LISBON SCHOOL OF ECONOMICS & MANAGEMENT
UNIVERSIDADE DE LISBOA

Microeconomics II

Licenciatura in Economics

9th of April 2019
Duration: 45m + 45m

Midterm Test — Part A

Maximum duration of Part A: 45 minutes

Full Name: …… A

Student Number: …… Class: ……

1. Mark your answers with an 'O' in the table below. You get 0.625 marks for each right answer, and a 0.625/3 (≈ 0.208) deduction for any wrong answer.
2. You cannot look up books or notes of any kind. Invigilators will not help you with the test.
3. You cannot use calculators, computers, mobile phones, or any other data storage device.
4. This test paper must be returned to the invigilator even if you decide not to take the test.

ANSWER SHEET

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a
b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b
c	c	c	c	c	c	c	c	c	c	c	c	c	c	c	c	c
d	d	d	d	d	d	d	d	d	d	d	d	d	d	d	d	d

1. A single-price monopolist's profit-maximising price is:
   a) Higher than the marginal cost.
   b) Equal to the marginal cost.
   c) Higher than average revenue.
   d) Equal to the average cost.

2. A single-price monopolist, in the usual graph, faces a demand curve that:
   a) Coincides with the its marginal revenue curve.
   b) Coincides with its average revenue curve.
   c) Is steeper than the market demand curve.
   d) Is less steep than the market demand curve.

3. A monopolist with zero costs and faces the demand curve $p = 200 - 2y$. It maximises profit producing:
   a) $y = 25$.
   b) $y = 50$.
   c) $y = 100$.
   d) $y = 200$.

4. In the long run a monopolistically competitive firm:
   a) Makes a strictly positive profit.
   b) Has a marginal revenue that exceeds the marginal cost.
   c) Does not produce at the minimum average cost.
   d) Charges a price that is higher than the average cost.

5. A firm facing a perfectly elastic demand curve:
   a) Is able to practice 2nd-degree price discrimination.
   b) Is able to charge a two-part tariff.
   c) Is able to perfectly price discriminate.
   d) None of the other alternatives is correct.

6. A café charges €3 for a coffee and €5 for two coffees. This is an example of:
   a) Different costs.
   b) First-degree price discrimination.
   c) Second--degree price discrimination.
   d) Third-degree price discrimination.

7. A monopolist's marginal revenue:
   a) Is the extra revenue for each extra unit sold.
   b) Equals $p(1 - 1/|\varepsilon|)$.
   c) Equals the price if demand is perfectly elastic.
   d) All other alternatives are correct.

8. A perfectly price-discriminating monopolist faces the demand $y = a - bp$. Then its marginal revenue curve is:
   a) $MR = a - 2bp$.
   b) $MR = a/b - y/2b$.
   c) $MR = a/b - 2y/b$.
   d) $MR = a/b - y/b$.

9. In order to maximise joint profit, two duopolists must:
   a) Produce the same quantity.
   b) Produce with the same average total cost.
   c) Produce with the same marginal cost.
   d) Produce with the same average variable cost.

10. The Stackelberg model is BEST described as a:
    a) Simultaneous game where the leader knows the follower's reaction function.
    b) Sequential game where the follower chooses after knowing the leader's output decision.
    c) Simultaneous game where each firm knows the other's reaction function.
    d) Sequential came where each firm knows the other's reaction function.

11. Two duopolists are producing the Stackelberg equilibrium quantities. Would any firm want to increase its output if it knew the other would keep producing the same?
    a) The leader would; the follower would not.
    b) Both would.
    c) None would.
    d) The follower would; the leader would not.

12. In the price leadership model with two firms:
    a) Both firms make marginal cost equal to price.
    b) Only the leader makes marginal cost equal to price.
    c) Only the follower makes marginal cost equal to price.
    d) None makes marginal cost equal to price.

13. A Nash equilibrium is a set of strategies where each is:
    a) A dominant strategy.
    b) A best response to the other equilibrium strategies.
    c) All other alternatives are correct.
    d) A mixed strategy.

14. The equilibrium in a prisoner's dilemma game that is repeated a known and finite number of times:
    a) Is Pareto efficient in some repetitions.
    b) Is Pareto efficient in all repetitions.
    c) Is not Pareto efficient in any repetition.
    d) The information is not enough to answer.

15. In the game below, *Up* is a dominant strategy if:

		Player 2	
		Left	*Right*
Player 1	*Up*	*a*, 1	*b*, 1
	Down	1, 0	1, 2

    a) $a = 2$ and $b = 0$.
    b) $a = 2$ and $b = 2$.
    c) $a = 0$ and $b = 2$.
    d) $a = 0$ and $b = 0$.

16. We have a prisoner's dilemma in the game below if:

		Player 2	
		Left	*Right*
Player 1	*Up*	*a*, 2	*b*, 3
	Down	3, -1	*c*, 0

    a) $a = 2$, $b = -1$ and $c = 0$.
    b) $a = 2$, $b = 2$ and $c = 0$.
    c) $a = 0$, $b = 2$ and $c = 2$.
    d) $a = 0$, $b = -1$ and $c = 2$.

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Microeconomics II

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9th of April of 2019
Duration: 45m + 45m

Midterm Test — Part B

Maximum duration of the exam: 1 hour and 30 minutes

Full Name: ……

Student Number: …… Class: ……

1. You cannot look up books or notes of any kind. Invigilators will not help you with the test.
2. Switch off and put away any graphical calculators, computers, mobile phones, or any other data storage device.

