WS 2021/2022 Exercise Exam

Principles of Economics (Technische Universität München)

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Exercise Exam: Principles of Economics – Winter Term 2021-2022

Answer Sheet

Family Name: ____________________

Given Name: ____________________

Signature: ____________________

Student No.: 0 __ __ __ __ __ __ __

0	0	0	0	0	0	0	0
1	1	1	1	1	1	1	1
2	2	2	2	2	2	2	2
3	3	3	3	3	3	3	3
4	4	4	4	4	4	4	4
5	5	5	5	5	5	5	5
6	6	6	6	6	6	6	6
7	7	7	7	7	7	7	7
8	8	8	8	8	8	8	8
9	9	9	9	9	9	9	9

Example:

Marking: A B C D

Improper: A B C D

Correction: A B C D

Please mark your answers with a black pen!

Block 1

1: A B C D
2: A B C D
3: A B C D
4: A B C D
5: A B C D

Block 2

6: A B C D
7: A B C D
8: A B C D
9: A B C D
10: A B C D

Block 3

11: A B C D
12: A B C D
13: A B C D
14: A B C D
15: A B C D

Block 4

16: A B C D
17: A B C D
18: A B C D
19: A B C D
20: A B C D

Block 5

21: A B C D
22: A B C D
23: A B C D
24: A B C D
25: A B C D

Block 6

26: A B C D
27: A B C D
28: A B C D
29: A B C D
30: A B C D

Block 7

31: A B C D
32: A B C D
33: A B C D
34: A B C D
35: A B C D

Block 8

36: A B C D
37: A B C D
38: A B C D
39: A B C D
40: A B C D

Exercise Exam: Principles of Economics

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Instructions:

1. Including the answer sheet, the exam consists of 18 pages. Please check whether your copy is complete.
2. The exam consists of 40 multiple choice problems (MCP).
   - Each MCP has 4 possible answers **(A)** – **(D)**, of which exactly one is true.
   - For each MCP, please indicate the answer you deem correct by filling out the corresponding letter circle on the answer sheet.
   - If you select the correct answer, you receive 3 points for the MCP.
   - If you select a wrong answer or no answer at all, you receive 0 points for the MCP.
   - If you select several answers or if your selection is unclear, you receive 0 points for the MCP.
3. Only the answer sheet is used to determine your grade.
4. Unless otherwise specified, the labeling of variables and parameters is identical to the notation used in the lectures and exercise classes.
5. Do not separate the answer sheet from the other pages.
6. You may use the back of the pages for sketches, calculations, etc..
7. Permitted materials: non-programmable scientific calculator, dictionary

Block 1: Specialization and Trade

Problems 1-5 refer to the following scenario:

Consider two economies, the EU and the USA. Both economies can produce only two goods: cars and computers. The following table shows for each economy the maximum possible production of either good, i.e. the output of cars that would result if zero computers where produced and vice versa.

Maximum Production (in millions)

	Cars	Computers
EU	10	50
USA	10	150

The opportunity costs of production are constant.

Problem 1

(A) The EU has a comparative advantage in the production of cars and computers.

(B) The USA has a comparative advantage in the production of cars and computers.

(C) The EU has a comparative advantage in the production of cars, while the USA has a comparative advantage in the production of computers.

(D) The USA has a comparative advantage in the production of cars, while the EU has a comparative advantage in the production of computers.

Problem 2

Which combination of cars and computers is *not* located on the joint transformation curve of the EU and the USA?

(A) 20 million cars and 0 computers

(B) 15 million cars and 125 million computers

(C) 10 million cars and 150 million computers

(D) 0 cars and 200 million computers

Problem 3

The EU and the USA can realize mutual gains from trade if they agree on terms of trade

(A) between $\frac{1}{15}$ and $\frac{1}{5}$ computers per car.

(B) between $\frac{1}{4}$ and $\frac{3}{4}$ computers per car.

(C) between $\frac{1}{15}$ and $\frac{1}{5}$ cars per computer.

(D) between $\frac{1}{4}$ and $\frac{3}{4}$ cars per computer.

For Problems **4-5**, assume the two economies agree to trade 1 car for 7.5 computers.

Problem 4

The maximum consumption

(A) of cars in the EU is 20 million.

(B) of computers in the EU is 125 million.

(C) of cars in the USA is 15 million.

(D) of computers in the USA is 200 million.

Problem 5

If each economy consumes 6 million cars, the maximum consumption of computers

(A) is 30 million in the EU and 90 million in the USA.

(B) is 60 million in the EU and 90 million in the USA.

(C) is 30 million in the EU and 120 million in the USA.

(D) is 60 million in the EU and 120 million in the USA.

