Microeconomics II

Resit Exam

Full name: ……………………………………………………………………………………………………

Student number: ………………………...................   Class: ……………………….

1. This exam consists of two parts. Part A consists of 16 multiple-choice questions and is worth 10 points. Part B consists of 3 open questions and is also worth 10 points.

2. Part A must be completed in 50 minutes and Part B in the remaining 70 minutes.

3. Indicate your answers to part A with an 'X' in the table below. Each correct answer is worth 0.625/10 points and each wrong answer is penalized 0.625/3 points.

4. Your answers to each of the three open questions in Part B should be written on separate answer sheets.

5. Any kind of consultation is not allowed.

6. Turn off mobile phones, computers, tablets, and smartwatches. Their use will be considered as fraud.

7. Return this sheet 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

PART A

Multiple choice (10 points / 50 min)

1. How does the elasticity of demand affect a monopolist's ability to set the price and its mark-up?

a) A monopolist always charges high prices, regardless of the elasticity of demand.
b) The less elastic the demand, the higher the mark-up that a monopolist can charge.

c) The more elastic the demand, the higher the mark-up that a monopolist can charge.

d) Elasticity of demand has no effect on a monopolist's pricing and mark-up strategy.

2. Which of the following statements best describes the two-part tariff pricing strategy of a monopolist?

a) A strategy in which the monopolist charges a high price for the first unit and a lower price for subsequent units purchased by the consumer.
b) a strategy in which the monopolist sets a single price that includes a fixed rate and a variable rate equal to the marginal cost that varies with the quantity consumed.
c) A strategy in which the monopolist charges different prices for different consumer segments.

d) A strategy in which the monopolist offers a discount for buying in bulk.

3. What is a key characteristic of companies that compete in a monopolistic competitive market?

a) They produce homogeneous products.

b) They can freely enter and exit the market in the long run.

c) They are price-takers.

d) They do not compete in any price-based way.

4. Which of the following statements best explains what expected utility is?

a) the total utility derived from the most likely outcome.

b) the utility derived from the worst possible outcome.

c) the sum of the utilities of all possible outcomes, each weighted by its probability of occurrence.

d) the usefulness derived from the best possible outcome.

5. Consider that John faces a risk of losing his wealth and has the option of buying insurance at an actuarially fair premium. Which of the following statements best describes how John will decide to purchase this insurance?

a) If John is risk averse, he will always buy the insurance, because the utility with the insurance is greater than without the insurance.

b) If John is risk neutral, he will only buy the insurance if the premium is lower than the expected loss, because he is indifferent to risk.

c) If John is risk averse, he will only buy the insurance if the premium is lower than the expected loss, because his goal is to minimize his expenses.

d) If John is a risk lover, he will always buy the insurance, because he prefers to avoid uncertainty.

6. Which of the following statements best describes a moral hazard problem?

a) In the health care market, an insurer does not know potential consumers' preexisting conditions.

b) In the car insurance market, where insurers cannot observe how carefully their current policyholders drive.

c) In the online market for nutritional supplements, when consumers cannot tell whether the supplements are of good or poor quality.

d) None of the above would lead to moral hazard.

7. Which of the following cost functions is most likely to give rise to a natural monopoly?

a) $c(Q) = 8Q^{0.5}$.

b) $c(Q) = 4Q$.

c) $c(Q) = 2Q^2$

d) The information is insufficient to answer.

8. A monopolist faces the inverse demand curve $p(Q) = 20 - Q$, where p is the price and Q is the quantity, and practices perfect price discrimination. If $Q = 5$, the marginal revenue is:

a) 0.

b) 5.

c) 10.

d) 15.

9) To maximize the total profit of a cartel, it is necessary that all firms in the cartel that produce set their quantities such that:

a) their average costs and marginal costs are the same.

b) their average costs are the same.

c) their marginal costs are the same.

d) their average variable costs and marginal costs are the same.

