Examination (Retake):   **Intermediate Microeconomics**   **Sommersemester 2001**

Examiner: **Dr. Carsten Helm**

The following aids can be used: Pocket calculators according to the note of the examination office
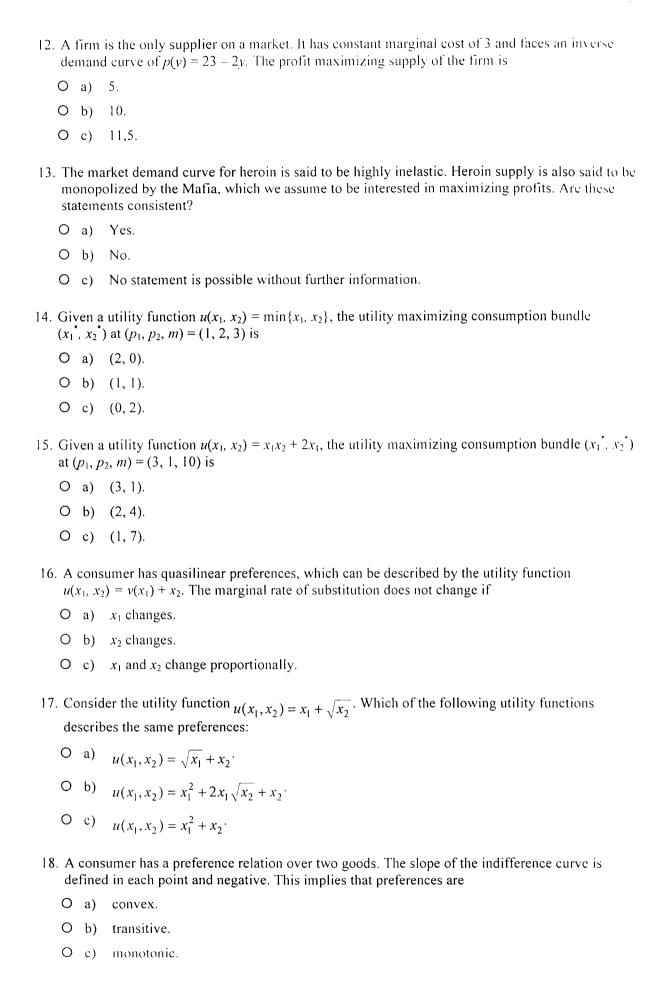
Examination questions:

Part I: Multiple Choice Questions (50 points)

Please return these pages.

In each of the following questions, exactly one answer is right. Therefore, you must not mark more than one answer as the right one. For every right answer, you get two points. For every wrong answer, you get one minus point. If you do not mark any of the three possible answers to a question, you get zero points for this question. Finally, if you leave the multiple choice part with a score of less than zero, this will be set equal to zero.

1. Suppose the production function is $f(x_1, x_2) = x_1^{3/8} x_2^{5/8}$, where $x_1, x_2 > 0$. The marginal product of the second input x_2 is

    O a)   constant.

    O b)   increasing.

    O c)   decreasing.

2. Suppose the production function is $f(x_1, x_2) = x_1^{-2/7} x_2^{5/7}$. The returns to scale of this production function are

    O a)   increasing.

    O b)   constant.

    O c)   decreasing.

3. A firm produces two identical outputs in two different production plants, and marginal production cost in the first plant exceed those in the second plant. How can the firm reduce its cost of producing a fixed level of output?

    O a)   By producing more in the first plant and reducing production in the second plant.

    O b)   By reducing production in the first plant and producing more in the second plant.

    O c)   It is not possible to reduce cost for a fixed level of output.

4. Suppose the production function is $f(x_1, x_2) = x_1^2 + x_1 x_2$. The technical rate of substitution of this production function at the point $(x_1, x_2) = (3, 4)$ is

    O a) $dx_2/dx_1 = -11/3$.

    O b) $dx_2/dx_1 = -7/2$.

    O c) $dx_2/dx_1 = -10/3$.

5. Consider a firm with globally decreasing returns to scale. If it splits up into two firms of equal size, than total profits would

   ○ a) decrease.

   ○ b) stay constant.

   ○ c) increase.

6. If average fixed cost are falling, then marginal cost

   ○ a) are below average cost.

   ○ b) are above to average cost.

   ○ c) can be below, above or equal to average cost.

7. The market for milk is characterized by an increasing inverse supply curve and a decreasing inverse demand curve. The government fixes a minimum price for milk, which exceeds the equilibrium market price, and buys any excess supply that exists at this price.

   ○ a) The consumers' surplus and the producers' surplus are both higher than in the competitive equilibrium.