Block 2: Consumption and Demand

Problems 6-10 refer to the following scenario:

Consider an individual who allocates her time budget of $Z > 0$ hours to labor L and free time F. Per hour of labor, the individual earns the wage rate $w > 0$. She spends her entire earned income wL on a particular consumption good, the quantity of which is denoted by q, and the price of which is given by $p > 0$. The individual maximizes the utility function

$$U(q, F) = q^{\frac{1}{2}} + F^{\frac{1}{2}}.$$

Problem 6

The individual's optimal consumption of free time is

(A) $F = \frac{pZ}{p+w}$.

(B) $F = \frac{p^2 Z}{p+w}$.

(C) $F = \frac{pZ}{p^2+w}$.

(D) $F = \frac{p^2 Z}{p^2+w}$.

Problem 7

Free time is

(A) a normal good and a complement to the consumption good.

(B) an ordinary good and a substitute to the consumption good.

(C) an inferior good and a complement to the consumption good.

(D) a Giffen good, and a substitute to the consumption good.

For Problems **8-10**, assume $Z = 24$ and $p = 1$, and consider a wage cut from $w = 5$ to $w = 0.5$.

Note: The hypothetical consumption bundle is the combination of q and F which yields the same utility *after* the wage cut as the optimal consumption bundle *before* the wage cut at minimum spending.

Problem 8

The hypothetical consumption bundle is

(A) $q = 100$ and $F = 25$.

(B) $q = 36$ and $F = 81$.

(C) $q = 16$ and $F = 64$.

(D) $q = 25$ and $F = 49$.

Problem 9

To afford the hypothetical consumption bundle, the individual would need a hypothetical time budget of

(A) $Z = 96$.

(B) $Z = 99$.

(C) $Z = 153$.

(D) $Z = 225$.

Problem 10

Regarding the consumption good, substitution effect and income effect of the wage cut work

(A) in the same direction.

(B) in opposite directions, where the substitution effect prevails.

(C) in opposite directions, where both effects neutralize.

(D) in opposite directions, where the income effect prevails.

Block 3: Production and Supply

Problems 11-15 refer to the following scenario:

Consider a profit-maximizing and price-taking firm with a production function

$$q = F(L, K) = (L \cdot K)^{\frac{1}{4}},$$

where $q \geq 0$ denotes output, and $L \geq 0$ and $K \geq 0$ denote the input of labor and capital, respectively. The wage rate for labor is given by $w = 5$, the rental rate for capital is given by $r = 5$, and quasi-fixed costs are given by $c^f = 1{,}000$. Let $p \geq 0$ denote the market price per unit of output.

Problem 11

The production function exhibits

(A) constant returns to scale and constant marginal products in both inputs.

(B) constant returns to scale and decreasing marginal products in both inputs.

(C) decreasing returns to scale and constant marginal products in both inputs.

(D) decreasing returns to scale and decreasing marginal products in both inputs.

Problem 12

The isoquants of the production function are

(A) strictly convex.

(B) strictly concave.

(C) linear.

(D) orthogonal.

Problem 13

The marginal costs of production are

(A) $MC(q) = 10q^{\frac{1}{2}}$.

(B) $MC(q) = 20q$.

(C) $MC(q) = 10q^2$.

(D) $MC(q) = 20$.

Problem 14

If $p = 100$, the firm's short-run supply is

(A) $q = 0$.

(B) $q = 5$.

(C) $q = 20$.

(D) $q = 100$.

Problem 15

Which is the threshold price, above which the firm's long-run supply is $q > 0$?

(A) $p = 0$

(B) $p = 100$

(C) $p = 200$

(D) $p = 300$

Block 4: Perfect Competition

Problems 16-20 refer to the following scenario:

Consider a perfectly competitive market in the long run. Market demand is

$$Q^D(p) = a - p,$$

where $p \geq 0$ denotes the market price, and $a \in \mathbb{N}$. The market is served by $n \in \mathbb{N}$ identical profit-maximizing firms. Each firm has total costs of

$$C(q) = \begin{cases} 1 + bq + q^2, & q > 0 \\ 0, & q = 0, \end{cases}$$

where $q \geq 0$ denotes output of the respective firm, and $b \in \mathbb{N}$.

Problem 16

The equilibrium number of firms is

(A) $n^* = \max\{a - b - 2, 0\}$.

(B) $n^* = \max\{a - b + 2, 0\}$.

(C) $n^* = \max\{a + b - 2, 0\}$.

(D) $n^* = \max\{a + b + 2, 0\}$.

Problem 17

In equilibrium, producer surplus is

(A) $\text{PS} = \max\{a - b - 2, 0\}$.

(B) $\text{PS} = \max\{a - b + 2, 0\}$.

(C) $\text{PS} = \max\{a + b - 2, 0\}$.

(D) $\text{PS} = \max\{a + b + 2, 0\}$.

