Exam: Economics IV (Public Economics/ Economic Policy)

Number: 5026

Examiner: Prof. Dr. Ronnie Schöb
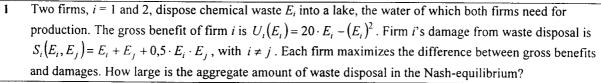
Date: February 21st, 2005

Name, First Name

Student Number

Study Program and Semester

Instructions

- The exam consists of two sections with multiple choice questions (one section for Economic Policy and one section for Public Economics). Both sections contain 15 question, all of which have to be solved. You have 120 minutes time for 30 questions (4 minutes per question).

- There are four possible answers to each question, only one of which is correct. For each correct answer, you are rewarded 3 points, for each false answer we subtract 1 point. No or more than one answer receive zero points.

- Please fill in your answers directly in the problem sheets by circling the (hopefully) correct letter.

- You may use dictionaries and non-programmable calculators without communication or word-processing capacities.

Economic Policy

1	Two firms, $i = 1$ and 2, dispose chemical waste E_i into a lake, the water of which both firms need for production. The gross benefit of firm i is $U_i(E_i) = 20 \cdot E_i - (E_i)^2$. Firm i's damage from waste disposal is $S_i(E_i, E_j) = E_i + E_j + 0{,}5 \cdot E_i \cdot E_j$, with $i \neq j$. Each firm maximizes the difference between gross benefits and damages. How large is the aggregate amount of waste disposal in the Nash-equilibrium?

A 4,2
B 10,6
C 7,6
D None of the above.

2	How large is the (rounded) welfare loss in case of individually rational behaviour in Question (1)?

A 7.68
B 20.40
C 12.44
D None of the above.

3	In Question (1), how large is the quantity tax t that induces the collectively rational solution?

A 2
B 4
C 6
D None of the above.

4	In Question (1), assume a situation without transaction costs and with complete information about individual net benefits and damages. Firm 1 owns the exclusive right to dispose waste, i.e. firm 2 must not dispose. Now, firm 2 proposes a waste allocation to firm 1 that maximizes the aggregate gain of both firms. What is the minimum compensation firm 1 will demand in order to accept the proposal?

A 36.25
B 50.75
C 30.50
D 28.25

5	Which of the following statements concerning the Coase-theorem is *false*?

A The absence of transactions costs and a complete system of property rights are necessary conditions for the theorem's validity.

B Given the assumptions of the theorem, the benefit distribution after negotiations is independent of the way that property rights are initially distributed.

C Given the assumptions of the theorem, after negotiations the property right to a good will be owned by the actor with the highest valuation for the good.

D Given the assumptions of the theorem, negotiations will result in an efficient allocation independently of the initial distribution of property rights.

6	The inhabitants of a village extract water from wells. The extracted amount of water per month, W (in m^3), depend on the number of wells B: $W(B) = 20 \cdot B - 0.5 \cdot B^2$. The price per m^3 water is 1 EUR, the operation of a well costs 10 EUR per month. How large is the socially optimal number of wells with which to extract water from the ground?

A 15
B 20
C 5
D 10

7	Suppose that there are no restriction to the operations of wells in Question (6), i.e. who wants to drill a well may do so. Assume that each inhabitant has the same technology. How many wells will be operated?

A   15
B   20
C   10
D   None of the above.

8	How large is the welfare loss between individually and collectively rational behaviour in Question (6)?

A   25
B   40
C   50
D   100

9	Which of the following statements concerning Popper's idea how to solve the induction problem is correct?

A   It is justified to conclude from a singular observation that a general law is true. On the other hand, one cannot conclude from a contradicting observation that a general law is false.

B   Abandoning the principle of empirism, according to which in science only observation and experiment can decide about the acceptance or rejection of laws and theories, solves the induction problem.

C   The basis of Popper's understanding of science, which is founded on continuous falsification trials, is the conjectural character of human discoveries, i.e. the idea that scientific discoveries are purely hypothetical and cannot claim general validity.

D   The existence of sufficiently many observations allows deriving a true theory and solves the induction problem.

10	Which of the following statements concerning Kuhn's concept of a scientific revolution is *false*?

A   The existence of a new paradigm is a sufficient condition for a scientific revolution.

B   Paradigms are incommensurable.

C   The term "anomaly" describes an observation that contradicts a central result of the paradigmatic theory and that resists all attempts of explaining it within the theory.

D   The term "normal science" describes research that is founded on one or more scientific achievements of the past and that is accepted for some time by a scientific community as the basis for its future work.

11	Which of the following statements about the Samuelson-condition is *false*?

A   The sum of the marginal willingness' to pay for the public good of all actors has to be equal in optimum to the marginal costs of producing it.

B   In optimum, the marginal rate of substitution of all actors have to be equal to the marginal rate of transformation.

C   Extending the production of a public good is welfare-enhancing if the aggregate utility that is created by the additional consumption exceeds the additional costs.

D   The sum of the marginal rates of substitution of all actors has to be equal in optimum to the marginal rate of transformation.

12	There are two firms, firm 1 and firm 2, which produce amounts x_1 and x_2. The inverse demand function in the market is given by $p(X) = 100 - 2 \cdot X$, where $X = x_1 + x_2$. Firm 1's cost function is $K(x_1) = 2 \cdot x_1$, firm 2's costs function is $K(x_2) = 12 \cdot x_2$. Both firms constitute a Cournot-duopoly. How large is the aggregate supply, X^*, in the Cournot-Nash-equilibrium?