   ○ b) The consumers' surplus is higher and the producers' surplus is lower than in the competitive equilibrium.

   ○ c) The consumers' surplus is lower and the producers' surplus is higher than in the competitive equilibrium.

8. For all households that demand apples, apples are a normal good. Furthermore, the inverse supply curve for apples is increasing. If the income of all households that demand apples increases, then

   ○ a) the price for apples increases.

   ○ b) the price for apples remains unchanged.

   ○ c) the price for apples decreases.

9. The demand for cigarettes is completely inelastic ($\partial D/\partial p = 0$). The supply for cigarettes is increasing in the price ($\partial S/\partial p > 0$). Now the government introduces a tax of 20 Cents per cigarette. The price that the consumers have to pay for a cigarette in a competitive equilibrium increases

   ○ a) by 20 Cents.

   ○ b) by less than 20 Cents.

   ○ c) not at all.

10. Consider a market with 8 identical firms, all of which have the cost function $c(y) = y^2 + 4$. The demand function is $D(p) = 90 - p$. In the competitive equilibrium, the price is

    ○ a) 60.

    ○ b) 18.

    ○ c) 6.

11. A monopolist faces the following demand function for his output good: $D(p) = A\, p^{-b}$. The demand has a price elasticity of

    ○ a) $-1/b$.

    ○ b) $-b$.

    ○ c) $1+b$.

12. A firm is the only supplier on a market. It has constant marginal cost of 3 and faces an inverse demand curve of $p(y) = 23 - 2y$. The profit maximizing supply of the firm is

    O a)   5.

    O b)   10.

    O c)   11,5.

13. The market demand curve for heroin is said to be highly inelastic. Heroin supply is also said to be monopolized by the Mafia, which we assume to be interested in maximizing profits. Are these statements consistent?

    O a)   Yes.

    O b)   No.

    O c)   No statement is possible without further information.

14. Given a utility function $u(x_1, x_2) = \min\{x_1, x_2\}$, the utility maximizing consumption bundle $(x_1^{\ast}, x_2^{\ast})$ at $(p_1, p_2, m) = (1, 2, 3)$ is

    O a)   (2, 0).

    O b)   (1, 1).

    O c)   (0, 2).

15. Given a utility function $u(x_1, x_2) = x_1 x_2 + 2x_1$, the utility maximizing consumption bundle $(x_1^{\ast}, x_2^{\ast})$ at $(p_1, p_2, m) = (3, 1, 10)$ is

    O a)   (3, 1).

    O b)   (2, 4).

    O c)   (1, 7).

16. A consumer has quasilinear preferences, which can be described by the utility function $u(x_1, x_2) = v(x_1) + x_2$. The marginal rate of substitution does not change if

    O a) x_1 changes.

    O b) x_2 changes.

    O c) x_1 and x_2 change proportionally.

17. Consider the utility function $u(x_1, x_2) = x_1 + \sqrt{x_2}$. Which of the following utility functions describes the same preferences:

    O a) $u(x_1, x_2) = \sqrt{x_1} + x_2.$

    O b) $u(x_1, x_2) = x_1^2 + 2x_1 \sqrt{x_2} + x_2.$

    O c) $u(x_1, x_2) = x_1^2 + x_2.$

18. A consumer has a preference relation over two goods. The slope of the indifference curve is defined in each point and negative. This implies that preferences are

    O a)   convex.

    O b)   transitive.

    O c)   monotonic.

19. A consumer with complete, transitive, convex and monotonic preferences is indifferent between the bundles (4,1) and (1,4). Which of the following relations is **not** possible in this case?

   ○ a) $(1,4) \; \phi \; (2,2)$.

   ○ b) $(3,3) \; \phi \; (1,4)$.

   ○ c) $(4,1) \; \phi \; (3,3)$.

20. Two firms intend to merge. The CEOs Maier and Müller can vote for either Frankfurt or Berlin as the location of the merged firm. The upper left-hand corner of each field gives the corresponding payoff of Mr. Maier, the lower right-hand corner gives the corresponding payoff of Mr. Müller. Which statement is right?

   ○ a)   The decision where both vote for Frankfurt is the only Nash-equilibrium in pure strategies.

   ○ b)   The decision where both vote for Berlin is the only Nash-equilibrium in pure strategies.

   ○ c)   (Frankfurt, Frankfurt) and (Berlin, Berlin) are both Nash-equilibria in pure strategies.

