The University of Sydney

Strategic Business Relationships
ECON 5026

Mid-semester Test

Practice

SID: _____

Instructions:

Total marks:	45 marks
Time permitted:	90 minutes
Permitted materials:	Calculators are permitted.
	Mobile phones are NOT permitted.

Section A: Answer all questions in the booklet provided.

Marks for each question are in parentheses ().

It is not sufficient to write the answers to each question.

Provide working and explanations for all answers.

Do not begin the test until instructed.

Good luck!

1. Two employees, Anna and Bert, are assigned to a team. If they both work hard, their productivity is enhanced, and at the end of each week they get rewarded with a bonus. However, both Anna and Bert dislike working hard, and prefer to surf the internet. The following matrix summarises the payoffs to both players each week as a function of their strategies (Work or Shirk).

Bert

		Shirk	Work
Anna	Shirk	$1000, 1000$	$5000, 0$
	Work	$0, 4000$	$2000, 2000$

(a) Suppose Anna and Bert are assigned to work together for exactly two weeks. What equilibrium outcomes do you predict? Explain. (Use the equilibrium concepts we have discussed in class.) [5 marks]

(b) Suppose that Anna and Bert are assigned together for an extended period. Each week, with probability p, they continue to work together. Under what conditions is it possible for Anna and Bert to sustain a subgame perfect equilibrium in which they both work each week? [6 marks]

(c) Suppose Anna and Bert are paid every two weeks, and are only able to observe the strategy of their partner once every two weeks. Explain what effect this will have on the sustainability of cooperation. [4 marks]

2. Wanda sells bottled water in the town of Freshwaters. Demand for bottled water is give by $Q(P) = 240 - 40P$ per day, where Q is the market output, and P is the market price. The cost of bottling and distributing water is determined by the cost function $C(q) = 2q$.

(a) Suppose Wanda is the only seller in Freshwater.

    i. What price should she charge? What profits does she earn? [3 marks]

    ii. Discuss possible barriers to entry that might sustain the profitability of Wanda's business. [3 marks]

(b) Suppose Frank also produces identical bottled water in the Freshwater market. Frank and Wanda simultaneously choose the price of bottled water. Consumers are perfectly informed about the prices of bottled water.

    i. Derive the reaction functions for Wanda and Frank. [3 marks]

    ii. What is the Nash equilibrium in this market. Explain carefully. [3 marks]

    iii. In the Nash equilibrium you described, do Frank and Wanda play dominant strategies? Explain. [3 marks]

3. Jessica has retired from her job as an economics professor at Harvard, and she now gives freelance economics lectures in her spare time. Two types of students are interested in her lectures. There are 100 Type A consumers who each have demand

$$p(Q) = 100 - 5Q,$$

where $p(Q)$ is the willingness to pay for the Qth lecture. There are 100 Type B consumers who each have demand

$$p(Q) = 100 - 10Q.$$

Jessica offers the following two packages to prospective students:

- *Basic*: 10 lectures for $500.

- *Premium*: 20 lectures for $1000.

It costs Jessica $2000 to provide each lecture, including room booking, preparation, and lecture delivery. If all students purchase the basic package, she needs to prepare 10 lectures. If any students purchase the premium package, she must prepare 20 lectures.

(a) If she offers these two packages, what will each type of consumer buy?   [4 marks]

(b) Jessica suspects that she could increase her profits by changing the price of the premium package. What is the profit-maximising price for the Premium package? What profits does she earn?   [6 marks]

(c) What conditions are required for Jessica to practice third degree price discrimination. Suppose Jessica can use third degree price discrimination. What package prices should she set, and what would be her profits.   [5 marks]

END OF THE TEST