Microeconomics II

May 19, 2025
Duration: 60m+40m

Final 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 2 open questions and is also worth 10 points.
2. Part A must be completed in 60 minutes and Part B in the remaining 40 minutes.
3. Indicate your answers to part A with an "X" in the table below. Each correct answer is worth 10/16 (= 0.625) points and each wrong answer is penalized by (10/16) /3 ($\approx$ 0.210) points.
4. Any kind of consultation is not allowed.
5. Turn off mobile phones, computers, tablets, and smartwatches. Their use will be considered fraud. The use of a non-graphical calculator is allowed.
6. Write your full name and student number on every answer sheet.
7. Return this answer 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
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
d	d	d	d	d	d	d	d	d	d	d	d	d	d	d	d

English – Version A

PART A
MULTIPLE CHOICE (10 points / 60 min)

1. A factory emits acidic smoke that damages nearby homes. The damage is estimated at €500 per day. The installation of a filter in the factory chimney to eliminate the acidity of the smoke costs €300 per day. According to the Coase Theorem and knowing that there are no transaction costs, which of the following statements is correct?

a. The factory will always install the filter if the owners are entitled to clean air.
b. The factory will never install the filter if it has the right to pollute.
c. An efficient outcome will occur regardless of who holds the pollution rights, and the filter will be installed.
d. The government must compensate the firm for the filter cost to restore efficiency.

2. The marginal social benefit of vaccine consumption is _____ than the marginal private benefit. As a result, the market equilibrium quantity consumed is _____ than the efficient level. Since consumers do not consider the external benefits that their consumption provides to others, the government could implement a _____.

a. greater; smaller; vaccine subsidy.
b. less; smaller; vaccine subsidy.
c. greater; larger; taxation of vaccines.
d. less; larger; vaccine production policy.

3. Suppose Manuel has a utility function $u(w) = w^{1/3}$, where w represents wealth. The following game is offered to Manuel: 50% chance of winning €100 and 50% chance of losing €100. It is known that Manuel's current wealth is €1000. Which of the following statements is true?

a. Manuel will accept the bet because it has an expected value greater than his wealth.
b. Manuel will be indifferent because the expected utility gain is equal to the expected utility loss.
c. Manuel will reject the bet because the expected utility of the bet is less than the utility of his certain amount of wealth.
d. Manuel accepts the bet because he is risk seeking.

4. Joana has a diminishing marginal utility of income. Which of the following best explains why Joana purchases an actuarially unfair insurance policy?

a. Joana incorrectly estimates the probability of loss.
b. Joana aims to maximize expected income.
c. Joana prefers a certain smaller loss to an uncertain bigger loss.
d. Joana is not being rational because the expected value of the insurance is zero.

5. Under which of the following conditions will consumer signaling unambiguously eliminate the inefficiency caused by adverse selection?

a. When it is costly to tell the truth and costless to lie.
b. When it is costless to tell the truth and very costly to lie.
c. When both truth-telling and lying are equally costly.
d. When consumers cannot send any signals at all.

6. In a competitive market with adverse selection, the possibility of a pooling equilibrium emerging depends on:

a. The level of risk aversion among low-cost consumers.
b. The average expected cost for all consumers, regardless of type.
c. The relative proportions of high- and low-cost consumers in the market.
d. Whether the low- and high-cost consumer can observe the firm's type.

7. A consulting firm is hiring recent economics graduates but cannot directly observe whether the candidates are high or low in competence. The company may offer a single salary that attracts both types of candidates. This strategy mainly depends on:

a. The extent to which low-competency candidates value job security compared to high-competency workers.
b. The percentage of high and low competence candidates in the candidate pool.
c. Whether candidates can provide reliable references.
d. How expensive it is for the company to train new low-skill employees.

8. A local transportation company is a monopoly and can separate two groups of consumers: students with an elastic demand versus workers with an inelastic demand. To maximize profits through price discrimination, a firm should:

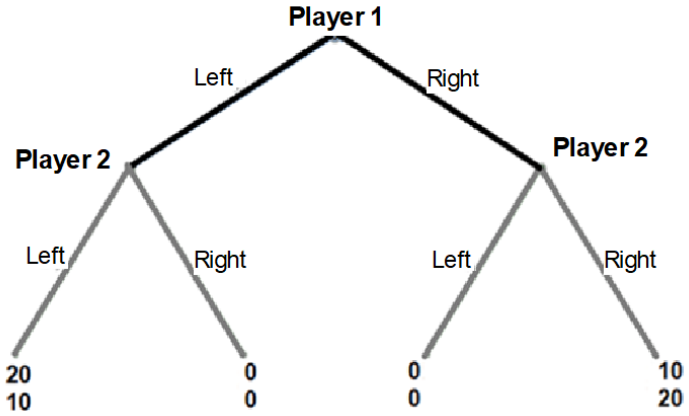
a. Charge the same price to both groups to avoid arbitrage.
b. Do not sell to students because they have an elastic demand.
c. Charge a higher price to workers, as they are less price-sensitive than students.
d. Charge students and workers a price with the same mark-up over marginal cost.

