Exam
Advanced Microeconomics: Part II (Uwe Jirjahn)

Winter 2017/18

Choose **two** questions out of the three questions Q.1, Q.2 and Q.3.

Q.1 Two firms produce homogeneous products. The inverse demand function is given by: $p(x_1, x_2) = 2 - x_1 - x_2$, where x_1 is the quantity chosen by firm 1 and x_2 the quantity chosen simultaneously by firm 2. The cost function of firm 1 is $C_1(x_1) = x_1$. The cost function of firm 2 is $C_2(x_2) = c_2 x_2$. Nature chooses $c_2 = c_L = 0.5$ with probability 0.5 and $c_2 = c_H = 1.5$ with probability 0.5. While firm 2 observes nature's choice, firm 1 cannot observe that choice. Identify the static Bayesian Nash equilibrium.

Q.2 Two firms produce homogeneous products. The inverse demand function is: $p(x_1, x_2) = a - x_1 - x_2$, where x_1 is the quantity chosen by firm 1, x_2 the quantity chosen by firm 2, and $a > 0$. The cost functions are $C_1(x_1) = x_1^2$ and $C_2(x_2) = x_2^2$. Firm 1 is a Stackelberg leader and firm 2 a Stackelberg follower.

Q.2.a Find the subgame-perfect quantities.

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

Q.3 Player 1 and player 2 bargain over sharing 300 dollars. The bargaining procedure follows the Rubinstein bargaining model. Player 1's share is

$$x_1^* = 300 \frac{1 - e^{-\Delta/5}}{1 - e^{-\Delta/5} e^{-2\Delta/5}}$$

where Δ is the time interval between subsequent periods. Calculate player 1's and player 2's share if Δ approaches zero.

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