

Please select one correct answer to each question.

1. The production possibilities frontier of a certain economy is given by the formula  $x^2 + 4y^2 = 200$ , where  $x$  and  $y$  are the produced goods. The utility function in this economy is  $U(x,y) = (xy)^{1/2}$ . The utility level in a competitive general equilibrium is:

- a)  $20^{1/2}$
- b) 20
- c)  $50^{1/2}$
- d) 80

2. Let the elasticity of substitution between factors equal  $\sigma$  for the production function  $y = f(x_1, x_2)$ . What is the elasticity of the ratio of expenses on  $x_2$  to expenses on  $x_1$  (i.e. elasticity of  $w_2x_2/w_1x_1$ ) with respect to the relation between  $x_1$  and  $x_2$  (i.e.  $x_1/x_2$ )?

- a)  $\sigma$
- b)  $1/\sigma - 1$
- c)  $1 - \sigma$
- d) none of the above

3. The demand for a certain good in a perfectly competitive market is given by the formula:  $p = 120 - Y$ , while the supply is  $p = 3Y$ . In consequence of imposing, by the government, a quantitative restriction amounting to  $Y_{max} = 20$  on producers in this market:

- a) the equilibrium quantity will be set at the level  $Y = 20$  and the equilibrium price will be  $P=100$
- b) the equilibrium quantity will be set at the level  $Y = 20$ , while  $P_d = 100$  and  $P_s = 60$
- c) there will be undersupply of the good amounting to 20
- d) there will be oversupply of the good amounting to 20

4. A perfectly competitive enterprise operates on the basis of technology  $Y = KL^{1/3}$ . The unit price of capital amounts to 4 *zloty*, while the unit price of labor is 2 *zloty*. How many units of labor should this enterprise employ in order to minimize the total costs of producing 50 units of output?

- a)  $L = (100/3)^{3/4}$
- b)  $L = 3$
- c)  $L = 8/13$
- d) none of the above

5. A monopsonist that produces its output using factor  $x$ :

- a) sets the amount of  $x$  purchased at the level  $pMP_x = w_x$ , where  $p$  is the price of output and  $w_x$  is the price of  $x$
- b) sets the amount of  $x$  purchased at the level  $MRP_x = w_x$ , where  $MRP_x$  is the marginal revenue product of  $x$
- c) pays per unit of  $x$  the price which depends on the quantity of  $x$  that it purchases
- d) none of the above

6. The inverse aggregate demand function for a good is  $p = 500 - Y$ , while the inverse aggregate supply function is  $p = 50 + Y$ . If the government grants a subsidy amounting to 20 *zloty* per each unit of the good, the resulting (social) deadweight loss (the difference between government expenditure and the change in consumer and producer surplus) will be:

- a) 50
- b) 75
- c) 100

d) 130

7. Which of the following production functions exhibit constant returns to scale?

(1)  $y = 3x_1 + 7x_2$

(2)  $y = x_1^{1/4} + x_2^{1/3}$

(3)  $y = \min\{x_1, x_2\} + \min\{x_3, x_4\}$

(4)  $y = x_1^{1/5} x_2^{4/5}$

a) 1 and 2

b) 1, 2 and 4

c) 1, 3 and 4

d) 1 and 4

8. What is the essence of a natural monopoly?

a) a high output level, guaranteeing the minimum average cost, in comparison with the aggregate market demand level

b) that the average cost is always constant

c) a low output level, guaranteeing the minimum average cost, in comparison with the aggregate market demand level

d) that the marginal cost is always constant

9. A monopolist applies third-degree price discrimination in two sub-markets. The price elasticity of demand in the first sub-market amounts to  $\varepsilon_1 = -2$ , while in the second sub-market it is  $\varepsilon_2 = -3$ . The ratio of the sale price in the first sub-market to the sale price in the second sub-market, i.e.  $p_1/p_2$ , amounts to:

a) 1/3

b) 2/3

c) 3/4

d) 4/3

10. If in the game given below

a,b	c,d
e,f	g,h

the following relationships exist in the so-called pure strategies:  $a \geq e$  and  $b \geq d$ , what can we say about the pair of strategies guaranteeing payoffs (a,b)?

a) it is the pair of strategies constituting the Nash Equilibrium

b) it is the pair of strategies constituting the Nash Equilibrium but only for  $a > 1$  and  $b > 1$

c) it is not a pair of strategies constituting the Nash Equilibrium

d) we cannot say anything

11. The Coase theorem suggests a certain manner of correcting erroneous market allocations caused by externalities. The practical application of this approach is often hindered by:

a) the difficulty to impartially estimate the size of the externality by the government

b) unjustly burdening the entity that causes the externality with a payment to the benefit of the other party

c) the absence of insurance against risk when concluding a transaction between the perpetrator and the injured party

d) none of the above

12. Two duopolists are playing three quantity games. Each of them has zero production costs. The table below presents the solutions of these games, where  $p$  is the sale price,  $y_1$  and  $\Pi_1$  are the output and profit level of the first firm, while  $y_2$  and  $\Pi_2$  are the output and profit level for the second firm.

	$p$	$y_1$	$\Pi_1$	$y_2$	$\Pi_2$
Game 1	30	30	900	60	1800
Game 2	60	30	1800	30	1800
Game 3	40	40	1600	40	1600

Game 2 represents a cartel.

What kind of games are game 1 and game 3?

