Microeconomics II

June 16, 2023
Duration: 50m+70m=120m

Regular exam
Part A [10,0]
Duration part A: 50 minutes

Full name: ……, **Version A**

Student number: …… Class: ……

1. Indicate your answer with an "O" in the Answer Table below. Each right answer is worth 0.625 values, and each wrong answer has a penalty of 0.625/3 ($\approx$ 0.208) values.
2. No consultation of any kind is allowed. Teachers will not provide explanations.
3. Turn off any cell phones, computers, or tablets, and keep them away from the table.
4. Return this sheet to the teacher even if you withdraw from the exam.

ANSWER TABLE

	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. Suppose a monopolist supplies two markets and charges different prices in both. Let y1 and y2 be the quantities sold in markets 1 and 2, respectively. The firm's profit maximization condition(s) is (are) given by:
   a) MB(y1 + y2) = MC(y1) = MC(y2).
   b) MB(y1) = MB(y2) = MC(y1 + y2).
   c) MB(y1 + y2) = MC(y1 + y2).
   d) MB(y1) = MC(y1) and MB(y2) =MC(y2).

2. Consider a market supplied by a single firm, with the following total cost function: CT(Q) = Q. The inverse demand function is: P(Q) = 100 – Q. If the firm can practice perfect price discrimination, what is the value of the producer surplus:
   a) 0
   b) 5000
   c) 4900,5
   d) 2450,25

3. Two duopolists with constant but different marginal costs form a cartel. To maximize total profit,
   a) The firm with the highest marginal cost produces just enough to make a non-negative profit; the firm with the lowest marginal cost produces everything else.
   b) The firm with higher marginal cost produces a smaller (but positive) quantity than the firm with lower marginal cost.
   c) Both firms produce the same amount.
   d) The firm with the lowest marginal cost produces everything.

4. Two duopolists with equal cost functions produce the same product and set prices simultaneously and without communicating with each other. At equilibrium, the price
   a) Equals marginal cost.
   b) None of the other answers are correct.
   c) It is equal to the monopoly price.
   d) It is higher than marginal cost but lower than monopoly price.

5. In the Cournot model, companies decide:
   a) Quantities simultaneously and without cooperation.
   b) Quantities simultaneously and cooperatively.
   c) Quantities sequentially and without cooperation.
   d) None of the other answers are correct.

6. If a game has a Nash equilibrium in mixed strategies, then necessarily:
   a) This equilibrium is unique.

b) This equilibrium is Pareto efficient.
c) There is an equilibrium in pure strategies.
d) None of the other answers are correct.

7. In "prisoner's dilemma" games:
   a) Both players have dominant strategies.
   b) There is only one unique Nash equilibrium in pure strategies.
   c) All other answers are correct.
   d) The Nash equilibrium is not Pareto efficient.

8. In a mixed strategy, each player chooses:
   a) Each of the possible actions with equal likelihood.
   b) An action depending on the opponent's choice in the previous round.
   c) A simple average of the payoffs associated with one's possible actions.
   d) The probabilities with which one randomly selects each of one's possible actions.

9. Afonso's utility of wealth is U(W)=W and he maximizes his utility. Afonso's initial wealth is $100,000. However, with probability 0.10, he could fall ill, and his treatment will cost $25,000. What is the maximum insurance premium he is willing to pay for full-risk insurance?
   a) $2,500
   b) $10,000
   c) $25,000
   d) The information given is not sufficient to calculate the willingness to pay for the insurance premium.

10. Ana is risk averse. She gets an offer to participate in a lottery in which, with probability 0.25, she loses $1,000 and with probability 0.75, she wins $500. Which of the following statements is true?
   a) Since Ana is risk averse, she will never accept to participate in the lottery.
   b) Since the expected value of the lottery is positive, Ana will certainly accept to participate in the lottery.
   c) She will only accept to participate in the lottery if her initial wealth is positive.
   d) The information is insufficient to determine whether Ana accepts to participate in the lottery.

11. In a particular insurance market, all individuals, both low and high risk, buy insurance at the same price. This is a clear situation of:
   a) Moral hazard.
   b) An aggregating equilibrium.
   c) Pareto inefficiency.
   d) None of the other answers are correct.

12. Asymmetric information necessarily results in:
   a) Adverse selection.
   b) Moral hazard.
   c) Adverse selection or moral hazard (one *or* both).
   d) None of the other answers are correct.

13. Public goods are generally provided by the government because:
   a) Private companies do not take external costs into account.
   b) Governments are more efficient than private companies in producing public goods.
   c) The production of public goods by private companies generates excessive profits.
   d) The existence of free-riding problems means that the market provides an insufficiently low quantity of public goods.

