

Test
Advanced Microeconomics: Part II (Uwe Jirjahn)

Summer 2021

Choose **two** questions out of the three questions Q1, Q2, Q3.

Q.1 Two firms produce homogeneous products. The inverse demand function is: $p = 150 - x_1 - x_2$, where x_1 is the quantity chosen by firm 1 and x_2 the quantity chosen by firm 2. The cost functions of the firms are $C_1(x_1) = 20x_1$ and $C_2(x_2) = 10x_2$. Firm 1 is a Stackelberg leader and firm 2 a Stackelberg follower.

Q.1.a Find the subgame-perfect quantities.

Q.1.b Calculate each firm's equilibrium profit.

Q.2 Two firms ($i = 1, 2$) produce differentiated products. The demand function for the product of firm i is given by: $q_i(p_i, p_j) = 100 - p_i + \frac{2}{3}p_j$, where p_i is the price chosen by firm i and p_j the price chosen simultaneously by its competitor. The cost function of each firm is $C_i(q_i) = 20q_i$.

Q.2.a Find the equilibrium prices.

Q.2.b Calculate each firm's equilibrium profit.

Q.3 Two firms ($i = 1, 2$) produce differentiated products. The market-clearing price is given by: $p(q_i, q_j) = 60 - q_i - \frac{1}{2}q_j$, where q_i is the quantity chosen by firm i and q_j the quantity chosen simultaneously by its competitor. The cost function of each firm is $C_i(q_i) = 10q_i$.

Q.3.a Find the response functions and show the response functions graphically.

Q.3.b Identify the Nash equilibrium.

Q.3.c Calculate each firm's equilibrium profit.

Note: If you answer all three questions, we will only consider Q.1 and Q.2.