For Problems **18-20**, assume $a = 15$ and $b = 3$.

Problem 18

In equilibrium, market price is

(A) $p^* = 17$.

(B) $p^* = 12$.

(C) $p^* = 8$.

(D) $p^* = 5$.

Problem 19

In equilibrium, total surplus is

(A) $\text{TS} = 30$.

(B) $\text{TS} = 45$.

(C) $\text{TS} = 60$.

(D) $\text{TS} = 75$.

Problem 20

If a tax at the rate $t = 0.5$ on profits is levied on firms, the equilibrium number of firms is

(A) $n^* = 0$.

(B) $n^* = 5$.

(C) $n^* = 10$.

(D) $n^* = 15$.

Block 5: Market Failure

Problems 21-23 refer to the following scenario:

Consider a monopoly market in the long run. The profit-maximizing monopolist faces market demand

$$Q^D(p) = a - p,$$

where $p \geq 0$ denotes the market price, and $a \in \mathbb{N}$. The monopolist's total costs are

$$C(Q) = \begin{cases} 1 + bQ + Q^2, & Q > 0 \\ 0, & Q = 0, \end{cases}$$

where $Q \geq 0$ denotes output, and $b \in \mathbb{N}$.

Problem 21

In equilibrium, the monopoly output is

(A) $Q^M = \max\{\frac{1}{2}(a-b), 0\}$.

(B) $Q^M = \max\{\frac{1}{2}(a+b), 0\}$.

(C) $Q^M = \max\{\frac{1}{4}(a-b), 0\}$.

(D) $Q^M = \max\{\frac{1}{4}(a+b), 0\}$.

For Problems **22-23**, assume $a = 15$ and $b = 3$.

Problem 22

In equilibrium, the monopoly price is

(A) $p^M = 17$.

(B) $p^M = 12$.

(C) $p^M = 8$.

(D) $p^M = 5$.

Problem 23

If a tax at the rate $t = 4$ per unit of output is levied on the monopolist, the monopoly profit in equilibrium is

(A) $\pi^M = 5$.

(B) $\pi^M = 7$.

(C) $\pi^M = 15$.

(D) $\pi^M = 17$.

Problems 24-25 refer to the following scenario:

Consider a public good available to $m \in \mathbb{N}$ identical individuals. The individuals can provide the public good at total costs

$$C(Q) = Q,$$

where $Q \geq 0$ denotes the quantity. Each individual's marginal benefit from the public good is

$$\mathrm{MB}(Q) = a - Q,$$

where $a \geq 1$.

Problem 24

The efficient provision Q_E of the public good

(A) increases in a, and increases in m.

(B) increases in a, and decreases in m.

(C) decreases in a, and increases in m.

(D) decreases in a, and decreases in m.

Problem 25

If $m = 2$ and $a = 1$, the efficient provision of the public good is

(A) $Q_E = 0$.

(B) $Q_E = \frac{1}{2}$.

(C) $Q_E = 1$.

(D) $Q_E = 2$.

Block 6: Macroeconomic Indicators

Problems 26-28 refer to the following scenario:

Consider a closed economy which produces only three goods: sausages, mustard, and pretzels. In each period, the entire output is consumed.

Base Period: 2017

	Output of sausages (in kg)	Price of sausages (per kg)	Output of mustard (in kg)	Price of mustard (per kg)	Output of pretzels (in kg)	Price of pretzels (per kg)
2017	1,000	30	500	10	1,000	5
2018	1,500	10	750	8	1,500	6
2019	500	60	1,500	4	2,000	6

Problem 26

Compared to 2017,

(A) both nominal and real GDP are greater in 2018.

(B) nominal GDP is smaller, while real GDP is greater in 2018.

(C) nominal GDP is greater, while real GDP is smaller in 2019.

(D) both nominal and real GDP are smaller in 2019.

Problem 27

(A) In 2018, the GDP-Deflator is 0.7.

(B) In 2018, the CPI is 1.2.

(C) In 2019, the GDP-Deflator is 1.4.

(D) In 2019, the CPI is 1.7.

Problem 28

The inflation rate

(A) between 2017 and 2018 based on the GDP-Deflator is 0.7.

(B) between 2017 and 2018 based on the CPI is 1.2.

(C) between 2018 and 2019 based on the GDP-Deflator is 1.4.

(D) between 2018 and 2019 based on the CPI is 1.7.

Problems 29-30 refer to the following scenario:

Consider an economy with an adult population of $N = 100$ million people.

Problem 29

If the labor force participation rate is $e = 0.6$, and $U = 6$ million people are unemployed, then the unemployment rate is

(A) $u = 0.05$.

(B) $u = 0.1$.

(C) $u = 0.15$.

(D) $u = 0.2$.