9. A monopolist faces a linear demand curve and determines output in such a way that the price elasticity of demand is equal to -2. What can we conclude about the monopoly's marginal revenue in this situation.

a. Marginal revenue is negative because elasticity is smaller than -1.
b. Marginal revenue is zero because elasticity is smaller than -1.
c. Marginal revenue is positive and equal to price.
d. Marginal revenue is positive and equal to half the price.

10. Which of the following statements is *false* about the sequential game in the figure below? Note that the first (second) number at the end of the game refers to the payoff from player 1 (2), and the equilibria in the answer options below first denote the strategy of player 1 and second the strategy of player 2.

a. The subgame perfect Nash equilibrium is given by *(Left; Left,Right)*.
b. Neither player has dominant strategies.
c. Player 2's strategy *(Right, Right)* is not credible.
d. This game has two subgame perfect Nash equilibria: *(Left; Left,Right)* and *(Right; Left,Right)*.



11. Consider that in the infinitely repeated prisoner's dilemma both players adopt a trigger strategy given by: cooperate except when the other player plays not cooperate once and then not cooperate forever. Which answer best supports the decision to cooperate in this strategy?

a. The threat of legal sanctions for failing to comply with the strategy.
b. The belief that the other player has imperfect information.
c. The possibility of not receiving future gains outweighs the one-time benefit of not cooperating once.
d. The possibility of renegotiating the game after a deviation from the cooperation strategy.

12. The Nash equilibrium in a Bertrand price game in which all firms have the same marginal cost is:

a. Efficient because all mutually beneficial transactions take place.
b. Efficient due to the assumption of free entry.
c. Inefficient because some mutually beneficial transactions are not performed at a loss.
d. Inefficient due to the uncertainties inherent in the game.

13. In an oligopoly, firms face a situation where _____ because each firm's profit depends not only on its own pricing and quantity decisions but also on _____. This creates an environment where companies can engage in _____ behavior to maximize their profits.

a. they make choices independently; the market demand curve; colluding.
b. decision making is strategic; their competitors' decisions; competitive.
c. price competition is maximized; how competitors react; monopolistic.
d. there is rigidity in prices; the marginal cost curve; competitive.

14. Consider the entry deterrence game between an incumbent and an entrant. How do the fixed entry costs and output level influence the entrant's decision to enter the market?

a. High fixed entry costs and a high level of output by the incumbent discourage entry, making the market less profitable for the entrant.
b. Low fixed entry costs and a high level of output by the incumbent encourage entry by the entrant.
c. High fixed entry costs have no impact on the entrant's decision, since only variable costs and established output levels are important for the entrant's strategic decision.
d. The incumbent's output level is irrelevant to the entrant's entry decisions, only the entrant's fixed and variable costs determine its entry into the market.

15. Consider a street with a length of 1 km as shown in the figure below. Suppose that on this avenue there are only 2 restaurants and that consumers are uniformly distributed along the avenue. Assume that restaurants have already set their prices and that consumers are indifferent between the services at the two restaurants but incur travel costs which increase quadratically with distance. This implies the farther a consumer is from a restaurant, their travel costs grow at an accelerating rate. Which of the following statements is true?

a. When restaurants are located at the opposite ends of the street, a situation of maximum differentiation is obtained, but it is not efficient.
b. When restaurants are located at positions 0.25 and 0.75, a non-efficient Nash equilibrium is obtained.
c. When the restaurants are both located at 0.5, the outcome is efficient because all consumers minimize their transportation costs.
d. When restaurants are located at the opposite ends of the street, a situation of maximum differentiation and efficiency is achieved.

16. Markets provide an _____ quantity of public goods for two reasons. First, individuals only consume these goods until the marginal _____ benefit equals the marginal cost. Second, some consumers may consume the good and benefit from its use _____.

a. inefficient; private; without paying.
b. efficient; private; while paying a too low price.
c. inefficient; social; without paying.
d. efficient; social; paying a 2-part tariff.

PART B
OPEN QUESTIONS (10 points / 40 min)

Question 1.