10. Two firms compete in Stackelberg, with the leader choosing the quantity first and the follower choosing the quantity second. Each firm can choose only one of two quantities,

which results in the profits in the table below. Note that in each cell the first (second) number refers to the profits of the leader (follower). The quantities that are chosen in Nash equilibrium are:

		Follower	
		$Q_S = 40$	$Q_S = 60$
Leader	$Q_L = 50$	10, 7	6, 8
	$Q_L = 80$	8, 4	5, 3

a) ($Q_L = 50$, $Q_S = 40$).

b) ($Q_L = 50$, $Q_S = 60$).

c) ($Q_L = 80$, $Q_S = 40$).

d) There is no Nash equilibrium.

11. In game theory, a mixed strategy is best defined by which of the following statements?

a) A player plays an average of his pure strategies.

b) In repeated games, each player alternately plays each of his pure strategies.

c) In repeated games, one player cooperates if the other player cooperated in the previous round and retaliates otherwise.

d) None of the other answers are correct.

12. In a certain health insurance market, insurers cannot distinguish between healthy and unhealthy consumers and therefore charge everyone the same price based on average risk. Most healthy consumers prefer not to buy insurance, although they would do so if the price reflected their own risk rather than the average risk. This is an example of:

a) Separating equilibrium.

b) Adverse selection.

c) Moral hazard.

d) None of the other answers are correct.

13. Which of the following provides the best example of a tragedy of the commons?

a) Congestion in IC19, a toll-free highway between Sintra and Lisbon, costs commuters extra time.

b) Heavy traffic on Avenida da Liberdade causes noise that disturbs pedestrians and residents.

c) As companies do not get taxed for C02 emissions, they emit too much C02 which warms the planet.

d) None of the answers provides a good example of a tragedy of the commons.

14. Which of the following situations best meets the conditions for a private solution proposed by the Coase theorem?

a) The noise from the bars in Bairro Alto bothers all the residents.

b) The noise from a factory located in the middle of a densely populated area bothers all the residents.

c) A construction company plans to build a new residential building which will block the view of a hotel, reducing its profits.

d) The massive use of antibiotics promotes the development of resistance in bacteria, making them less effective.

15. Xavier and Yvone are the only consumers of a certain public good. Both contribute €500 to this public good. Both also consume a private good. Let their marginal rate of substitution (MRS) be defined by the units of the private good that can be traded for one unit of the public good so that they are indifferent. Let

their MRSs be equal to: MRS Xavier = 0.5 and MRS Yvonne = 1.2. Each unit of public good costs 2 units of private good. The provision of the public good is:

a) At the social optimal level.

b) Not at the social optimal level because Yvone should pay more and Xavier less.

c) Not at the social optimal level because Yvone should pay less and Xavier more.

d) Higher than the social optimal level.

16. The best explanation for why the private provision of public goods is inefficient is that:

a) Private suppliers ignore negative externalities.

b) Private suppliers are not able to bear the high costs of providing public goods.

c) Anyone can enjoy the public good without paying for it.

d) Consumers of the public good ignore negative externalities on other consumers.

PART B

Open questions (10 points / 70 min)

SOLVE EACH QUESTION ON A SEPARATE ANSWER SHEET

QUESTION 1 (4 points)

Joana has a Vespa that has a value of €10,000. The probability of Joana having an accident is 0.10, and the cost of repairing the Vespa in case of an accident is €4,000. Suppose that Joana's utility function is given by u(w)= ln(w), where w is the value of her Vespa.

a) (1p) Determine the expected value of Joana's Vespa.

b) (1p) Determine the expected utility of Joana.

c) (1p) Suppose there is a "Two Wheel" insurance that offers full coverage for the €4,000 repair costs at an actuarially fair premium. Show that Joana is willing to buy this full insurance (use 3 decimal places in your calculations).

d) (1p) Show that for the insurance company the expected profit from the "Two Wheel " insurance is zero.

a) EV=0.9(10000)+0.1(10000-4000)=9600

b) EU = 0.9 ln 10000 + 0.1 ln (10000-4000) =9.159

c) EU (with insurance) > EU (Without insurance)

