M1 Industrial Organisation
2015-2016 Resit Examination

Please write your candidate number here: _____

PLEASE READ THESE INSTRUCTIONS CAREFULLY:

- This exam is for M1 Industrial Organisation.
- You have 1 hour. You should answer *both* questions, and you should answer them *in this booklet*.
- This exam has 2 questions, and is 9 pages long. Please check to make sure your copy has all 9 pages.
- The total number of points on the exam is 20. Each question states the number of points it is worth. Allocate your time accordingly.
- Show your work. Unless otherwise indicated, partial credit may be given for partially correct work.
- Place your answer to each question in the space provided. Answers not provided in the correct space will not be marked.
- Write answers neatly. Illegible writing cannot be graded.
- **Good Luck!**

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1 Multiple Choice (7.5 points)

You will receive 1.5 points for each correct answer. However you will lose 1.5 points for each incorrect answer. If you leave a question blank, you get 0 points for that question.

1. True or false: The deadweight loss is higher when a monopolist charges a uniform price than when it uses first-degree price discrimination (personal pricing).
   Answer:

2. True or false: According to Arrow's "replacement effect" theory, a monopolist has more incentives to innovate than a firm operating in a competitive market.
   Answer:

3. True or false: If two firms merge without efficiency gains in a market for a homogenous good with quantity competition, the profit of the other firms in the market increases.
   Answer:

4. True or false: If firms 1 and 2's actions x_1 and x_2 are strategic substitutes, best-response functions slope down (i.e. $R_i(x_{-i})$ is decreasing for $i = 1, 2$).
   Answer:

5. True or false: In a Hotelling model of competition, firms' profit is an increasing function of the differentiation parameter (or transportation cost).
   Answer:

2 Vertically differentiated products (12.5 points)

Consider the following model of vertical product differentiation. There is one consumer who is interested in buying one unit of a product. The consumer's type θ is uniformly distributed on the interval $[0,1]$ i.e. the cumulative distribution function of θ is $F(x) = \Pr(\theta \leq x) = x$. The consumer knows her type. The payoff to the consumer when she has type θ and buys a product of quality s_i at price p_i is

$$\theta s_i - p_i \ .$$

The payoff to the consumer if she buys nothing is 0.

There is one firm in the market. The firm knows only that the consumer's type has cumulative distribution function $F(x) = \Pr(\theta \leq x) = x$, but does not know the realisation of θ. There are two products, denoted 1 and 2. Product 1 has quality $s_1 > 0$, and product 2 has quality $s_2 > s_1$. The marginal cost to the firm of producing good 1 is c_1, where $0 < c_1 < s_1$. The marginal cost to the firm of producing good 2 is c_2, where $\frac{s_2}{s_1} c_1 < c_2 < s_2 + c_1 - s_1$.

1) Suppose the monopolist sells only product 1 (i.e. consumers cannot buy product 2). Let p_1 denote the price of the product. You may assume that $0 < p_1 < s_1$.

a) Explain carefully why the firm's profit function is given by

$$(p_1 - c_1)\left(1 - \frac{p_1}{s_1}\right).$$

Answer

b) Calculate the firm's optimal price p_1^*. Show your calculations. [*There is no need to check second order conditions.*]

$p_1^* =$ .....

Calculations

2) Now suppose that the monopolist sells **both** products. Let p_1 and p_2 denote the prices of the two products. You may assume that

$$0 < \frac{p_1}{s_1} < \frac{p_2 - p_1}{s_2 - s_1} < 1.$$

The consumer buys at most one of the two products.

a) Explain carefully why the firm's profit function is given by

$$(p_1 - c_1)\left(\frac{p_2 - p_1}{s_2 - s_1} - \frac{p_1}{s_1}\right) + (p_2 - c_2)\left(1 - \frac{p_2 - p_1}{s_2 - s_1}\right).$$

Answer

b) Calculate the firm's optimal prices p_1^* and p_2^*. Show your calculations. [*There is no need to check second order conditions.*]

$p_1^* =$ ..... $p_2^* =$ .....

Calculations

3) Without doing any detailed calculations, explain why consumer surplus must (weakly) increase when the monopolist goes from selling only product 1, to selling both product 1 and product 2.

Answer