

SØK1011 - EXAM

Total points = 25 points.

Question 1 (4 points)

In a perfectly competitive market, each firm has the following production costs:

Firm supply	Firm total costs
1	10
2	18
3	24
4	28
5	30
6	42
7	56
8	72
9	90
10	110

The market demand is given by: $X = 80 - 5p$ (where X denotes the market quantity of the good).

- a) (2 points) What is the market price in the long-run equilibrium?
- b) (1 point) What is the market quantity of the good in the long-run equilibrium?
- c) (1 point) How many firms will operate in the market in the long-run equilibrium?

Question 2 (6 points)

In the market for videos on demand, there are two types of consumers whose marginal willingness to pay is described by the following demand curves:

Type 1: $p = 20 - 4x$

Type 2: $p = 20 - 2x$

where x is the number of videos watched in a month.

The only supplier is a firm whose marginal cost of streaming a video is zero. The firm offers two plans. Plan 1 allows the customer to watch x_1 videos per month at a monthly fee of F_1 . Plan 2 allows the customer to watch x_2 videos per month at a monthly fee of F_2 . In both plans, the price per video is 0.

- a) (4 points) Assume the firm knows the type of each customer and can offer the correct plan to each customer. Find the values of x_1, F_1, x_2, F_2 that maximize profits.
- b) (2 points) Assume the firm does not know the type of each customer and lets customers choose the plan they want. Keeping x_1 and x_2 equal to what you found earlier, find the values of F_1 and F_2 that maximize profits.

Question 3 (4 points)

Consider a market where two firms, A and B, compete by choosing how much to supply, as in the Cournot oligopoly model. The market demand curve is:

$$p = 30 - 2X$$

where X is the total market quantity.

Firm A has a constant marginal cost $c_A = 4$. Firm B has a constant marginal cost $c_B = 4$.

- a) (3 points) Find the equilibrium supply of firm A and firm B.
- b) (1 point) Find the equilibrium price.

Question 4 (3 points)

Two firms compete in a market. Each firm can set either a high price (strategy H) or a low price (strategy L).

If firm 1 chooses H and firm 2 chooses H, each of them earns a profit of 120.

If firm 1 chooses L and firm 2 chooses L, each of them earns a profit of 30.

If firm 1 chooses H and firm 2 chooses L, firm 1 earns a profit of 10 and firm 2 earns a profit of 150.

If firm 1 chooses L and firm 2 chooses H, firm 1 earns a profit of 150 and firm 2 earns a profit of 10.

- a) (1 point) Assuming this game is played only once, what is the Nash equilibrium?
- b) (2 points) If this game is repeated for an infinite number of periods and the discount factor is 0.4, can the two firms cooperate (choosing H in each period)? Answer yes or no, and briefly explain why.

Question 5 (4 points)

A good is sold under perfect competition. Let x denote the total amount of the good. The market marginal willingness to pay (or marginal benefit) is: $130 - 25x$. The market marginal private cost is: $10 + 5x$. Production of the good creates a total externality cost equal to $5x^2$.

- a) (1 point) Find the competitive market equilibrium level of x .
- b) (2 points) Find the socially efficient level of x .
- c) (1 point) What level of per-unit tax should the government charge on the production of the good to achieve the socially efficient outcome?

Question 6 (4 points)

What are two important characteristics of public goods? Briefly explain what they mean.