MOT1421
Economic Foundations
Week Three

OLIGOPOLY & CHOICE OF TECHNIQUE
SELF-TEST

The self-assessment consists of 10 Questions. Each Question has a weight of 1. Your maximum score therefore is 10. A score of 6 means that you have successfully passed the test.

Question 1

Calculate the Hirschman-Herfindahl Index for the following two markets:

	Market A	Market B
s_1 (biggest firm)	0.55	0.40
s_2	0.25	0.34
s_3	0.06	0.22
s_4	0.05	0.01
s_5	0.04	0.01
s_6	0.03	0.01
s_7 (smallest firm)	0.02	0.01
HHI		

In which market is marker concentration the highest?

Question 2

Consider the following non-cooperative Cournot oligopoly consisting of two identical firms. Price (in euros) is determined according to the following market demand function: P = 400 – Q. The cost functions of the two firms are:

$C_1 = 40\ Q_1 + 250$ and $C_2 = 40\ Q_2 + 250$.

Determine the Cournot equilibrium outcome. Determine Q_1 and Q_2. What is the equilibrium price? What are the profits of firm 1 and of firm 2? How large are joint profits?

Question 3

Suppose the two firms in Question 2 form a cartel. Determine the cartel outcome. Determine Q_1 and Q_2. What is the equilibrium price? What are the profits of firm 1 and of firm 2? How large are joint profits? Do the two firms have an incentive to create a cartel?

Question 4

Suppose that firm 1 violates the cartel agreement of Question 2 and maximises profits, assuming that firm 2 will stick to the cartel agreement. Determine the market outcome in this scenario. Determine Q_1 and Q_2. What is the equilibrium price? What are the profits of firm 1 and of firm 2? How large are joint profits?

Question 5

In Question 4 we assumed that firm 1 is violating the cartel agreement. Now suppose that firm 2 violates the agreement, while firm 1 will keep to the cartel agreement. Determine the market outcome in this scenario. Complete the following pay-off matrix:

Firm 2 / Firm 1	collude in a cartel	violate the cartel agreement
collude in a cartel		
violate the cartel agreement		

What is the dominant strategy of firm 1? What is the dominant strategy of firm 2? Does this market end up in a Nash equilibrium? Explain your answer.

Question 6

Consider the following production function: $x = 2\sqrt{K\ L}$. Derive the equation for the production isoquant.

Question 7

We continue with Question 6. Assume that *W* = 4 and *R* = 8 and that total cost TC = 80. What is the profit-maximising combination of *L* and *K*?

Question 8

Consider the standard Cobb-Douglas production function: $x = a \times L^{\alpha} \times K^{\beta}$.

- How does this production function change when there is neutral technological progress?
- How does this production change when there is labour-saving technological progress?

Question 9

What is the difference between technical efficiency and economic efficiency?

Question 10

What is the difference between static efficiency and dynamic efficiency?

End of self-test Week 3