Consider a small town with two bars that exclusively sell alcoholic drinks. Each bar chooses both a price and a product characteristic. The product characteristic refers to the alcohol content of their drinks, which can take any value between 0 and 1. Consumers differ in their preferences for alcohol content and are uniformly distributed along this interval. The utility consumers derive depends on both the price and how closely the product matches their preferred alcohol content.

a) Suppose the government introduces a regulation that fixes the price of alcoholic drinks for health-related reasons. This implies the two bars can only compete by choosing the alcohol content of their drinks. What is the equilibrium outcome in terms of product characteristics? Justify your answer. [1.5p]

b) A new government abolishes price controls, allowing bars to compete both on price and alcohol content. Explain intuitively why, in this setting, the two bars may choose maximum product differentiation as an equilibrium strategy. [1.5p]

c) Now consider a large city with many bars, each offering slightly different types of drinks. The market can be described as monopolistically competitive: Each bar faces a downward-sloping demand curve and acts as a monopolist over its niche. Explain the following apparent paradox: "*In long-run equilibrium, incumbent firms may enjoy positive economic profits, while potential entrants face zero or even negative expected profits*." Use a graph to support your explanation. [2p]

Question 2.

Consider a utility company that produces electricity at a constant private marginal cost of €2 per kWh. The marginal external cost of electricity production is constant at €1 per kWh. The demand for electricity is given by the function $p = 10 - q$, where q is the number of kWh and p is the price. You may ignore the (sunk or potentially recurring) fixed costs of this production.

a) Consider that this utility company is a monopoly and produces electricity with the aim of maximizing profits, what is the quantity and price in this market? [2p]

b) What is the quantity and corresponding price in this market when the monopoly internalizes the external cost (i.e., when it takes into account the social marginal cost instead of just the private marginal cost)? Show that this solution differs from the socially optimal quantity. [2p]

c) Now consider that the market for energy production is a perfect competitive market. If the government wants to incentivize this market to produce the socially optimal quantity, what is the value of the tax per kWh that should be introduced? [1p]

Question 1.

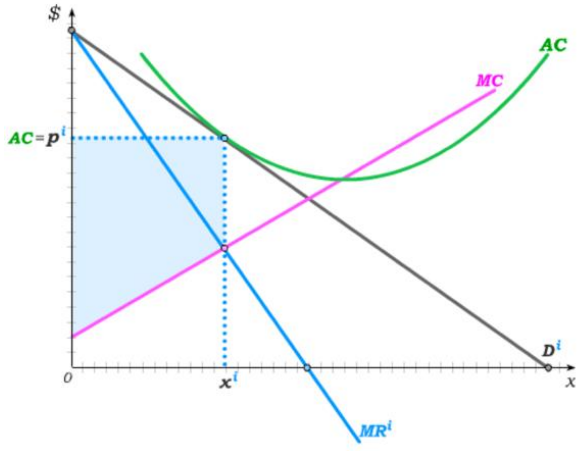
a. This situation is a classic Hotelling location model with fixed prices and horizontal differentiation. The Nash equilibrium in this case occurs when both bars locate at the centre, i.e., alcohol content = 0.5. If either bar were to deviate slightly from the centre, it would lose more customers on the far side than it gains on the near side. Hence, there is no profitable deviation from the centre.

b. In short, the two bars can soften price competition by differentiating their products. Greater differentiation reduces the overlap in customer bases, which allows each bar to raise prices above marginal cost and earn positive profits.

In more detail, once prices are flexible, each bar can use price as a strategic tool to attract consumers. If the two bars offer very similar products, e.g., if they both choose alcohol contents near the centre, they compete for nearly the same group of customers. This intense competition leads to a Bertrand-style outcome, where each firm undercuts the other until prices fall to marginal cost and economic profits are zero.

In contrast, if the bars choose very different alcohol contents, e.g., one at 0 and one at 1, their products become less substitutable. In this case, some consumers strongly prefer their product and are unwilling to switch even if the other bar charges a slightly lower price. This product differentiation creates market power, weakens the intensity of price competition, and enables both firms to charge prices above marginal cost, resulting in positive economic profits.

c. Incumbent firms (existing bars) may still earn positive profits, while potential entrants face zero or negative profits, due to the presence of fixed costs. These fixed costs are sunk for incumbents, but relevant to potential entrants. This implies that economic profits for the incumbent considers marginal costs, whereas the economic profit for the entrant considers average costs. The first can be positive, whereas the latter is zero (or negative). See the graph below for an illustration.



Question 2.

a. TR=(10-q)q, so MR=10-2q. Max profits if MR=PMC, so 10-2q=2, which implies q=4 and p=6.

b. MR remains MR=10-2q. However, max "profits" now implies MR=PMC+EMC, so 10-2q=2+1, which implies q=3.5 and p=6.5.
This is different from the socially optimal level, which is p=PMC+EMC, so 10-q=3, which implies q=7 and p=3.

c. The Pigouvian tax is equal to the EMC in the social optimum, which is 1 (in fact, note that EMC are constant and always equal to1) . Hence the Pigouvian tax is 1.