UNIVERSITY OF OSLO
DEPARTMENT OF ECONOMICS

Exam: **ECON4820 – Strategic Competition**

Date of exam: Friday, June 4, 2010 **Grades will be given: June 16, 2010**

Time for exam: 2:30 p.m. – 5:30 p.m.

The problem set covers 2 pages

Resources allowed:
- No resources allowed

The grades given: A-F, with A as the best and E as the weakest passing grade. F is fail.

The exam consists of 3 problems. They count as indicated. Start by reading through the whole exam, and make sure that you allocate time to answering questions you find easy. You can get a good grade even if there are parts of problems that you do not have time to solve.

Problem 1 (50 %)

The correctness of the statements below depends on the circumstances. For each of the statements, specify circumstances under which the statement is true, or specify circumstances under which the statement is false (or do both if appropriate).

(a) In static oligopoly, competition between two firms leads to price = marginal cost.
(b) Capacity competition followed by price competition yields quantity competition.
(c) In models of dynamic oligopoly, tacit collusion is facilitated by few firms and short detection lags.
(d) In models of dynamic oligopoly, price wars occur during booms.
(e) Asymmetric cost information is welfare-enhancing as it motivates firms to signal low costs through low prices.
(f) Competition is good for firms' incentives to innovate.
(g) Auction form (first-price vs. second-price and sealed bid vs. open) does not matter for allocative efficiency and seller revenue.
(h) Mergers are welfare-enhancing if the increase in the profits of non-merging firms is larger than the reduction in consumers' surplus.

Problem 2 (15 %)

(a) What is a natural monopoly?

(b) Consider a natural monopoly. According to the theory of perfectly contestable markets, potential competition ensures that the monopoly rent is dissipated in a non-wasteful manner, leading to average cost pricing. Discuss market conditions that are conducive for such rent dissipation and non-wastefulness.

Problem 3 (35 %)

Consider two firms engaged in quantity (Cournot) competition. The inverse demand function is given by $P = 12 - Q$, where Q equals the sum of two firms' quantities: $Q = q_1 + q_2$. Both firms have constant unit costs, equal to c for firm 1 and equal to 6 for firm 2. Assume throughout that each firm knows its own cost and that firm 1 also knows that firm 2's cost equals 6.

(a) Assume that firm 2 knows that firm 1's cost equals c. Show that $q_1 = q_2 = 2$ is a Nash equilibrium if firm 1's unit cost, c, also equals 6. Derive expressions for q_1 and q_2 as functions of c for $0 \leq c \leq 9$. What are the equilibrium values of q_1 and q_2 if $c > 9$?

Assume for the rest of the problem that firm 1's unit cost, c, depends on firm 1's expenditure, k, on cost reduction. Firm 1's cost reducing expenditure, k, can take on the values 0 or 10. If $k = 0$, then $c = 6$, while if $k = 10$, then $c = 3$.

(b) First, consider the case where firm 2 cannot observe firm 1's choice of $k \in \{0, 10\}$. Show that firm 1 choosing $k = 0$ and $q_1 = 2$ and firm 2 choosing $q_2 = 2$ is a Nash equilibrium (i.e., given that firm 2 chooses $q_2 = 2$, it is best response for firm 1 to choose $k = 0$ and $q_1 = 2$, and given that firm 1 chooses $k = 0$ and $q_1 = 2$, it is best response for firm 2 to choose $q_2 = 2$).

(c) Next, consider the case where firm 2 *can* observe firm 1's choice of $k \in \{0, 10\}$. Show that firm 1 will choose $k = 10$.

(d) Why does firm 1 choose to spend more on cost reduction in the case where firm 2 can observe firm 1's cost reduction expenditure before making its quantity choice?

Please do not forget the periodic course evaluation for ECON4820, which you will find on the website for the course. The deadline is June 10!