- a) game 1 is a Stackelberg game, game 3 is a Cournot game and the first firm is a quantity leader in the Stackelberg game
- b) game 1 is a Stackelberg game, game 3 is a Cournot game and the second firm is a quantity leader in the Stackelberg game
- c) game 1 is a Cournot game, game 3 is a Stackelberg game and the first firm is a quantity leader in the Stackelberg game
- d) game 1 is a Cournot game, game 3 is a Stackelberg game and the second firm is a quantity leader in the Stackelberg game

13. For which market structure profits of all firms are in the long-run equilibrium always equal zero?

- a) in Cournot oligopoly
- b) in price leadership oligopoly
- c) in Stackelberg oligopoly
- d) in monopolistic competition

14. A perfectly competitive firm has the production function  $Y = 2(K)^{1/2}$ , where  $K$  stands for capital. Its output has hitherto been sold at the price of 8 *zloty* per unit and the price of a unit of capital amounted to 4 *zloty*. As a result of a change in the sale price of output, the discussed firm began to purchase  $9/4$  units of capital. By how much did the sale price of output have to decrease?

- a)  $\Delta p = -5$
- b)  $\Delta p = -3$
- c)  $\Delta p = -2$
- d) none of the above

15. Due to adverse selection in the market for health insurance a 32-year-old woman who neither drinks nor smokes and has a normal body weight:

- a) will pay less for health insurance than persons living in less healthy conditions
- b) is likely not to buy health insurance since it is calculated on the basis of expected medical expenses of persons with a higher risk of encountering health problems than the discussed woman
- c) will start to lead an unhealthy life (smoking, drinking, gaining weight) following the purchase of insurance
- d) none of the above

16. In a pure exchange economy consumers A and B trade with goods  $x$  and  $y$ . Consumer A's utility function takes the form  $U_A(x_A, y_A) = x_A^2 y_A^{1/3}$ , while for consumer B it is  $U_B(x_B, y_B) =$

$x_B^{2/3} y_B^4$ . Consumer A has an initial endowment consisting of 1 unit of good x and 3 units of good y, while consumer B has an initial endowment of 4 units of good x and 3 units of good y. None of them can influence the prices of x and y. The price ratio  $p_x/p_y$  in a competitive equilibrium amounts to:

- a) 3/5
- b) 14/17
- c) 21/25
- d) none of the above

17. A monopolist has the total cost function  $TC(Y) = Y$ . The inverse market demand function is  $p = 2 - 0,5Y$ . If in consequence of imposing a unit tax by the government the equilibrium sale price increased to the level of  $p = 1.75$ , the tax amounted to:

- a)  $t = 0.3$
- b)  $t = 0.5$
- c)  $t = 0.75$
- d)  $t = 1$

18. Consider the following optimization problem concerning the producer: minimizing the total production cost with the constraint of constant output. If we solve the aforementioned problem using Lagrange's method, what is the economic interpretation of the Lagrange multiplier  $\lambda$ ?

- a) it is the average cost
- b) it is the inverse of the average cost
- c) it is the marginal cost
- d) it is the inverse of the marginal cost

19. The first consumer's demand function for a public good is  $q = 2 - p$ , while for the second consumer it is  $q = 4 - p$ . The marginal cost of providing this good is constant and amounts to  $MC = 4$ . The socially efficient provision of this good is:

- a)  $Q = 4$
- b)  $Q = 3$
- c)  $Q = 2$
- d)  $Q = 1$

20. The Groves-Clarke tax helps to determine the socially optimal supply of a public good. Thanks to what is this goal achieved?

- a) thanks to burdening everybody, who does not declare their demand for a good honestly, with the tax
- b) thanks to providing incentives for a potential user of a public good to honestly declare his/her demand for that good
- c) thanks to agreeing on the distribution of the surplus of the Groves-Clarke tax revenues following the finalization of the public good supply
- d) thanks to eliminating the monopoly on the supply side

21. An enterprise has the total cost function  $TC(y) = y^2 - 50y + 1000$ . It sells its output in a perfectly competitive market for 30 *zloty* per unit. However, it generates a negative externality and the costs thereof are  $EC(y) = 0,25y^2 + 10$ . The Pigouvian tax rate imposed on this enterprise in order to guarantee the socially efficient output level should in this situation amount to:

- a) 10
- b) 12
- c) 16

d) none of the above

22. For the following game find the probabilities which guarantee the Nash Equilibrium in the so-called mixed strategies. Before calculating the aforementioned probabilities please check whether it is possible to eliminate strictly dominated strategies.

5,5	6,4	7,0
6,4	5,5	6,1
2,4	1,3	2,1

- a) for each player the probabilities are  $(1/2, 1/2, 0)$
- b) for each player the probabilities are  $(1/4, 1/4, 1/2)$
- c) for each player the probabilities are  $(0, 1/2, 1/2)$
- d) none of the above

23. A perfectly competitive firm has the short-run total cost function  $STC(y) = y^2/10 + 3y + 500$ . When should this firm shut down its production?

- a) whenever  $p < y/5 + 3$
- b) whenever  $p < y/10 + 3$
- c) whenever  $p < y/10 + 3 + 500/y$
- d) whenever  $p < 500/y$

24. There are  $n$  firms operating in a perfectly competitive industry and each of them has a long-run total cost function  $LTC(y) = y^2 + 4$ . The aggregate market demand in this industry is given by  $Y(p) = 300 - 50p$ . How many firms are going to operate in this industry in the long-run equilibrium?

- a)  $n = 10$
- b)  $n = 25$
- c)  $n = 45$
- d)  $n = 50$

25. The First Fundamental Theorem of Welfare Economics states that:

- a) a conflict inevitably arises within the functioning of the state between social equality and economic efficiency
- b) the equilibrium in a perfectly competitive market is Pareto-efficient
- c) the theory of the “second best” solution envisages that the effects of disturbances in one market should be equally distributed in other markets
- d) for the given resources and a specific technical level in the economy there exist infinitely many variants of Pareto-efficient allocations