

**Instructions:**

- Please answer all six questions.
- Use of non-programmable calculators is allowed.
- Please put your name on *all* sheets.
- Please hand in *all* exam materials.

**Question 1**

Consider the following game with imperfect information:

		Player B	
		$b_1$	$b_2$
A	$a_1$	2, 3	1, 1
	$a_2$	1, 1	2, 3

- a) Find all Nash equilibria (including mixed-strategy ones).
- b) Given, the players play the mixed-strategy equilibrium, what is the probability of play of each of the possible pure action profiles?

**Question 2**

Two firms,  $A$  and  $B$ , can produce any quantity  $w_A$ ,  $w_B$  they like at no costs. Inverse demand is  $p = e^{-(w_A + w_B)}$ .

- a) Compute  $A$ 's reaction function.
- b) Compute the equilibrium quantity.
- c) Show that each player's best strategy is a dominant one.

**Question 3**

Consider the following game in simultaneous moves:

		$B$	
		$b_1$	$b_2$
A	$a_1$	1, 1	0, 1
	$a_2$	1, 0	2, 2

- a) Find all pure-strategy Nash equilibria.
- b) There is something special about one of the equilibria. Which one is it, and what is special about it?
- c) If there is a trembling hand perfect strategy to  $A$ , it must be  $a_2$ . Why?

**Question 4**

In a Bertrand game of simultaneous price choice in a Duopoly, what will be the equilibrium, if both firms have the same marginal costs and try to maximize relative payoffs? Explain your answer (briefly!).

**Question 5**

Consider a game with the following payoffs:

		<i>B</i>	
		<i>b</i> <sub>1</sub>	<i>b</i> <sub>2</sub>
<i>A</i>	<i>a</i> <sub>1</sub>	1, 1	0, 1
	<i>a</i> <sub>2</sub>	1, 0	2, 2

1. Draw the extended form of the game for the case that *A* is the first mover. Find the subgame perfect equilibrium.
2. Transform the game into one in relative payoffs. Find the subgame perfect equilibrium.

**Question 6**

Consider a game with the following payoffs:

		<i>B</i>	
		<i>b</i> <sub>1</sub>	<i>b</i> <sub>2</sub>
<i>A</i>	<i>a</i> <sub>1</sub>	1, 3	2, 1
	<i>a</i> <sub>2</sub>	3, 1	1, 2

- a) Assuming the game is a simultaneous move one, find all pure strategy equilibria.
- b) Assuming the game is a sequential move one with *A* moving first, find all subgame perfect equilibria.
- c) Why are there more (pure strategy) equilibria in the sequential move game than in the simultaneous move game?