Regular 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. Which of the following concept expresses the situation that consumers can benefit from the consumption of a good without paying for it?

a. Tragedy of the commons.
b. Moral hazard.
c. Free-riding.
d. Adverse Selection.

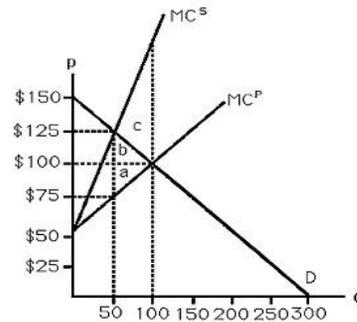2. The optimal provision of a public good implies that the marginal cost is:

a. equal to the marginal benefit of each individual in a community.
b. equal to the sum of the marginal benefits of all individuals in the community.
c. equal to the average marginal benefit among all individuals in the community.
d. increasing with the number of individuals in the community.

3. When there are positive externalities, what is the expected market outcome in the absence of government intervention?

a. Under-production or under-consumption of goods or services.
b. Over-production or over-consumption of goods or services.
c. An equilibrium production that maximizes the consumption of society.
d. Efficient production resulting from the increased benefits produced by the externality.

4. Which of the following statements about the utility function of a risk-averse individual is false?

a. The utility function is increasing in wealth or income.
b. The utility function is concave.
c. Expected utility of wealth or income is always equal to the utility of expected wealth or income.
d. The expected utility is calculated by multiplying the utilities of each possible outcome with their probabilities.

5. The figure above shows an industry that generates a negative externality. If the market is competitive and the government implements a Pigouvian tax of 100 per unit of steel, then it can be said that:

a. production will be lower than the socially optimal production of steel.
b. The socially optimal quantity of steel of 50 units is produced.
c. The socially optimal quantity of steel of 100 units is produced.
d. production will be higher than the socially optimal production of steel.

6. An individual's utility for each additional euro increases by the same amount when she has €1,000 and when she has €10,000. We can say that this individual, for these monetary values, is:

a. Risk-averse.
b. Risk-loving.
c. Risk-neutral.
d. Cautious about risk.

7. There are 100 cars for sale in a town, of which 60 are low-quality and 40 are high-quality. All buyers are willing to pay €4,000 for a low-quality car and €8,000 for a high-quality car. The sellers are willing to accept at least €3,000 for a low-quality car and €7,000 for a high-quality car. Buyers are risk neutral and cannot see which car is low- or high-quality. What is the buyers' willingness to pay for a car of unknown quality?

a. Any value between €4,000 and €7,000.
b. €5,600.
c. Any value between €4,000 and €8,000.
d. Depends on the type of asymmetric information generated between buyer and seller.

8. John has purchased insurance against the risk of theft of his cell phone. After paying for an insurance policy, John started to forget his cell phone more often on the table of the pastry shop where he usually has his morning coffee. This situation is an example of:

A. Adverse Selection.
b. Moral hazard.
c. Signalling.
d. Advantageous selection.

9. In the Cournot model, when firms compete for quantities, firms' strategies are best described by:

a. firms maximize the sum of profits.
b. set the equilibrium price equal to the monopoly price.
c. set equilibrium price equal to the average cost of both companies.
d. None of the other alternatives are correct.

10. In a sequential game of price leadership, what is the pricing strategy of the leading company in the market?

a. It determines its price following the strategy set by the follower.
b. It sets prices without considering the decision of the follower.
c. It determines the price on its "residual" demand and influences the pricing decisions of the follower.
d. It determines the price that maximizes its profit considering the (total) market demand and compels the follower to take that price.

11. Which of the following statements best describes the inefficiency associated with long-term monopolistic competition?

a. Firms produce at a level where the price is equal to the marginal cost, resulting in a Pareto inefficiency.
b. Firms produce at a point where the average total cost is not minimized, leading to productive inefficiency.
c. Firms set prices equal to the average total cost, resulting in zero surplus for the consumer.
d. Companies operate at a scale where the marginal cost is higher than the average cost, leading to a Pareto inefficiency.

12. When the insurance premium is actuarially fair, a risk-averse person will choose to:

a. fully insure as she can get expected wealth for sure.
b. partially insure to reduce the costs of insurance.
c. not insure as expected utility without insurance is highest.
d. insure any amount as she is indifferent.

13. Which statement best describes the concept of a Nash equilibrium?

a. a situation in which all players achieve their best possible results, regardless of the actions taken by other players.
b. a strategy profile in which no player has an incentive to deviate from their chosen strategy, given the strategies chosen by the other players.
c. a situation in which one player dominates the others and can impose his preferred outcome.
d. a strategy profile in which players cooperate to maximise joint outcomes, leading to efficient results.

14. Suppose that the following payoff matrix corresponds to years of punishment in prison:

	Not confess	Confess
Not confess	(1, 1)	(10, 0)
Confess	(0, 10)	(5, 5)

In the context of the prisoner's dilemma game, which of the following statements is true?

a. If both players do not confess, both receive the maximum penalty.
b. If one player does not confess and the other does, the one who does not confess receives a longer prison sentence.
c. The prisoner's dilemma demonstrates that rational self-interest always leads to a Pareto efficient outcome.
d. If both players confess, both receive the minimum sentence.

15. A unique theater in a small town can segment its market into two groups of buyers: students and non-students. The demand functions per group are given by $P_1=110-2Q_1$ and $P_2=80-Q_2$, where Pi is the price and Qi is the number of tickets sold in market i=1,2. The total cost function for the monopolist is given by $TC=10(Q1+Q2)$. This theater uses an optimal pricing strategy to maximize its profit. How many tickets are sold in each market?

a. $Q_1=20, Q_2=35$
b. $Q_1=25, Q_2=20$
c. $Q_1=25, Q_2=35$
d. $Q_1=30, Q_2=10$.