<div align="center">

Müller

	Frankfurt	Berlin
Frankfurt	200 400	0 0
Berlin	0 0	300 100

Maier
</div>

21. The profits of firm 1 and firm 2 depending on their actions are given in the following matrix. (Firm 1 can choose between U and D, firm 2 can choose between L and R). The upper left-hand corner of each field gives the profits of firm 1, the lower right-hand corner gives the profits of firm 2. Which statement is right?

   ○ a)   The game has two Nash-equilibria in pure strategies, but only one of them is Pareto efficient.

   ○ b)   The game has exactly one Nash-equilibrium in pure strategies, which is also an equilibrium in dominant strategies.

   ○ c)   The game has exactly one Nash-equilibrium in pure strategies, and this equilibrium is Pareto efficient.

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Firm 2

	L	R
U	1 1	3 0
D	0 3	2 2

Firm 1
</div>

22. Michael and Ralf are consuming strictly positive quantities of petrol (good x_1) and brake fluid (good x_2). Michael's marginal rate of substitution between brake fluid and petrol is $dx_2/dx_1 = -2$. Ralf's marginal rate of substitution between brake fluid and petrol is $dx_2/dx_1 = -1$.

   O a) There exists a mutually beneficial exchange with the property that Michael gives some petrol to Ralf in exchange for some brake fluid.

   O b) There exists a mutually beneficial exchange with the property that Michael gives some brake fluid to Ralf in exchange for some petrol.

   O c) There exists no mutually beneficial exchange.

23. Which of the following statements is **wrong?**

   O a) Average fixed costs never increase with output.

   O b) Average total costs are always greater than or equal to average variable costs.

   O c) Average costs can never can never rise while marginal costs are declining.

24. A firm has the following production function: $f(x_1, x_2) = \min\{2x_1, x_2\}$. If output remains constant and the price for input x_1 doubles,

   O a) the firm increases demand for input x_1.

   O b) the firm decreases demand for input x_1.

   O c) the firm does not change its demand for input x_1.

25. The compensating variation and the equivalent variation are the same for

   O a) Cobb-Douglas utility.

   O b) quasilinear preferences.

   O c) perfect substitutes.

Part II: Discussion (20 points) Answer one of the following questions:

Alternative 1

a) Explain *graphically* the concepts of **compensating variation** and **equivalent variation**. Shortly explain for which type of questions these concepts can be used. (15%)

b) For what type of preferences are the compensating variation, the equivalent variation (and also the consumers surplus) of the same size. Briefly explain your answer. (5%)

Alternative 2

This was a weird Christmas. Anne got only sweets, and Bob got only comics. Therefore, they decide to exchange their initial endowment of sweets and comics. Both have standard – i.e. convex, monotonic and transitive – preferences over the two goods.

a) Depict the initial endowment as well as Anne's and Bob's preferences over sweets and comics in an Edgeworth box. (8%)

b) Based on the shape of indifference curves that you have drawn, derive graphically the exchange equilibrium. Briefly explain your derivation. (8%)

c) Could we assure uniqueness of the exchange equilibrium if preferences were non-convex? Briefly explain your answer (you can do so graphically). (4%)

Part III: Analytical Part (30 points)

Nadine loves smoking cigarettes and watching movies in the cinema. But she is still living on her parents money and has only € 60 available per month. Denote by x_1 the packets of cigarettes that Nadine consumes per months and by x_2 the number of movies that Nadine watches per months. The price p_1 of a packet of cigarettes is € 2 and the price p_2 of a movie is € 5. Nadine's utility function is given by

$$u(x_1, x_2) = x_1^{2/3} x_2^{4/3}$$

a) Given her income constraint, what is the maximum number of movies that Nadine can watch? (4%)

b) If Nadine is a utility maximising agent, how much money should she spend on watching movies and on smoking cigarettes? (10%)

c) Nadine's parents are concerned that their daughter spends her money on cigarettes. Therefore, they tell Nadine that they will reduce her pocket allowance to € 20 if she doesn't stop smoking. Briefly explain whether Nadine will react by stopping to smoke. (4%)

d) Suppose that Nadine's utility function were given by $u(x_1, x_2) = 0.5 x_1^{1/3} x_2^{2/3}$. How does this affect her consumption of cigarettes? (4%)

e) Given the original utility function of $u(x_1, x_2) = x_1^{2/3} x_2^{4/3}$, what is the maximum utility that Nadine can achieve with her original budget of € 60? (4%)

f) Is Nadine better off, worse off, or equally well of if her preferences are described by $u(x_1, x_2) = 0.5 x_1^{1/3} x_2^{2/3}$ rather than by $u(x_1, x_2) = x_1^{2/3} x_2^{4/3}$? (4%)