A   31
B   29
C   20
D   15

13	Suppose, in a Stackelberg situation firm 1 is the leader and firm 2 is the follower. In a sequential game, the leader first sets its quantity x_1, then the follower sets its quantity x_2. In Question (12), the leader supplies a quantity

A 29

B 27

C 25

D None of the above.

14	Strict convexity of preferences imply that

A the average of two consumption bundles is valued higher than the consumption bundles themselves.

B indifference curves cannot intersect.

C indifference curves must be negatively sloped.

D each consumption bundle is at least as highly valued as itself.

15	A monopolist faces a demand function $x(p) = 100 - 0{,}5 \cdot p$. Its cost function is $K(x) = 40 \cdot x$. How large is the absolute value of the price elasticity of demand at the profit maximum?

A 1

B 3/2

C 2

D None of the above.

Public Economics

16	50 jury members have to choose between three candidates Marika, Justine and Stephanie for the Miss Saxony-Anhalt contest. The following tables show the jury's preferences:

Rank \ number of members	6	13	9	7	10	5
1.	Marika	Marika	Justine	Justine	Stephanie	Stephanie
2.	Justine	Stephanie	Marika	Stephanie	Justine	Marika
3.	Stephanie	Justine	Stephanie	Marika	Marika	Justine

The following rules apply: That candidate wins who gains the absolute majority of votes. If no candities gains an absolute majority, there will be a run-off between the two most successful candidates. Who will win the contest with this rule?

A Marika

B Justine

C Stephanie

D There is a tie between Stephanie and Justine.

17	Who will win the contest in Question (16) if there is pairwise voting between the candidates (with a control count)?

A Marika

B Justine

C Stephanie

D No candidate because there are cyclical majorities.

18	Suppose, the 5 members of the jury that place Stephanie above Marika and Marika above Justine, state false preferences concerning Marika and Justine. The put Marika on 3rd and Justine on 2nd place. Which statements concerning the contest result is correct if a Borda count is applied?

A The manipulation changes the outcome. Stephanie wins instead of Marika.

B The outcome does not change. Marika wins in both cases.

C The manipulation changes the outcome. Justine wins instead of Marika.

D The outcome cannot change because the Borda-count is independent of irrelevant alternatives.

19 The market for good x is characterized by the inverse demand function $p(x) = 20 - \frac{1}{3} \cdot x$. The supply function is $S(p) = 9 \cdot p$. The government introduces a per unit tax of 4 EUR. How large is the tax revenue?

A 164

B 144

C 188

D None of the above.

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20 How large is the excess burden in Question (19)?

A 22

B 18

C 10

D None of the above.

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21 In Question (19), which statement about the tax incidence is correct?

A The market side that has to pay the tax to the fiscal authorities bears the full tax.

B The supply side bears more of the burden than the demand side.

C The demand side bears more of the burden than the supply side.

D Each market side bears half the tax.

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22 How large is a gross value tax rate τ in Question (19) that raises the same tax revenue?

A 0.5

B 0.25

C 0.75

D None of the above.

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23 B is the tax base and $T(B)$ the tax schedule that assigns a tax liability to each tax base. The difference between B and $T(B)$ is the residual $X(B)$. Which statement concerning the schedule $T(B) = a \cdot B - c$ is correct if $0 < a < 1$ and $c > 0$ are constant?

A The marginal tax rate is less than the average tax rate for all B.

B The tax is directly progressive.

C The residual elasticity $\rho(B)$ is negative for all B.

D The revenue elasticity $\alpha(B)$ is larger than 1 for all $B > \frac{c}{a}$.

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24 With the same notation as in (23), which statement concerning the schedule $T(B) = a \cdot B^c$ is correct if $0 < a < 1$ and $c > 1$ are constant?

A The marginal tax rate is constant for all B.

B The revenue elasticity $\alpha(B)$ is constant for all B.

C The residual elasticity $\rho(B)$ is constant for all B.

D The average tax rate is larger than the marginal tax rate for all B.

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25 In a two-good-world, a household has the utility function $U(x, y) = \sqrt{x} + \sqrt{y}$ and exogenous income $M = 54$. The prices of both goods are $p_x = 2$ and $p_y = 1$. The government introduces a quantity tax of $t_x = 1$ on good x. How large is the (rounded) welfare loss of the household after the tax has been introduced as compared with the initial situation?

A 0.51

B 12.43

C 1.78

D None of the above.

26	Which utility level can be achieved in Question (25) if the same tax revenues is raised by a lump-sum tax?
A	8.01
B	8.62
C	10.07
D	None of the above.

27	How large is the (rounded) equivalent variation in Question (25)?
A	6
B	8
C	4
D	None of the above.

28	How large is the (rounded) excess burden of taxation in Question (25) measured by the equivalent variation?
A	1.5
B	2.7
C	3.9
D	None of the above.

29	Suppose, the price elasticity of demand of good A is larger than that of good B. Which of the following statements is correct?
A	If good A is consumed complementary to labour, the Corlett-Hague-rule requires that this good is taxed higher than good B.
B	The taxation of good A does not create an excess burden if the supply has an elasticity of zero.
C	To achieve first-best taxation, the tax raes for both goods should be indirectly proportional to their own price elasticity.
D	A one percent price increase of good B causes a larger demand reduction of good A.

30	Which of the following statements is correct?
A	A marriage splitting method favours married couples to unmarried ones with the same total income, if the tax schedule is concave and the partners have sufficiently unequal incomes.
B	The equivalent variation gives the maximum income a household is willing to give up, if the government abstains from introducing a tax.
C	Taxes on interest income do not distort intertemporal consumption decisions.
D	A poll tax is consistent with the criterion of vertical equity of taxation.