Problem 30

If the unemployment rate is $u = 0.05$, and $E = 76$ million people are employed, then the labor force participation rate is

(A) $e = 0.6$.

(B) $e = 0.7$.

(C) $e = 0.8$.

(D) $e = 0.9$.

Block 7: Economic Growth

Problems 31-35 refer to the following scenario:

Consider a closed economy in the long run. Output Y is determined by the production possibilities according to

$$Y = F(L, K) = L^{\frac{2}{3}} K^{\frac{1}{3}},$$

where L denotes the labor force, and K denotes the capital stock. Output is used for consumption C and investment I. Investment equals savings sY, where $s \in [0, 1]$ denotes the saving rate. In any period t, the labor force grows at the rate $n = \frac{1}{6}$, while the capital stock depreciates at the rate $\delta = \frac{1}{6}$. Let lower-case letters denote quantities per worker.

Problem 31

The steady-state

(A) capital per worker is $k^* = (3s)^{\frac{1}{2}}$.

(B) output per worker is $y^* = (3s)^{\frac{1}{2}}$.

(C) consumption per worker is $c^* = (3s)^{\frac{3}{2}}$.

(D) investment per worker is $i^* = (3s)^{\frac{3}{2}}$.

Problem 32

If the saving rate is $s = \frac{1}{3}$, then the steady-state

(A) capital per worker is $k^* = 2$.

(B) output per worker is $y^* = 2$.

(C) consumption per worker is $c^* = \frac{2}{3}$.

(D) savings per worker is $sy^* = \frac{2}{3}$.

Problem 33

In the golden-rule steady state,

(A) capital per worker is $k^*_{gold} = 2$.

(B) output per worker is $y^*_{gold} = 2$.

(C) consumption per worker is $c^*_{gold} = \frac{1}{3}$.

(D) savings per worker is $sy^*_{gold} = \frac{1}{3}$.

Problem 34

(A) The steady state where $k^* = \frac{1}{2}$ is dynamically inefficient.

(B) The steady state where $k^* = \frac{3}{2}$ is dynamically efficient.

(C) If $s = \frac{1}{2}$, the resulting steady state is dynamically inefficient.

(D) If $s = \frac{2}{3}$, the resulting steady state is dynamically efficient.

Problem 35

In any steady state,

(A) the capital stock K grows at the rate 0.

(B) output Y grows at the rate $\frac{1}{6}$.

(C) investment per worker i grows at the rate $\frac{1}{3}$.

(D) consumption per worker c grows at the rate $\frac{2}{3}$.

Block 8: Economic Fluctuations

Problems 36-40 refer to the following scenario:

Consider a closed economy in the short run, where Y denotes output, and r denotes the interest rate. In the goods market, demand Z comprises private consumption $C(Y-T) = 1{,}000 + 0.75(Y-T)$ with taxes $T \geq 0$, planned investment $I(r) = 2{,}000 - 100r$, and government consumption $G \geq 0$. Total savings S comprise private savings S_{Pr} and government savings S_G. In the financial market, liquidity demand is $L(Y, r) = Y - 200r$, while money supply is $M \geq 0$.

Problem 36

In the goods market, the government consumption multiplier is

(A) $\frac{\partial Y}{\partial G} = 2$.

(B) $\frac{\partial Y}{\partial G} = 4$.

(C) $\frac{\partial Y}{\partial G} = 6$.

(D) $\frac{\partial Y}{\partial G} = 8$.

Problem 37

The effect of a marginal change in taxes on the general-equilibrium interest rate is

(A) $\frac{\partial r^*}{\partial T} = -\frac{1}{100}$.

(B) $\frac{\partial r^*}{\partial T} = -\frac{1}{200}$.

(C) $\frac{\partial r^*}{\partial T} = \frac{1}{200}$.

(D) $\frac{\partial r^*}{\partial T} = \frac{1}{100}$.

For Problems **38-39**, assume that government consumption is $G = 1{,}500$ and taxes are $T = 2{,}000$.

Problem 38

If money supply is $M = 3{,}000$, the general-equilibrium interest rate is

(A) $r^* = 5$.

(B) $r^* = 10$.

(C) $r^* = 15$.

(D) $r^* = 20$.

Problem 39

The general-equilibrium output is $Y^* = 10{,}000$ if money supply is

(A) $M = 3{,}000$.

(B) $M = 5{,}000$.

(C) $M = 7{,}000$.

(D) $M = 9{,}000$.

Problem 40

Ceteris paribus,

(A) an increase in government consumption G decreases general-equilibrium total savings S^*.

(B) an increase in money supply M decreases general-equilibrium investment I^*.

(C) a decrease in government consumption G increases general-equilibrium private savings S^*_{Pr}.

(D) a decrease in money supply M increases general-equilibrium consumption C^*.