14. National defence is generally considered a public good. However, much of the weapons that equip modern armies are produced by private companies. We can therefore conclude that:
   a) Resources would be more efficiently used if the state produced the weapons.
   b) The resources would be more efficiently used if the private companies that produce the weapons guarantee the national defence.
   c) Weapons are rival and exclusive, but national defence is non-rival and non-exclusive.
   d) In contrast to what is stated above, national defence is not truly a public good.

15. A tannery and a fishing club are located next to a lake. The tannery pollutes the lake, which reduces the quantity and quality of fish. Assume that the property rights over the waters of the lake have been assigned to the tannery and that the conditions of the Coase Theorem hold. Compared to the situation of not having defined the property rights, the pollution emitted by the tannery is:
   a) Greater.
   b) Smaller.
   c) Equal.
   d) Different, but it is not possible to say if greater or smaller.

16. Albano has a dog, and the barking of the dog bothers his neighbour Benilde. Suppose that the benefit that Albano derives from having a dog can be valued at 500 euros. The damage that Benilde suffers from the noise of the dog corresponds to 700 euros. Assume that Albano has the legal right to own a dog. A possible negotiated solution based on the Coase Theorem is:
   a) Benilde pays Albano 250 euros to get rid of the dog.
   b) Albano pays 650 euros to Benilde to compensate for the noise.
   c) Benilde pays Albano 650 euros to get rid of the dog.
   d) There is no private solution that improves the initial situation.

Regular exam

Part B [10,0]

Duration part B: 70 minutes

1. There is no need to write your answers on different sheets.
2. Write your name and student number on each answer sheet.
3. No consultation of any kind is allowed. Teachers will not provide explanations.
4. Turn off any cell phones, computers, or tablets, and keep them away from the table.

Question 1 [3,5]

Note: the items in this question are independent.

a) A profit-maximizing firm operates with the cost function $c(y) = 0.5y^2$. The firm can sell abroad at a price $p_o = 32$. In the domestic market the firm is a monopolist (imports are prohibited) and faces the inverse demand curve $p_d(y_d) = 60 - p_d$, where y_d and p_d are the quantity and price in the domestic market respectively. How much will the company sell in each market? What price will it charge in the domestic market? Explain your reasoning. [1,5]

b) Two duopolists, companies 1 and 2, operate with the cost functions $c_1(y_1) = 5y_1$ and $c_2(y_2) = 7y_2$, where the inverse of *market* demand $Y=y_1+y_2$ is $p(Y) = 99 - 0{,}5Y$. In a simultaneous game, the amounts that maximize the profit of each one as a function of the quantities of the other would be given by $y_1 = f_1(y_2) = 94 - 0.5y_2$ and by $f_2(y_1) = 92 - 0.5y_1$. But firm 1 decides its quantity first and firm 2 decides its quantity second, already knowing the quantity of firm 1. Find the quantities and equilibrium price. Explain your reasoning. [2,0]

Question 2 [3,5]

Note: the items in this question are independent.

a) Carolina and Sofia are university students and are spending their summer holidays in Albufeira. On one of the nights, they consider going to a new discotheque, Karma. However, Carolina and Sofia are hesitant to enter. If they both enter the disco, their utility levels are 20 for each of them. If one of the friends enters and the other does not, the one that enters has a utility level of 10 and the one that does not enter has a utility level of 5. If both do not enter, their utility levels are 10 for each of them. Assuming that the game is simultaneous and non-cooperative, determine the Nash equilibrium or equilibria in pure strategies. Explain your reasoning. [1.5]

b) Margarida and Vera are good friends and decide to participate in a game, in which strategies A and B are available. The payoffs associated with these strategies are reported in the matrix below. Consider the following statement: "*If the game is sequential, Vera has no interest in playing first*." Do you agree? Justify.

		Vera	
		A	*B*
Margarida	*A*	(2,1)	(2,-3)
	B	(3,-2)	(1,0)

Question 3 [3,0]

Consider that television broadcasting (via an antenna) is a public good. Moreover, consider a society composed of two individuals, A and B, that have the following (inverse) demand functions for television: $P_A = 50 – 0,5Q$ and $P_B = 150 – 0,5Q$, where Q is the quantity demanded measured in broadcast hours per week and P_i the relevant price for individual i = A, B. The total cost of providing the service is given by: $CT(Q) = 2 + 80Q$.

a) Explain the characteristics of television broadcasting (via an antenna) that justify its classification as a public good. Would this classification be maintained if the emission system was through a coded cable signal, so that TV can only be accessed after obtaining access to the code? Justify. [1,5]
b) Determine graphically and analytically the value of the optimal provision of the public good. [1,5]

Multiple choice – version A

1. B
2. C
3. D
4. A
5. A
6. D
7. C
8. D
9. A
10. D
11. B
12. D
13. D
14. C
15. B
16. C

Open questions

1.a.

