Regular Exam — 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. Public goods arise from:
   a) Consumption externalities.
   b) Asymmetric information.
   c) Uncertainty in transactions.
   d) Adverse selection.

2. The efficient quantity of a public good is such that its marginal cost is equal to:
   a) The wealthiest consumer's marginal benefit.
   b) The sum of all consumers' marginal benefits.
   c) The sum of all consumers' average benefits.
   d) The poorest consumer's marginal benefit.

3. Private provision of a public good typically leads to:
   a) An inefficiently high provision.
   b) An efficient provision.
   c) An inefficiently low provision.
   d) Different quantities for different consumers.

4. Which of the following is an example of a public good?
   a) National defence.
   b) Control of air pollution.
   c) Street lighting.
   d) All other alternatives are examples of public goods.

5. If there is a negative externality the marginal social cost:
   a) Is higher than the marginal private cost.
   b) Is equal to the marginal private cost.
   c) Is lower than the marginal private cost.
   d) May be higher or lower than the social marginal cost.

6. Cement production pollutes the air. Compared with the socially optimal output, an unregulated cement producer:
   a) Will produce too much.
   b) Will produce the socially optimal output.
   c) Will produce too little.
   d) Will produce more if it lowers its output.

7. The marginal social cost curve will be above the firm's supply curve (marginal private cost) if:
   a) It produces a public good.
   b) It causes a positive externality.
   c) It causes a negative externality.
   d) There are no transaction costs.

8. If there are negative externalities, Pareto efficiency will be achieved if the market price equals:
   a) The marginal private cost.
   b) The marginal social cost.
   c) The marginal external cost.
   d) Zero.

9. There is a pooling equilibrium if:
   a) Differently abled workers are paid the same wage rate.
   b) Employers are able to tell able from unable workers.
   c) All workers are paid more than they would with perfect information.
   d) Equally abled workers are paid different wage rates.

10. Ana bought collision car insurance, and then started competing in her car in illegal and dangerous car races. This will typically give rise to:
    a) Adverse selection.
    b) Moral hazard.
    c) Signalling.
    d) None of the other alternatives is correct.

11. Which of the following usually leads to adverse selection?
    a) Ana took less care with her health after buying health insurance.
    b) Ana did not tell her health insurer about previous health problems.
    c) Ana is a risk lover and chose not to buy life insurance.
    d) None of the other alternatives is correct.

12. In a certain market, 50% of all goods are of high quality, 50% of low quality. Consumers are willing to pay up to €1 200 for low quality items, €2 400 for high quality; sellers accept from €1 000 for low quality items, €2 000 for high quality. If both consumers and sellers know the quality of the item before transaction then:
    a) All goods will be traded: low quality at prices from €1 000 to €1 200; high-quality from €2 000 to €2 400.
    b) Only low-quality goods will be traded.
    c) All goods will be traded at a price of €1 800.
    d) All goods will be traded at a price of €1 500.

13. Ana, an expected-utility maximiser, is risk neutral. Then her utility function from wealth is:
    a) Convex.
    b) A straight line.
    c) Concave.
    d) The information is insufficient to answer.

14. Ana, an expected-utility maximiser, prefers to gain €5 to toss a coin and get €9 if it comes us heads or nothing if tails. Then Ana is:
    a) Risk averse.
    b) Risk lover.
    c) Risk neutral.
    d) The information is insufficient to answer.

15. Ana, an expected-utility maximiser, gets utility 1 from €30, utility 2 from €55, and utility 4 from €70. Then, between €55 for sure and a lottery in which she earns €30 or €70 with 50% probability each, she will choose:
    a) €55.
    b) The lottery.
    c) She is indifferent between the two.
    d) The information is insufficient to answer.

16. Ana, a risk-averse expected-utility maximiser, runs the risk of losing €10 000. She can insure any amount paying an insurance premium at a fair rate. She will prefer:
    a) To insure an amount below €10 000 (partial insurance).
    b) To buy no insurance.
    c) The information is insufficient to answer.
    d) To insure the €10 000 (full insurance).

Normal-Period Exam — Part B
Maximum duration of the exam: 1 hour and 30 minutes

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)

Part c) is independent of the other parts.

a) (1.5) Ana maximises expected utility, and her utility from wealth is given by $u(w) = \ln w$ where ln is the natural logarithm. Her initial wealth is €100 000, but she faces a 20% chance of losing €60 000. She can buy full insurance paying an insurance premium of €15 000, which makes 25 cents per euro insured. This is the only insurance option available. Will Ana prefer to buy the insurance or not? Explain.

b) (1.5) Now suppose Ana can insure any amount she wants, still paying 25 cents per euro insured. Would she make the same decision as in part a) (full insurance or no insurance)? If not, how much would she insure? Explain.

c) (2) In the second-hand car market, 60% of all cars are plums (good cars), and 40% are lemons. Sellers know the quality of the car, but potential buyers cannot tell a lemon from a plum before the purchase. Potential buyers are willing to pay up to €6 000 for a plum and up to €1 200 for a lemon. Potential sellers are willing to sell a plum from €3 900 and a lemon from €1 000. Fin the equilibrium in this market. Will there be adverse selection? Explain.

