Economics 201B - Final Exam

You should do three of the four questions. You have three hours. Good luck.

1. Hunter-Gatherer

Two players must decide whether to be hunters or gathers. If both are hunters, both receive 0; if both are gatherers both receive 1. If one is a hunter and one a gatherer, the hunter receives 3 and the gatherer 2.

a. Find the normal form of this game.
b. Find the Nash equilibrium of this game.
c. Are there any dominated strategies?
d. Find the pure and mixed Stackelberg equilibrium in which player 1 moves first.
e. Find the minmax for both players.

Now suppose that the game is infinitely repeated

f. Player 1 is a long-run player with discount factor δ; player 2 is a short-run player with discount factor 0. Find the set of perfect public equilibrium payoffs to the long-run player as a function of her discount factor.
g. Find strategies that support the best equilibrium from part f.
h. Player 1 and 2 are both long-run players with common discount factor δ. When δ is close to one describe the set of perfect equilibrium payoffs to both players.
i. Find a discount factor and strategies for part h such that both players receive an equilibrium payoff of 2.5.

2. Greenspan

A long-lived central bank faces a short-run representative consumer. The bank must decide whether or not to inflate; the consumer must decide whether or not to expect inflation. If the consumer guesses correctly, she gets 1; incorrectly she gets 0. Central bank payoffs are

	Guess inflate	**Guess not**
inflate	0	2
not	-10	1

As a result of whether or not the central bank chose to inflate, economic activity is determined: there are two possibilities hyperinflation or price stability. If the bank chose to inflate the probability of hyperinflation is 1; if the bank chose not to inflate, the probability of hyperinflation

is 10%. In all that follows, equilibrium means perfect public equilibrium of the infinitely repeated game with public randomization.

a. Find the extensive and normal forms of the stage-game.
b. For the long-run player, find the minmax, the static Nash, mixed precommitment and pure precommitment payoffs.
c. Find the worst equilibrium for the long-run player, and describe in general terms the set of equilibrium payoffs for the long-run player.

First assume that the consumer can observe whether or not the central bank inflates.

d. Find the best equilibrium for the central bank as a function of the discount factor.

Now assume that the consumer cannot observe whether or not the central bank inflates but can observe whether or not there is hyperinflation.

e. Find the best equilibrium for the central bank as a function of the discount factor.

Mechanism Design

A risk averse consumer with utility $\log c$ has equal probability of endowment 1 or 20. A risk neutral insurance company offers a contract based on the statement of the consumer about her endowment. A consumer with a high endowment may misrepresent and pretend to have a low endowment. A consumer with a low endowment may not misrepresent. After the endowment is realized, the insurance company discovers the type (endowment) of the consumer with probability π, and if the type is observed may impose a (arbitrarily large) penalty on the consumer. However, regardless of the state and the contract, the consumer may always "run away" and consume 1. (In other words – the insurance company can set any penalty they want, but if they set the penalty too high, the consumer will run away and consume 1 rather than pay the penalty.) What is the optimal contract?

Risk Aversion

a. Starting from the expression $u(x-p) = Eu(x+\sigma y)$ with $Ey = 0, Ey^2 = 1$ derive the standard expression for the risk premium p.

b. Suppose an individual is indifferent between getting nothing and a win $105, lose $100 equal probability gamble. For an individual with CES preferences, find the coefficient of relative risk aversion as a function of wealth, using the approximation of part a.

c. If wealth is $350,000, what is the coefficient of relative risk aversion?

d. If preferences are logarithmic what is wealth?