Final exam

Instructions: You have 120 minutes to complete this exam. Write your answers in the blue book provided to you. Credit, including partial credit, will depend principally on your explanations, so be sure to write thorough answers. Good luck!

Problem 1 (10 points) Consider the game below:

		Namon L	Namon R
Avon	T	4,8	0,0
	B	8,20	X,Y

a. If (B, R) is the Nash equilibrium of this game, what must be true of X and Y? Your answer should be two inequalities, one for X and one for Y.

b. If this game is played sequentially, with Avon moving first and (B, R) is the subgame perfect equilibrium outcome, what must be true of X and Y? Your answer should be two inequalities, one for X and one for Y.

Problem 2 (12 points) Suppose that normal workers increase a firm's revenue by \$6, while smart workers increase revenue by $\$A$, where $A > 6$. Firms cannot tell smart workers from normal workers *ex ante*, but can observe a worker's educational level.

Any worker can acquire as much education as she wishes, but getting e years costs a normal worker $B * e$, where $B > 1$, while e years cost a smart worker only e.

a. Solve for e^*, the minimum years of education that smart workers must get to differentiate themselves from normal workers. Your answer will be a function of the variables A and B.

b. As A increases, does e^* increase or decrease? Explain intuitively why this is the case.

c. As B increases, does e^* increase or decrease? Explain intuitively why this is the case.

Problem 3 (10 points) Answer the following short-answer questions about moral hazard, adverse selection, and insurance:

a. Explain, in one or two sentences, a moral hazard problem faced by insurance companies. Make sure to explain why what you are describing is moral hazard.

b. Explain, in one or two sentences, an adverse selection problem faced by insurance companies.

Problem 4 (12 points) A town has 100 voters: 51 conservatives and 49 liberals. A conservative and a liberal candidate are running for mayor. Voting is by simple majority, and in the case of a tie assume the liberal candidate wins. A conservative voter gets a payoff of 10 if the conservative candidate is elected and -10 if the liberal is elected; vice versa for a liberal voter. It costs a citizen 1 to vote.

a. Explain why it is not a Nash equilibrium for everybody to vote.

b. Explain why it is not a Nash equilibrium for nobody to vote.

c. Is it a Nash equilibrium for 50 conservatives and 49 liberals to vote?

Problem 5 (12 points) McNulty's is a monopoly supplier of Lexington Legends hats. Their cost of producing q hats is $\frac{1}{4}q^2$, so their marginal cost is $mc = \frac{1}{2}q$. The demand function for Legends hats is $p = 90 - 2q$.

a. Solve for McNulty's profit-maximizing price and quantity.

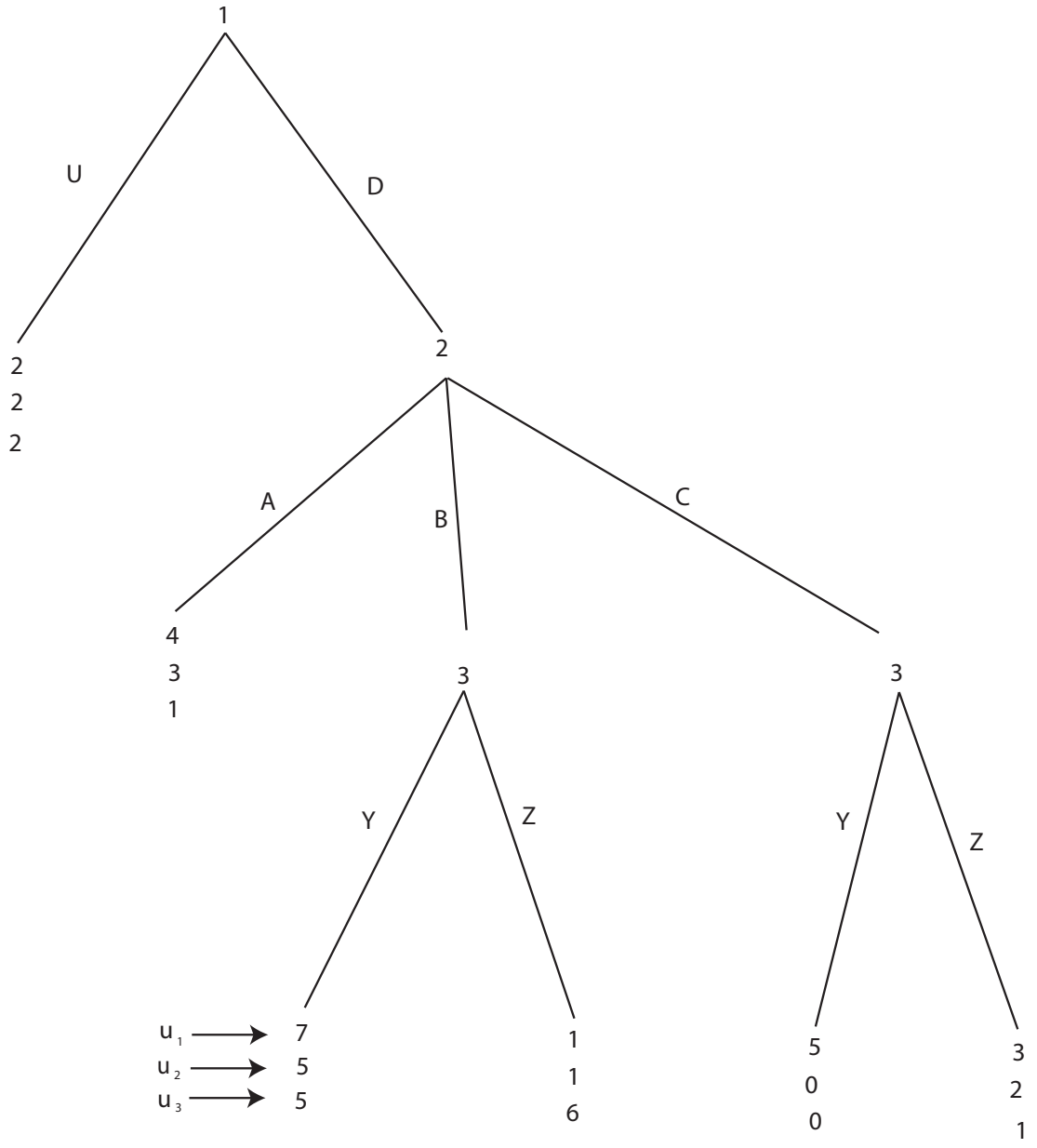
b. Suppose a supplier, Marlo's Accessories, offers to produce as many hats as McNulty's wants for a fee of \$12/hat. That is, McNulty's can buy some hats at a constant marginal cost of \$12 and resell them, in addition to whatever hats McNulty's itself makes, for whatever price it wishes. How many hats should McNulty's purchase from Marlo's Accessories?

