Fall 2006 – Chesnes
120 Minutes – 500 Points

Economics 414 – Final

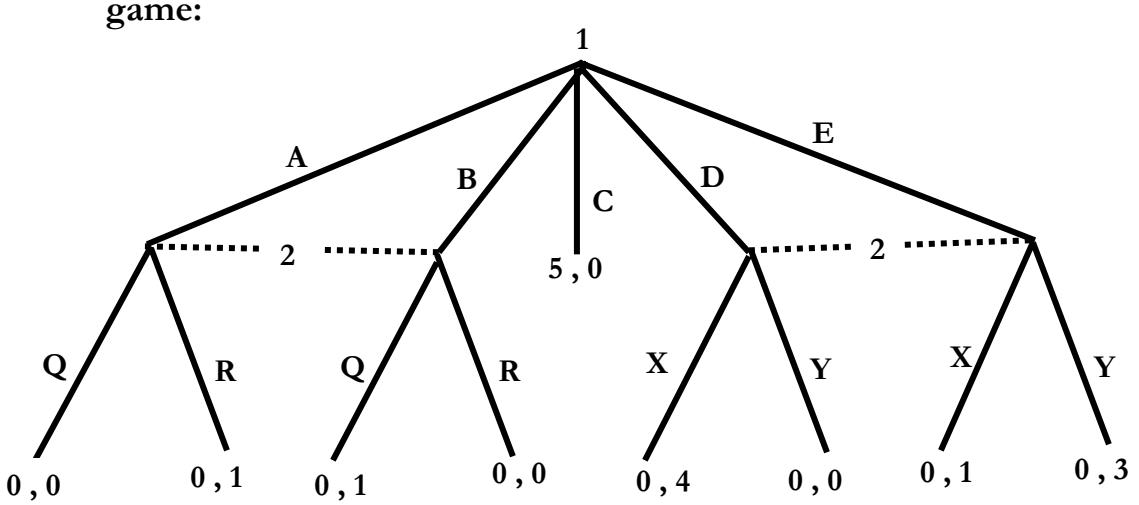
Please answer ALL questions on this examination. Be sure to explain any non-standard notation that you use and JUSTIFY your answers. Each question is worth 25% of the total. Good Luck!

1. ***Simultaneous moves.*** **Consider the following simultaneous move game:**

		Player 2		
		L	**C**	**R**
Player 1	**T**	**(-10, -10)**	**(10, -15)**	**(15, 0)**
	M	**(-10, 10)**	**(-5, 0)**	**(-10, 10)**
	B	**(0, 10)**	**(0, 0)**	**(0, 0)**

   a. **What strategies survive Iterated Elimination of Strictly Dominated Strategies?**
   b. **Find all Nash equilibria of the game (Pure and/or Mixed).**
   c. **State the two conditions required for a mixed strategy profile, α^*, to be a mixed strategy Nash equilibrium.**

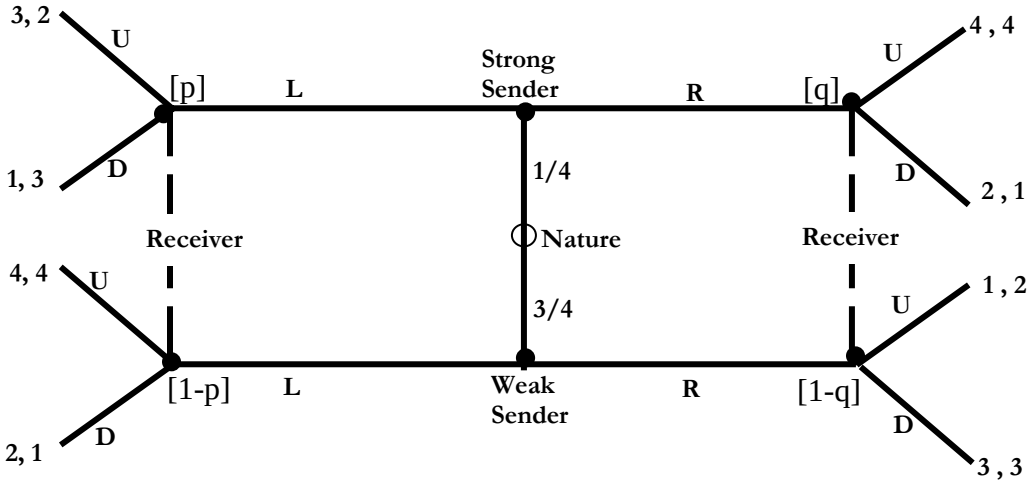
2. ***Extensive game of Imperfect Information.*** **Consider the following game:**



   a. **Write down the game in strategic (normal) form and solve for the *pure strategy* Nash Equilibria and the Subgame Perfect Nash Equilibria.**

   b. **Consider the strategies: (C, RX). Find beliefs that support these strategies as a Perfect Bayesian Equilibrium.**

3. ***Signaling game.***



a. **Solve for a Perfect Bayesian Equilibrium involving "pooling on L."**

b. **Show there does not exist a separating equilibrium involving a strong sender playing L and a weak sender playing R.**

c. **Define *information set* as it pertains to dynamic games of imperfect information. How many information sets do the sender and receiver have in the game above?**

4. ***Infinitely repeated Cournot game.*** **Two oligopolists operate in a market with inverse demand given by $P(Q) = 14 - Q$, where $Q = q_1 + q_2$ and $q_i \geq 0$ is the quantity produced by firm i. Each firm has constant marginal cost equal to 2.**

   a. **Consider a one period game. Show that when firms choose their quantities simultaneously, they each produce $q_i^c = 4$ and obtain profits of 16.**

   b. **Consider a one period game. Show that a monopolist facing the same demand curve and the same marginal cost will produce $Q^m = 6$ units and obtain profits of 36.**

   c. **Now consider the infinitely repeated game where the two firms choose quantities in each period to maximize aggregate discounted profits and both discount the future at rate δ. Each firm follows a Grim Trigger Strategy:**
      - ✓ **Produce ½ Q^m in the first period.**
      - ✓ **Produce ½ Q^m in each subsequent period if no firm has deviated in any prior period.**
      - ✓ **Produce q_i^c in each subsequent period otherwise.**

      Show that the one period optimal deviation (if the other firm continues to produce ½ Q^m) is $q_i^d = 4.5$ yielding profit of 20.25.

   d. **Finally, solve for the critical discount factor, δ^*, required to sustain cooperation (i.e. each producing ½ Q^m).**