QUESTION 2 (5 marks)

In a certain market the inverse demand and supply curves are $p^D = 40 - y$ and $p^S = 10 + 0.5y$. The industry discharged untreated sewage into a nearby lake, which gives rise to a constant external marginal cost of €10 per unit produced

a) (2.5) Find the unregulated equilibrium quantity and the socially optimal quantity. Explain why they are different or why they are the same (whichever turns out to be the case).

b) (1.5) Citizens pressure demand that pollution be reduced. So the government decides to levy a Pigouvian tax on the industry. Find the optimal value of tax. What is the effect of the tax on the equilibrium quantity, consumer price, and tax revenue?

c) (1) Discuss whether the Coase theorem is applicable to the externality described above.

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	c	d	a	a	c	b	a	b	b	a	b	d	b	d

Answers to Part B

Question 1

a) With no insurance Ana gets €100 000 with probability 80% or €40 000 with probability 20%. Hence her expected utility is 0.8ln 100 000 + 0.2ln 40 000 = 11.329; with full insurance she will pay the insurance of €15 000 and get the €60 000 back from the insurer if the loss occurs; so she will get €85 000 whether the loss occurs or not, and her utility will be ln 85 000 = 11.35, which is higher than with no insurance, so she will buy the full insurance.

b) If she insures an amount k she will pay and insurance premium of 0.25k. So if no loss occurs she will get €100 000 – 0.25k; if the loss occurs she will get €100 000 - €60 000 – 0.25k + k = €40 000 + 0.75k. So she maximises
max EU = 0.8ln(100 000 – 0.25k) + 0.2ln(40 000 + 0.75k)
The first order condition is: – 0.2/(100 000 – 0.25k) + 0.15/(40 000 + 0.75k) ⇔ k = 37 333.33.
So she will insure €37 333.33.

c) If both plums and lemons are offered for sale, buyers, as they are risk neutral, will be willing to pay up to the expected value of the car for them, which is 0.6 x €6 000 + 0.4 x €1 200 = €4 080. At this price both plums are lemons are indeed offered for sale as everybody, even owners of plums, are willing to sell at this price. The price will then be somewhere between €3 900 and €4 080. There is no adverse selection. A counter example may be instructive. If buyers were willing to pay only, say, €3 800 for a car of unknown quality, plums would not be offered for sale: that is, buyers, not willing to pay the owners of plums' reservation price, would "select" the bad cars only; this would be adverse selection. But as they are willing to pay enough to bring all cars to the market there is no such adverse selection. (We are ignoring here the possibility that sellers outnumber buyers, in which case things would be more complicated, and it is not clear what the equilibrium would be.)

Question 2

a) The unregulated equilibrium exists when $p^S = p^D$ ⇔ 10 + y = 40 – 0.5y ⇔ y = 20; p = 20. The social optimum is such that the marginal social cost (*MSC*) equals the marginal social benefit (*MSB*). *MSB* just equals p^D (as there is no positive externality), but *MSC* is the marginal private cost (or p^S) plus the marginal external cost. So p^S + 10 = p^D ⇔ 10 + y + 10 = 40 – 0.5y ⇔ y = 13.33. This is less than the unregulated equilibrium quantity, because in an unregulated market, producer increase output up to the point where buyers are willing to pay the private marginal cost (but not the marginal external cost), whereas the socially optimal quantity requires that buyers be willing to pay private marginal cost plus the external marginal cost (this requires a lower quantity, so that either the private marginal cost is lower, buyers' willingness to pay is higher, or, as is the case, both).

b) The Pigouvian tax equals the marginal external cost at the socially optimal quantity, which is €10. This brings the equilibrium quantity down to the socially efficient one (because now buyers pay the full marginal social cost), so 13.33. The consumer price is p^D(13.33) = 26.67, which is also p^S + 10. The tax revenue is €10 x 13.33 = 133.33.

c) The Coase theorem states that if property rights are well defined (in this case this means that it would have to be clear whether the firm has the right to pollute the lake or whether it is the general population that has the right to a clean lake), and the parties involved can negotiate with little cost, then negotiation would achieve a Pareto efficient solution regardless of who has the property rights. This means the firm would have to compensate the population for the pollution if the population had the property rights, or the population would have to pay the firm to pollute less if the firm had the property rights. In this case the property right might well be well defined, but if many people were affected by the pollution, negotiations would be impractical, meaning that the Coase theorem would not be applicable in this case.