

# AUSTRALIAN NATIONAL UNIVERSITY

Second Semester Examination - 2005

## ECONOMICS I (HONOURS) (ECON1100)

Study Period : 15 minutes

Time Allowed : 3 hours

Permitted Material: Calculators – non programmable

**ANSWER THE FOLLOWING 6 QUESTIONS  
EACH QUESTION IS WORTH 10 FOR A TOTAL OF 60**

### QUESTION 1

(a) Consider a game with the following payoff matrix:

		Player 2	
		a	b
Player 1	A	2,2	0,3
	B	3,0	1,1

The numbers in each cell represent the amount of money each player receives when that particular combination of strategies is played. Is this game a prisoner's dilemma? Explain in detail why or why not. In particular, define and use the concepts of Nash equilibrium and dominant strategy. (5 points)

(b) Suppose now that the players are not "selfish"; rather, the preferences of each player is represented by a payoff function in which each player gives a weight one to the amount of money she receives but also gives a non-negative weight  $a$  to the amount of money the other player receives, so that the payoff matrix with altruistic preferences is now:

		Player 2	
		a	b
Player 1	A	$2 + 2a, 2 + 2a$	$3a, 3$
	B	$3, 3a$	$1 + a, 1 + a$

Find the range of values of  $a$  for which the resulting game is the prisoner's dilemma. For values of  $a$  for which the game is not the prisoner's dilemma find the Nash equilibrium. (5 points)

### QUESTION 2

State whether the following is true or false and explain in detail why (In particular, give an example to illustrate your answer): "If a simultaneous game has two outcomes that both satisfy the definition of a Nash equilibrium, it must be true that one player would prefer to have the game end in one equilibrium while the other player would prefer to have the game end in the other equilibrium." (10 points)

### **QUESTION 3**

- (a) Explain the main differences between moral hazard and adverse selection. (5 points)
- (b) Consider two types of college students: A (able) and C (challenged). Potential employers are willing to pay \$150,000 to A and \$100,000 to C. Suppose the types differ in their tolerance for taking a tough course rather than an easy one. Each must sacrifice something but this sacrifice is slightly less for A than C (A cost is \$7,500 a year of salary and C cost is \$8,000 a year of salary). Consider the following policy: anyone who has taken a certain number,  $n$ , or more of tough courses will be regarded as A, and anyone who has taken less than  $n$  will be regarded as C.  $n$  must be an integer. What is the minimum level of  $n$ , if any exists, that will achieve separation? (5 points)

### **QUESTION 4**

Two airlines, Airgo and Flyme, compete against each other on the route between Sydney and Cairns. Each day they must decide on the number of discount seats to offer on this route. The number of seats offered by Airgo is  $S_A$  and the number offered by Flyme is  $S_F$ . The market-determined discount price,  $P$ , depends on the total number of seats offered by both airlines,  $S_A + S_F$  according to the equation:  $P = 200 - 0.10(S_A + S_F)$ . The marginal cost of flying a passenger on this route equals \$100 for Airgo and \$50 for Flyme. Determine:

- (a) The profit function of each airline. (1 point)
- (b) The best response function of each airline. (2 points)
- (c) The Nash equilibrium. (3 points)
- (d) If the two airlines could collude, what prices would they charge and how many units would each sell? (4 points)

### **QUESTION 5**

There are 25 potential used-car buyers, each of whom is willing to pay \$1200 for a good used car and \$400 for a lemon. Potential buyers want to buy at most one car. Before they purchase a used car, buyers are not able to tell whether it is a good used car or a lemon. The current owners of lemons have a reservation price of \$700 for their cars, and the current owners of good cars have a reservation price of \$200. In this market, there are 5 good cars and 15 lemons. Draw the supply curve.

- (a) Suppose that all the potential buyers believe that all used cars will be offered for sale. Is this optimistic belief self-confirming? (2 points)
- (b) Suppose that all demanders believe that the only used cars that will reach the market are lemons. Is this pessimistic belief self-confirming? (2 points)
- (c) Imagine now that there are 10 good cars and 10 lemons. Draw the supply curve and repeat parts (a) and (b) before for this new distribution. (2 points for each)
- (d) Suppose that a new mechanic arrives in town. This mechanic places a high value on his reputation and is known to be scrupulously honest. For a cost of \$100, the mechanic will check the car thoroughly and will certify good cars as good and lemons as lemons. Identify in which of the previous situations the possibility of quality certification unambiguously increases welfare. Justify your answer. (2 points)

## **QUESTION 6**

- (a) Is there any acceptable way to rank social states or to make collective choices based on individual preferences over social states? Discuss Arrow's axioms for collective choice and provide an informal statement of Arrow's theorem. (5 points)
- (b) Consider a choice among four alternatives (a library, a ski slope, a swimming pool, a garbage dump) by rank-order voting. Construct an example in which the outcome (the most preferred alternative) is say, a library, if the vote is among the first three alternatives, while the outcome is a ski slope if the vote is among all four alternatives? Which axiom does this voting scheme violate? (5 points)