QUESTION 1 (5 marks)

A duopolistic market has the demand curve $p(y) = 100 - y$, and the firms have costs $c_1(y_1) = 12y_1$ and $c_2(y_2) = 8y_2$.

a) (1.5 marks) Find the Cournot equilibrium quantities, price, and profits. Show all your calculations.

b) (1.5 marks) Now assume firm 1 is the leader and credibly announces its output decision before firm two makes its own decision. Find the equilibrium quantities, price, and profits. Show all your calculations.

c) (1 mark) In general (not just in this particular example), can the leader in a Stackelberg market make less profit than if would if the market works according to the Cournot model? Explain.

QUESTION 2 (5 marks)

A monopolist faces the demand curve $p(y) = 300 - 2y$ and has costs $c(y) = y^2 + 20$.

a) (2.5 marks) The firm charges a single price. Find the profit maximising price and quantity. Explain why the profit is not zero.

b) (2.5 marks) Find the deadweight loss caused by the monopoly and explain what it means.

Answers to Part A (this version, A)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
a	b	b	c	d	c	d	d	c	b	a	c	b	c	b	a

Answers to Part B

Question 1

a) In the Cournot model each firm maximizes its profit taking the other firm's output as constant, which gives rise to a reaction function, that is, the firm's profit-maximising output is a function of the other firm's output:
$\pi_1 = p(y_1 + y_2)y_1 - c_1(y_1) = (100 - y_1 - y_2)y_1 - 12y_1 = 100y_1 - y_1^2 - y_1y_2 - 12y_1$.
$\partial\pi_1/\partial y_1 = 100 - 2y_1 - y_2 - 12 = 0 \Leftrightarrow y_1 = 44 - 0.5y_2 = f_1(y_2)$, firm 1's reaction function.

$\pi_2 = p(y_1 + y_2)y_2 - c_2(y_2) = (100 - y_1 - y_2)y_2 - 8y_2 = 100y_1 - y_1y_2 - y_2^2 - 8y_2$.
$\partial\pi_2/\partial y_2 = 100 - y_1 - 2y_2 - 8 = 0 \Leftrightarrow y_1 = 46 - 0.5y_2 = f_2(y_1)$, firm 2's reaction function.

There will be an equilibrium if simultaneously we have $y_1 = 44 - 0.5y_2$ and $y_1 = 46 - 0.5y_2$ (that is, both firms are producing according to their reaction functions) which yields $y_1 = 28$ and $y_2 = 32$. Total output is $y = 60$. Then $p(60) = 100 - 60 = 40$. Profits are $\pi_i = py_i - c_i(y_i)$: $\pi_1 = 40 \times 28 - 12 \times 28 = 784$ and $\pi_2 = 40 \times 32 - 8 \times 32 = 1024$.

b) Firm 2 observes firm 1's output and produces according to its reaction function. Firm 1 knows this and takes that into account when chooses its own output:

$\pi_1 = p(y_1 + f_2(y_1))y_1 - c_1(y_1) = (100 - y_1 - 46 + 0.5y_1)y_1 - 12y_1 = 54y_1 - 0.5y_1^2 - 12y_1$.

$\partial\pi_1/\partial y_1 = 54 - y_1 - 12 = 0 \Leftrightarrow y_1 = 42$.

Then $y_2 = f_2(42) = 46 - 0.5 \times 42 = 25$. Total output is $y = 67$. Then $p(60) = 100 - 67 = 33$, and profits are: $\pi_1 = 33 \times 42 - 12 \times 42 = 882$ and $\pi_2 = 33 \times 25 - 8 \times 25 = 625$.

c) No, it cannot. The leader has the option of producing its Cournot-equilibrium output, in which case the follower would also produce its Cournot-equilibrium output, and the leader (and the follower too, but that does not concern us here) would have the same profit as in the Cournot equilibrium. Therefore it will never choose an output that would earn itself a lower profit.

Question 2

a) The monopoly maximises profit where $MC = MR$. Revenue is $p(y)y = 300y - 2y^2$; $MR = 300 - 4y$. So $MC = MR \Leftrightarrow 2y = 300 - 4y \Leftrightarrow y = 50$. $p(50) = 200$. Profit is not zero (it is $200 \times 50 - (50^2 + 20) = 7{,}480$) because the monopolist, definition, faces no competition and is therefore able to charge a price above average cost. If other firms were able to enter the market they would do so a drive price down, until profits were zero. But because there are barriers to entry this does not happen. (Demand could lower and the demand curve could tangent to the average cost curve, in which case the monopolist would have zero profit; that would be a tremendous coincidence, and is not the case in the present example.)

b) (A graphical illustration would help here.) The monopolist charges a price higher than marginal cost: $MC(50) = 100$. Marginal cost equals price for $MC = p \Leftrightarrow 2y = 300 - 2y \Leftrightarrow y = 75$. The monopoly sells 50 only, so an additional 25 could be sold at a price higher than marginal cost. The deadweight loss is the surplus these additional units would give rise to if they were sold: $(200 - 100) \times (75 - 50)/2 = 1{,}250$. That "lost" surplus is a measure of the inefficiency caused by the monopolist.