16. Consider an economy with two types of markets: a perfectly competitive market and a monopolistic market practicing first-degree price discrimination. Which of the following statements is false?

a. Both markets achieve allocative efficiency without generating a deadweight loss.
b. The surplus in the monopolistic market with first-degree price discrimination exclusively goes to the producer.
c. If the demand and marginal cost function would be the same in both markets, the total surplus in the perfect competitive market is larger than the total surplus in the monopolistic market.
d. If the demand and marginal cost function would be the same in both markets, then quantity traded in both markets would be identical.

PART B

OPEN QUESTIONS (10 points / 70 min)

SOLVE EACH QUESTION ON A SEPARATE ANSWER SHEET

QUESTION 1 (3 points)

Giga has a natural monopoly on fiber internet distribution. Its technology is represented by the total cost function: $TC=20+10Q$, where Q is the quantity. Suppose that the demand for fiber internet connections is given by $P=20-0.5Q$, where P is the price.

a) (1.5p) Determine the solution that maximizes the efficiency of the market and calculate the respective (potential negative) profit of the company.

b) (1.5p) Determine the two solutions that guarantee zero profits to the company. Which of those solutions has a higher consumer surplus?

Solution
a) P=MC then Q=20, P=10, Profit=-20
b) P=AVC, and then Q=17.7 and P=11.5. (the alternative Q=2.25 and P=18.87, but this results in a smaller consumer surplus).

QUESTION 2 (3 points)

Suppose that two telecommunication-companies, Teophone and Vodacell, must decide on the strategy to adopt against their competitor. Both companies can compete or collude. The table below shows the payoff matrix for each combination of strategies, where in each cell the first (second) number is the payoff of Vodacell (Teophone):

		Teophone	
		Compete	Collude
Vodacell	Compete	2, 2	8, 3
	Collude	4, 5	6, 4

a) (1p) Give the definition of a Nash equilibrium in dominant strategies.

b) (1p) Determine the Nash equilibrium/equilibria in pure strategies of the game above. Also check if the Nash equilibrium/equilibria consist of dominant strategies.

c) (1p) Now assume that there is no Nash equilibrium in dominant strategies in the game above. Change a maximum of two payoffs so that there is an equilibrium in dominant strategies for both players, and state what the equilibrium is.

Solution
a) A Nash equilibrium in dominant strategies is a scenario where each player's best response / chosen strategy is independent of the strategy of the other player.
b) The Nash equilibria are (Collude, Compete) and (Compete, Collude). There is no equilibrium in dominant strategies, as each player's best response depends upon the other player's chosen strategy.

		Teophone	
		Competition	Collude
Vodacell	Competition	2, 2	**8**, **3**
	Collude	**4**, **5**	6, 4

c) For example:

		Teophone	
		Competition	Collude
Vodacell	Competition	2, 2	**8**, **3**
	Collude	**4**, 5	**9**, **6**

The Nash equilibrium (Collude, Collude) is an equilibrium in dominant strategies.

QUESTION 3 (4 points)

Suppose that in the competitive pulp market the demand is $p = 100 - Q$, where p is the price and Q is the quantity. The private marginal cost is $PMC = 10 + Q$. The pollution produced during the production process imposes marginal external costs on society equal to Q, so that external marginal costs are $EMC = Q$.

a) (1.5p) Determine the market equilibrium from a private and social point of view and represent them in a graph. Which of the two equilibria is Pareto optimal? Why?
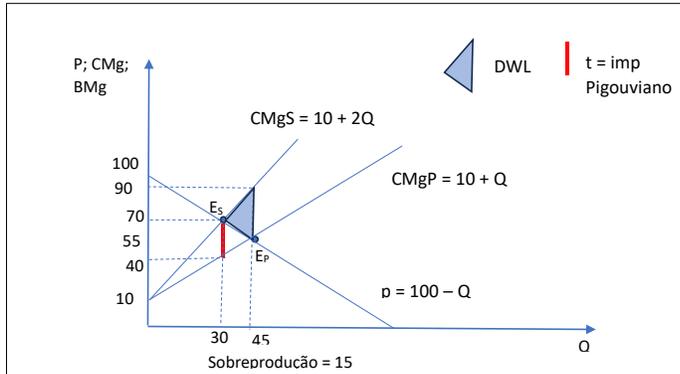
b) (1p) What would be the value of the optimal Pigouvian tax implemented by the government, so that the external costs are "internalized" by producing firms?

c) (1.5p) In the absence of an optimal Pigouvian tax, would social welfare be greater or smaller if the pulp market stopped to be competitive and became dominated by a monopoly? Provide the necessary calculations to justify your answer.

Solution:
a) The private optimum is: $100 - Q = 10 + Q \rightarrow Q^* = 45$ and $p^* = 55$. The social optimum is: $CMgP(Q) + CMgExt(Q) = BMg(Q) \rightarrow 10 + Q + Q = 100 - Q \rightarrow Q^{**} = 30$ e $p^{**} = 70$.

The social equilibrium equates all marginal benefits to all marginal costs. In contrast, the private equilibrium does not incorporate the external marginal costs created by the production process. Therefore, the private equilibrium generates an over-production of 15 units.

b)   Pigouvian tax t = CMgExt (Q**=30) = 30.

c) The monopoly maximizes profits by MR=MC, so Q* : RMgP (Q) = CMg(P) $\rightarrow$ 100 − 2Q = 10 + Q $\rightarrow$ Q*$_M$ = 30, which is equal to the output in the social optimum. Therefore, welfare would be greater in a monopoly regime than in a competitive private equilibrium.