. This gives us: $MC(q) = 6q = 30 \Rightarrow q = 5$. Given each firm is cleaning 5 carpets per period and there are a total of 700 carpets cleaned each period in the market, there must be 140 firms. Since each firm's average costs are $AC(q) = \frac{3q^2}{q} = 3q,$ increases in output raises the firm's average cost. Thus, each firm has increasing costs. Also, since the market supply curve is upward sloping in the long–run, as output expands in the long–run the industry is an increasing price industry.

24) ***a.***
Market equilibrium price is found by equating S and D.

$75 - 1.5Q = 25 + 0.50Q$
$50 = 2Q$
$Q = 25$ (thousand yards per month)

The equilibrium selling price is
$P = 75 - 1.5(25) = \$37.5$/yard.

b.
Since the firm's supply is based on its MC curve, we can use MC to determine production rate.

$P = 37.5 = MC = 2.5 + 10q$
$q = \frac{35}{10} = 3.5$ (thousand yards / month)

c.
Since each firm produces 3.5 thousand yards per month and total production is at 25 thousand yards per month, a total of 7.14 firms would be needed.

d.
Producer surplus is the area between the price of \$37.5 and MC, bounded by zero and 3.5 units of output for the typical firm. The bounded area is a triangle.

$\text{Area} = \frac{1}{2}b \cdot h = (0.5)(3.5)(37.5 - 2.5) = \$61.25$ (thousand)

25) The profit maximizing output level is where the market price equals marginal cost (providing the price exceeds the average variable cost). To determine the optimal output level, we need to first equate marginal cost to the market price. That is, $MC(q) = \frac{75}{32}q^3 = P = 1{,}200 \Leftrightarrow q = 8$. The average variable cost at this output level is:

$AVC(8) = \frac{75}{128}(8)^3 = \frac{75(512)}{128} = 300$. Since $P > AVC(8)$, Homer will maximize profits at 8 units. Homer's profits are:

$\pi = Pq - C(q) = 1{,}200(8) - \left\{\frac{75(8)^4}{128} + 10{,}240\right\} = -3{,}040$. Homer will produce and make a loss as losing \$3,040 is better than not producing and losing \$10,240.