Question 3

7 points \((3 + 4)\)

(a) 3 points:
- One point is earned for a correctly labeled supply and demand graph with a price ceiling indicated below the market equilibrium.
- One point is earned for correctly labeling \(Q_A\).
- One point is earned for correctly labeling \(Q_B\).

(b) 4 points:

(i) 2 points:
- One point is earned for identifying \(Q_1\) as the profit-maximizing output.
- One point is earned for identifying \(Q_3\) as the socially efficient output.

(ii) 2 points:
- One point is earned for recognizing that at \(Q_3\), the monopolist incurs a loss.
- One point is earned for identifying the area of loss, \(P_1P_3DF\).
Write in the box the number of the question you are answering on this page as it is designated in the exam.

\[3\]

**a)**

![Graph of supply and demand](Image)

**b)**

1) \(Q_1\)

2) \(Q_3\)

ii) The monopoly is incurring a loss. The area of loss is the rectangle \(p_1, p_3, D, F\).
B) i. The profit-maximizing output for the natural monopoly is at $Q_4$. This is where $MR = MC$. The socially efficient output for the natural monopoly is at $Q_2$. This is where $P = ATC$. ii. At the socially efficient output, the monopoly is making a profit at area $P_2ACP_4$. 
3. a) **Price Ceiling**

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b) (i) \( Q_3 \) is the profit-maximizing output which is at \( P_t = F \).

(ii) The socially efficient output is at \( Q_2 \) making a profit.
Overview

The question assessed the ability of students to understand pricing and output decisions under various conditions for a perfectly competitive market and for a natural monopoly. Part (a) asked students to draw a binding price ceiling in a competitive market and identify the quantity sold and the socially efficient output. Part (b) asked students to identify from a provided graph of a natural monopoly the profit-maximizing output and the socially efficient output and to identify profit or loss at the latter.

Sample: 3A
Score: 7

All parts are correctly answered.

Sample: 3B
Score: 4

The student lost 1 point in part (b)(i) for identifying the socially efficient output as $Q_2$ instead of $Q_3$. The student lost 2 points in part (b)(ii) for incorrectly identifying a profit at $Q_2$ and for identifying an area of profit/loss that is inconsistent with the choice of $Q_2$.

Sample: 3C
Score: 2

In part (a) the student earned 1 point for correctly drawing the price ceiling below market equilibrium and 1 point for correctly identifying and labeling $Q_A$ where the price ceiling intersects the supply curve.