Fall 2006 – Chesnes
75 Minutes – 300 Points

Economics 414 – Midterm

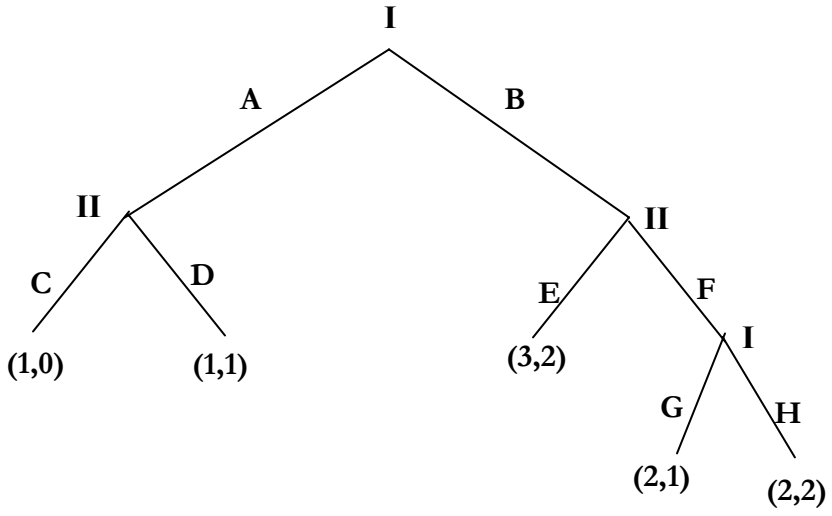
Please answer ALL questions on this examination. Be sure to explain any non-standard notation that you use. Justify your answers!

1. **(40%) Consider the following simultaneous move game:**

		Player 2		
		L	**C**	**R**
Player 1	**T**	**(0, 0)**	**(3, 4)**	**(0, 2)**
	M	**(3, 2)**	**(2, 1)**	**(2, 1)**
	B	**(1, 4)**	**(0, 4)**	**(0, 3)**

   a. **Define dominant strategy.**
   b. **Show that player 2 can dominate R with a mixture of L with probability q and C with probability 1 - q. What value of q is required?**
   c. **Find all Nash Equilibria of the game (Pure and/or Mixed) and plot the Best Response correspondences for each player.**

2. **(30%) Consider the following extensive game with perfect information:**



Note for the payoff (X,Y): X is player I's payoff and Y is player II's payoff.

   a. **Define Sub-Game Perfect Nash Equilibrium.**
   b. **Write down ALL possible strategies of each player.**
   c. **Solve for the Sub-Game Perfect Nash Equilibria of the game.**

3. **(30%) Consider a two-player game where player 1 chooses s_1 and player 2 chooses s_2. Payoffs for each player are:**

$$\pi_1(s_1,s_2) = 40s_1 - s_1^2 + 4s_1s_2$$

$$\pi_2(s_1,s_2) = 100s_2 - 50s_1 - s_2^2 - s_1s_2$$

Throughout this question, you only need to worry about pure strategies (i.e., do not worry about the possibility players will choose mixed strategies).

   a. **Suppose the players choose s_1 and s_2 simultaneously. Draw each player's best response function on a single graph (with s_1 on the horizontal axis and s_2 on the vertical axis). Find the pure strategy Nash Equilibrium in this game.**

   b. **Now suppose the game is changed so that player 1 plays first and then player 2 plays after learning player 1's decision. Find the solution to this game through backward induction.**

   c. **BONUS – Explain why it MUST be the case that the payoff for player 1 in part (b) must be at least as great as that in part (a).**