The fair premium = γK = 0.1(4000) =400

Hence, EU (with insurance) = 0.9 U(10000-400) + 0.1 U(10000-4000+4000-400) = U(10000-400) = ln (10000-400)= 9.169

EU (Without insurance) =0.9 ln 10000 + 0.1 ln (10000-4000) =9.159 (see also answer b).

d) π = 0.9 (400) + 0.1(400 - 4000) = 0

QUESTION 2 (3 points)

Company X is going to hire John. At his work, John can exert himself or work calmly. The company cannot observe John's effort, so they cannot make the salary dependent on his effort. Therefore, the company must decide whether to pay John €3000 or €2000 ex-ante. This decision takes place a month before John starts working, after which John decides whether to exert himself or not. Depending on John's salary and effort, the profit of the company (first number in each cell) and the utility of John (second number in each cell) will be as follows:

		John	
		Exert	Calmly
Company X	€3000	€500, 3	-€600, 4
	€2000	€1500, 1	€400, 2

a) (0.5p) Is this game simultaneous or sequential? Justify your answer.

b) (1p) Find the Nash equilibrium of this game. Explain.

c) (1.5p) Comment on this game and its Nash Equilibrium, especially with respect to asymmetric information, adverse selection, moral hazard, and Pareto efficiency.

a) Sequential: First, the company decides the salary; second, John decides how much to work given the salary.

b) There is a unique Nash equilibrium, (€2000, Calmly). No matter what the company chooses, John will always choose Calmly (which is a dominant strategy for him). Given that the company chooses first, and realizes that John will follow with choosing Calmly no matter what (as the company "solves the game backwards"), the Company chooses €2000.

c) There is asymmetric information in the form of "hidden action": the company cannot observe John's effort. This generates moral hazard and Pareto inefficiency: both players would be better off with (€3000, Exert), but this is not a Nash equilibrium. Even if John promised to exert, the company knows that after signing the contract, John would be interested in choosing calmly, because it would lead to higher utility.

QUESTION 3 (3 points)

This question consists of two independent sub-questions.

a) (1.5p) Two duopolists, with the cost curves $c_1(Q_1) = 2Q_1$ and $c_2(Q_2) = 3Q_2$, face the inverse demand curve $p(Q) = 19 - 0.5Q$, where p is the price and $Q=Q_1+Q_2$ is the total market quantity. Find the equilibrium quantities, price, and profits when firms compete on quantities simultaneously (that is, Cournot competition).

b) (1.5p) Companies X and Y operate in perfect competitive markets. Company X sells its product at a price $p_x = 10$ and has costs $c_x(x) = 0.5x^2$, where x is the quantity. Company Y sells its product at a price $p_y = 16$

and has costs $c_y(y) = y^2 + xy$, where y is the quantity. Explain the nature of the externality in this situation and find the optimal Pigouvian tax to achieve the Pareto optimum.

a) Profit maximization results in the reaction functions $Q_1 = f_1(Q_2) = 17 - 0.5Q_2$ and $Q_2 = f_2(Q_1) = 16 - 0.5Q_1$. From equating the reaction functions we obtain the equilibrium quantities $Q_1 = 12$ and $Q_2 = 10$. The equilibrium price is then $p(12 + 10) = 8$, and the profits are $\pi_1 = 72$ and $\pi_2 = 50$.

b) Company X causes a negative externality to company Y: by producing x, it increases the costs of company Y. The Pareto optimum is given by maximizing the sum of profits. This maximization results in $x = 4$ and $y = 6$. The Pigouvian tax is equal to the external marginal cost in the Pareto optimum. The external marginal cost is $-\partial \pi_y/-\partial x = y$. At the Pareto optimum, $y = 6$, so the appropriate Pigouvian tax is 6 per unit of x. Consistent with this, note that with a Pigouvian tax of 6 per unit of x, the individual profit function of company X becomes: $\pi_x = 10x - 0.5x^2 - 6x$. Hence, now Company X would also choose the Pareto optimum of $x = 4$ by maximizing her own individual profits.