MICROECONOMIC THEORY (ECON 713)
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MIDTERM
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Time: **75** minutes
Number of questions: **3**
Number of points: **26**
Rules: **Closed-book** exam

Good luck!

Question 1: Equilibria in a First-Price Auction with Common Values [10 points]
Consider a first-price sealed-bid auction with 2 bidders with common values. (The allocation rules, including tie-breaking are standard, as in class.) The valuation of each bidder *i* is given by $v_i = \alpha t_i + \gamma t_j$, where *j* is the other player, t_h is the signal received by player h=i,j (e.g., the number of barrels of oil in a tract) and $\alpha,\gamma>0$. Each bidder knows only his own signal and that the signals come from a uniform distribution on [0,1], which is common knowledge.

(i) Define a Bayesian Game induced by this auction.
(ii) Define a Bayesian Nash Equilibrium of this game.
(iii) Derive the linear Bayesian Nash Equilibrium of the game.

Question 2: Adverse Selection [12 points]
Consider a market for second-hand cars with a continuum of sellers, each of which owns a car of value v in [0,1] and values the car at $u_s=\theta_0 v$ and a continuum of buyers who derive utility $u_b=\theta v$ from driving a car, θ in [0,1]; θ is common to all sellers. The values v are distributed according to a continuous c.d.f. F(v), which are independent across sellers and buyer characteristics θ are distributed according to a continuous c.d.f. G(θ). Assume that the value v is known to the seller and the buyer knows only the distribution.

(i) Which buyers should buy? (i.e., what is the efficient volume of trade (in terms of G())?) Which sellers (v's) should sell?
(ii) Find the demand and supply functions (in terms of G() and F(), respectively). Is the demand necessarily downward-sloping? Explain.
(iii) Let f and g be densities of F and G, respectively. Solve for the competitive equilibrium assuming that f and g are uniform on [0,1]. Is trade efficient?
(iv) Suppose that a minimal quality standard $s_0>0$ is introduced (i.e., selling a car of quality lower than s_0 is prohibited). Show that the standard may improve welfare.
(v) Ignore the quality standard and go back to the general specification in (2). Show that a higher-price equilibrium Pareto dominates a lower price equilibrium.

Question 3: Axiomatization [4 points]
What are the benefits of axiomatization? In what sense is axiomatization useful outside of decision theory?