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Course name:	Intermediate microeconomics
Course code:	EC2101
Type of exam:	Re-take
Examiner:	Adam Jacobsson
Number of credits:	7,5
Date of exam:	200329
Examination time:	09.00-14.00
Aids:	You may use your book, notes, calculator.

Write your personal identity number (personnummer) on each answer sheet.

Start each new question/section/part on a new answer sheet.

Explain notions/concepts and symbols. If you think that a question is vaguely formulated, specify the conditions used for solving it. Only legible exams will be marked.

The exam consists of 5 questions. Questions 1-3 are worth 25 points each, question 4 is worth 15 points and question 5 is worth 10 points. 100 points in total. For the grade E 45 points are required, for D 50 points, C 60 points, B 75 points and A 90 points. If you have the course credit you do not answer question 5.

Your results will be made available on your Ladok account (www.student.ladok.se) within 15 working days from the date of the examination.

Good luck!

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Question 1

Donald and Joe have the following initial endowments of apples (A) and oranges (O):

$$\overline{A_D} = 6, \overline{O_D} = 6, \qquad \overline{A_J} = 6, \overline{O_J} = 6$$

Donald's preferences are represented by the following utility function:

$u_D(A_D, O_D) = A_D^{\frac{1}{3}} O_D^{\frac{2}{3}}$

Joe's preferences are represented by this utility function: $u_J(A_J, O_J) = A_J^{\frac{2}{3}} O_J^{\frac{1}{3}}$.

a) Draw an Edgeworth box diagram with Donald in the lower-left corner and Joe in the upper-right corner, where consumption of oranges is measured on the horizontal axis and consumption of apples is measured on the vertical axis. Identify the initial endowments and draw the indifference curves of Donald and Joe consistent with these endowments.

(5 points)

b) Let p_A and p_O denote the prices of apples and oranges respectively. Calculate a competitive equilibrium when Donald and Joe decide to trade with each other. That is, find the equilibrium prices and the final (optimal) allocation of apples and oranges. Show your calculations.

(15 points)

c) Show graphically the Pareto dominating space given the initial endowments and show that the competitive equilibrium is Pareto-efficient. Explain what a Pareto-efficient allocation means for Donald and Joe.

(5 points)

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Question 2

The famous detective Sherlock Holmes is energetically trying to catch the super villain Professor Moriarty. Professor Moriarty has to meet another villain, Dr Corona, at either the busy and crowded Piccadilly Circus or at the tranquil and beautiful Kew gardens. Sherlock has of course deduced this and is now thinking about where to go. Moriarty is also thinking about where to meet Dr Corona. If Sherlock and Moriarty end up in the same location, Sherlock will arrest Moriarty (and also catch Corona) which yields a payoff of 8 to Sherlock and -6 to Moriarty. If they end up in different locations Sherlock gets a payoff of 0 and Moriarty a payoff of 5. Since Sherlock loves the beauty of Kew gardens, he will earn an additional payoff of 2 if he ends up there. The payoffs are illustrated in the game matrix below.

a) Assume that Sherlock and Moriarty decide simultaneously (without knowing their opponent's choice) where to go. Find the pure-strategy Nash equilibria (if any). Explain your result intuitively.

(7 points)

		Moriarty	
		Piccadilly	Kew gardens
Sherlock	Piccadilly	8, -6	0, 5
	Kew gardens	2, 5	10, -6

b) Now, let Sherlock and Moriarty use mixed strategies. Sherlock goes to Piccadilly with probability p and Moriarty goes to Piccadilly with probability q. Derive the best-response functions/correspondences of the players and illustrate them in a diagram.

(8 points)

c) Find the Nash Equilibrium in mixed strategies and illustrate it in the diagram under b). (5 points)

d) Now let us assume that Moriarty's payoff in the case where he is caught in Kew gardens increases by 2 (no other payoff changes). Will Moriarty's Nash equilibrium choice of q change? If so, by how much? Explain your answer carefully. (5 points)

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Question 3

Consider the market for a virus vaccine with the following inverse demand function: $p(y) = 40 - 2y$ where *y* is total sold quantity of the vaccine on the market and $p(y)$ is the price for which it sells for. There are only two firms on this market, ACME and BETA, who both produce this homogenous good. ACME's cost function is $c_A(y_A) = 4y_A$ and BETA's cost function is $c_B(y_B) = 2y_B$ where y_A is quantity produced by ACME and y_B is quantity produced by BETA. The two firms set their production quantities simultaneously without knowing the choice of their opponent, but both firms know the inverse demand function and each other's cost functions.

a) Derive both firms' best response functions and draw these in a diagram. (8 points)
b) What quantities will each firm produce in the equilibrium? Illustrate these quantities in the diagram from a). What is the total quantity produced and what is the equilibrium price? (7 points)

Now assume that ACME sets its quantity before BETA, and that BETA can observe ACME's choice before choosing its own quantity y_B.

c) What quantities will the firms produce in the new equilibrium? Show your calculations. If you were the social planner and wanted to maximize the amount of vaccine produced, which market structure (compare b) to c)) would you prefer and why? (7 points)
d) Questions 3b) and 3c) represent two different market structures with imperfect competition. What are the models used to analyse them called? Can you think of any other market structures that would increase output and lower price even more than in 3b) and 3c)? Explain briefly. (3 points)

Question 4

The viking boat building company Floke inc. uses capital, *K*, and labour, *L*, to produce long boats according to the following production function: $f(K, L) = K^{\frac{1}{2}}L^{\frac{1}{2}}$. Let *r=2* and *w=4* be the prices of capital and labour respectively. *P=20* is the market price of long boats. The markets for long boats, capital and labour are all perfectly competitive.

In the short run, the level of capital is fixed at $K = 36$.

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a) Set up the-short run profit maximization problem. Calculate Floke inc.'s short-run optimal level of labour. Show your calculations. (5 points)
b) What are Floke inc.'s short-run profits (use your result from a))? Show your calculations. (5 points)

In the long run, Floke inc. can vary both *K* and *L,* as Floke inc. can then expand or shrink its boat building yard, should it wish to do so.

c) What is Floke inc.'s technical rate of substitution between capital and labour? Explain in words what your answer means for Floke inc. (5 points)

Question 5
If you have the course credit, do not answer this question.

We have covered market imperfections and their effects during the course. Discuss at least two of these market imperfections. In your answer, explain what the imperfection is, when it is likely to occur and its effects. Also, suggest solutions for the imperfections.

(10 points)