Para maximizar o lucro, empresa iguala as receitas marginais ao custo marginal: $Rmg_i = Rmg_e = Cmg$. $Rmg_e = 32$; logo $Cmg = 32 \Leftrightarrow y = 32$; $Rmg_i = 32 \Leftrightarrow 60 - 2y_i = 32 \Leftrightarrow y_i = 14$. $y_e = y - y_i = 18$. Alternativamente podemos maximizar a função de lucro: max $\pi = 32y_e + (60 - y_i)y_i - 0.5(y_e + y_i)^2$.

1.b.

A empresa 1 sabe que, produzindo a quantidade y_1, a empresa 2 produzirá $y_2 = f_2(y_1) = 92 - 0.5y_1$; então maximiza o lucro tendo isto em atenção: max $\pi_1 = [99 - 0.5(y_1 + 92 - 0.5y_1)]y_1 - 7y_1$, donde resulta $y_1 = 96$; $y_2 = f_2(96) = 44$; $y = 96 + 44 = 140$; $p(140) = 29$.

2.a.

Os níveis de satisfação associados às decisões de entrar ou não entrar na discoteca por parte da Carolina e da Sofia encontram-se reportados na seguinte matriz:

		Sofia	
		Entra	Não Entra
Carolina	Entra	(<u>20</u>,<u>20</u>)	(10,5)
	Não Entra	(5,10)	(<u>10</u>,<u>10</u>)

Os payoffs sublinhados refletem a melhor resposta dada a estratégia do outro jogador. Podemos concluir que os equilíbrios de Nash em estratégias puras sao: {Entra, Entra} e {Não Entra, Não Entra}

2.b.

Para se identificar o(s) equilíbrio(s) no cenário em que o jogo é sequencial, vamos recorrer ao método da indução retroactiva, e considerar ambas as situações: (i) a Margarida joga em primeiro lugar e a Vera joga a seguir; e (ii) a Vera joga em primeiro lugar e a Margarida joga a seguir.

(i) a Margarida joga em primeiro lugar e a Vera joga a seguir

No primeiro nó terminal, a Vera irá escolher a estratégia A, uma vez que A é a estratégia que permite obter um payoff superior, 1 > -3. No segundo nó terminal, a Vera irá escolher a estratégia B, uma vez que B é a estratégia que permite obter um payoff superior, 0 > -2. Consequentemente, os pares de estratégias (A, B) = (2, -3) e (B, A) = (3, -2) são eliminados, restando apenas os pares de estratégias (A, A) = (2, 1) e (B, B) = (1, 0). No nó inicial, a Margarida irá escolher a estratégia A, dado que esta estratégia permite obter um payoff superior, 2 > 1. Assim, o equilíbrio perfeito nos sub-jogos é (A, A) = (2, 1).

(ii) a Vera joga em primeiro lugar e a Margarida joga a seguir

No primeiro nó terminal, a Margarida irá escolher a estratégia B, uma vez que B é a estratégia que permite obter um payoff superior, 3 > 2. No segundo nó terminal, a Margarida irá escolher a estratégia A, uma vez que A é a estratégia que permite obter um payoff superior, 2 > 1. Consequentemente, os pares de estratégias (A, A) = (1, 2) e (B, B) = (0, 1) são eliminados, restando apenas os pares de estratégias (A, B) = (-2, 3) e (B, A) = (-3, 2). No nó inicial, a Vera irá escolher a estratégia A, dado que esta estratégia permite obter um payoff superior, -2 > -3. Assim, o equilíbrio perfeito nos sub-jogos é (A, B) = (-2, 3).

Em resumo, quando a Margarida joga em primeiro lugar e a Vera joga a seguir, a Vera obtém um payoff de 1. Já quando a Vera joga em primeiro lugar e a Margarida joga a seguir, a Vera obtém um pay-off de -2. Como a Vera tem, então, um payoff superior quando a Margarida joga em primeiro lugar e ela joga a seguir, a Vera não tem qualquer interesse em jogar em primeiro lugar.

3.a.

A emissão de TV em sinal aberto tem as propriedades de não-rivalidade no consumo e de não-exclusão pelo preço pelo que pode ser classificado como um bem público. A emissão por cabo permite a exclusão pelo preço pelo que não é um bem público. Existe ainda, no caso do cabo, a possibilidade de congestionamento.

3.b.

A curva de procura agregada corresponde à soma vertical das procuras individuais:

P = 200 – Q se Q<= 100

P = 150 – ½ Q se Q>100

O Custo marginal é: CMg=80

Igualando o primeiro ramo da curva agregada ao CMg temos :

200-Q = 80 ➔ Q = 120 (valor não admissível)

Igualando o segundo ramo da curva agregada ao CMg temos :

150- ½ Q = 80 ➔ Q* = 140 (valor admissível)