c. Now suppose Roger Clemens attempts yet another comeback with the Legends, skyrocketing demand for Legends apparel (and HGH!). McNulty's new demand function is $p = 162 - 2q$. Now how many hats should McNulty's purchase from Marlo's Accessories?

Problem 6 (10 points) Consider the following interaction between two entrepreneurs (players 1 and 2) who are working on a joint project, and a venture capitalist (player 3) who is a potential investor in the project. First, player 1 decides whether to devote high or low effort to preliminary work on the project. Player 2 observes this choice and then decides whether to devote high or low effort himself. They then make a presentation to the venture capitalist, who can observe which, if any, of the entrepreneurs devoted high effort to the project, and decides whether or not to invest.

The payoffs are as follows. Each entrepreneur gets a payment of 5 if the venture capitalist invests and 0 otherwise. In addition, choosing high effort costs an entrepreneur 1, while choosing low effort is free. Investing costs the venture capitalist 2, but if he invests he gains 3 for each entrepreneur who chose high effort. If the venture capitalist does not invest, his payoff is 0. Draw the game tree corresponding to this game and find its subgame perfect equilibrium outcome.

Problem 7 (5 points) Consider the sequential move game below:



What is the subgame perfect equilibrium outcome?

Problem 8 (8 points) Bubbles has an income of \$500. He also gets \$300 in food stamps from the government, which can only be redeemed for food.

Explain briefly, possibly with the aid of a diagram, why giving Bubbles \$300 cash instead of food stamps cannot make him worse off, and might make him better off.

Problem 9 (15 points) Consider the following two gambles:

Gamble A	**Gamble B**
89% chance of \$100	50% chance of \$0
10% chance of \$500	30% chance of \$500
1% chance of \$0	20% chance of a free ticket to Gamble A

a. What is the expected value of Gamble A?
b. What is the expected value of Gamble B?

Suppose that Omar's utility function is $u(w) = \sqrt{w}$, where w is his winnings.

c. Calculate Omar's expected utility from Gamble A.
d. Omar has a ticket for Gamble A. What is the smallest amount of money he would accept in exchange for the ticket?
e. Calculate Omar's expected utility from Gamble B. What is the smallest amount of money he would accept in exchange for a ticket to gamble B?

Problem 10 (6 points) In January 1914, Henry Ford more than doubled the wages of his employees. Based on material presented in class, which of the choices presented below is the most plausible explanation as to why he did this? (Just write the letter of the answer you choose in your bluebook.)

A. He was having trouble attracting new workers and thought that the higher wage would bring him more workers.
B. He was concerned about the perceived low quality of his workforce, and thought that by paying higher wages he could lure more educated and able workers away from other firms.
C. He was considering challenging President Wilson in the 1916 election, and saw the wage increase as an inexpensive way to generate publicity and gain favor with working-class voters.
D. He wanted to reduce absenteeism and increase the effort of his workers.
E. Two or more of the above are true.