Written Exam Economics summer 2016

Microeconomics III

Date: 18 August 2016

(2-hour closed book exam)

Please note that the language used in your exam paper must be English.

This exam consists of 3 pages in total

PLEASE ANSWER ALL QUESTIONS.
PLEASE EXPLAIN YOUR ANSWERS.

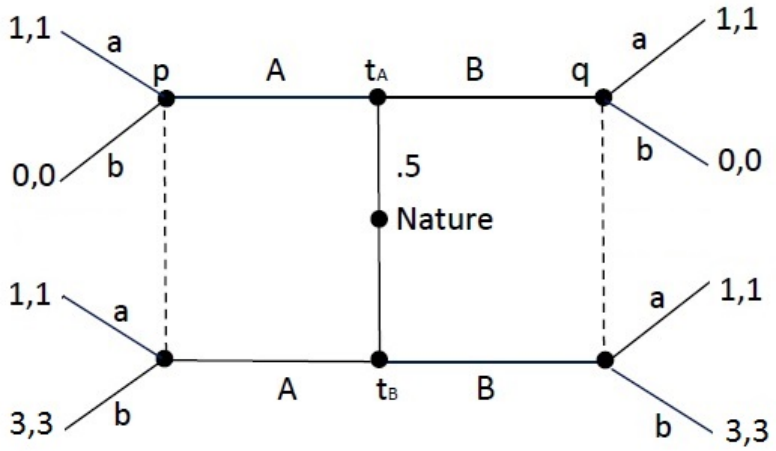
1. (a) Denote the normal-form game below by G. Solve G by iterated elimination of strictly dominated strategies. Explain briefly each step (1 sentence).

		Player 2		
		t_1	t_2	t_3
Player 1	s_1	$2,6$	$3,6$	$3,2$
	s_2	$1,4$	$4,4$	$0,5$
	s_3	$3,2$	$5,1$	$1,1$
	s_4	$4,4$	$2,1$	$4,0$

   (b) Suppose we repeat G twice. Denote the resulting game by $G(2)$. Find the set of Subgame-perfect Nash Equilibria of $G(2)$. Be careful to write out the equilibrium strategies.

   (c) How would we have to modify the payoffs in G to make it possible that there exists a Subgame-perfect Nash Equilibrium in which an action profile which is *not* a stage-game NE is played in one of the stages in $G(2)$? Explain this intuitively or give an example of a change in the payoffs.

2. Consider the game below, where sender observes nature's choice of t, and chooses the message A or B. Receiver does not observe t, but observes player 1's choice of message and chooses a or b.



   (a) Is this a cheap talk game? Is it a game of coordination or conflict? Explain your answers.

   (b) Find a separating Perfect Bayesian Equilibrium.

   (c) Find a pooling Perfect Bayesian Equilibrium in which the sender always sends the message A.

   (d) Compare the payoffs in the two equilibria you found in parts (b) and (c): does one equilibrium Pareto dominate the other?

   (e) Do the equilibria satisfy SR6 (equilibrium domination)?

3. Consider a *first-price sealed bid auction* with two bidders, who have valuations v_1 and v_2, respectively. For $i = 1, 2$, these values are distributed independently and uniformly with

$$v_i \sim u(2, 4).$$

Thus, the values are *private*.

Show that there is a symmetric Bayesian Nash Equilibrium in linear strategies: $b_i(v_i) = cv_i + d$, $i = 1, 2$. Find c and d.

4. Consider the following version of Spence's education signaling model, where a firm is hiring a worker. The worker is characterized by his type θ, which measures his ability. There are two worker types: $\theta \in \{\theta_L, \theta_H\}$. Nature chooses the worker's type, with $\mathbb{P}(\theta = \theta_H) = p$ and $\mathbb{P}(\theta = \theta_L) = 1 - p$. The worker observes his own type, but the firm does not observe the worker's type.

The worker can choose his level of education: $e \in \mathbb{R}^+$. The cost to him of acquiring this education is

$$c_\theta(e) = 2 \cdot \frac{e^2}{\theta}.$$

Education is observed by the firm, who then forms beliefs about the worker's type: $\mu(\theta|e)$. We assume that the marginal productivity of a worker is equal to his ability, and that the company is in competition such that it pays the expected marginal productivity:

$$w(e) = \mathbb{E}(\theta|e).$$

Thus, the payoff to a worker conditional on his type and education is

$$u_\theta(e) = w(e) - c_\theta(e).$$

Suppose for this exercise that $\theta_H = 6$ and $\theta_L = 2$.

(a) Show that there is a *separating* pure strategy Perfect Bayesian Equilibrium where the low-ability worker chooses $e_L^* = 0$ and the high-ability worker chooses $e_H^* = 2$. You can use the off-equilibrium-path beliefs $\mu(\theta_H|e) = 0$ if $e \notin \{e_L^*, e_H^*\}$.

(b) Find a *pooling* pure strategy Perfect Bayesian Equilibrium, where both worker types choose the same education level $e_p > 0$. What is the value of e_p in this pooling equilibrium? Give some intuition as to whether or not this pooling equilibrium is unique.