Blue-book – 25 out of 50 pts. (2 qns., 12 pts. each + 1)

Answer these questions in your blue-book. Show your work and intermediate steps for partial credit. Points are split equally across all sub-parts. Your score will only be based on the marks in your blue-book. You will not receive any credit for anything written on your exam paper. You will receive 1 extra point for correctly writing your name, perm number, version (A, B, C, or D), and TA’s name on your blue-book.

1. A monopolist sells exclusively to Freya, whose demand is given by \( p = 15 - 2q \) and has \( MC = q \) (and no fixed cost).

(a) Find the profit maximizing price, \( p \), and quantity, \( q \).

Answer: \( p = 9 \) and \( q = 3 \)

(b) What are the monopolist’s profits, the consumer surplus, and the deadweight loss?

Answer: \( \pi = 22.5 \), \( CS = 9 \), and \( DWL = 6 \)

(c) If the monopolist used a two-part tariff, instead of a uniform price, what would be the optimal per-unit price, \( p \), fee, \( f \), and quantity, \( q \).

Answer: \( p = 5 \), \( f = 25 \), \( q = 5 \)

(d) What are the profits, consumer surplus, and deadweight loss under the two-part tariff? Very briefly discuss how your answers are similar or different to those for the uniform-pricing scheme.

Answer: \( \pi = 25 + 12.5 = 37.5 \), \( CS = 0 \), and \( DWL = 0 \). The monopolist uses marginal-cost pricing, which eliminates the deadweight-loss, but captures all of the (increased) CS with the fee, thereby increasing her profits.

2. Two firms compete as duopolists, face market demand given by \( P = 4 - Q \), and both have \( MC = 1 \).

(a) Find the market price, \( p \), and total industry quantity, \( Q \), predicted by the Bertrand model of duopoly.

Answer: \( p = MC = 1 \), \( Q = 3 \)

(b) Find the market price, \( p \), and total industry quantity, \( Q \), predicted by the Cournot model of duopoly.

Answer: \( p = 2 \), \( Q = 2 \)

(c) State whether the overall welfare predicted in the Bertrand model is higher, lower, or the same as that predicted by Cournot, with a very brief explanation.

Answer: Unlike the Cournot model, the Bertrand model predicts that price will be driven down to marginal cost. So the Bertrand \( p \) is lower and \( Q \) is higher than under Cournot competition. As a result, welfare is higher.

(d) Now suppose a third firm enters the market. It is identical to the other two firms in all respects. What is the new price, \( p \), and total quantity, \( Q \) predicted by Bertrand model?

Answer: The new entrant doesn’t affect the market outcome, so \( p = 1 \) and \( Q = 3 \).

(e) What is the new price, \( p \), and total quantity, \( Q \), predicted by the Cournot model?

Answer: \( p = 7/4 \) and \( Q = 9/4 \)

(f) State whether the change in overall welfare in response to the new competitor that is predicted by the Bertrand model is greater, smaller, or the same as that predicted by Cournot, with a very
Answer: The Cournot model predicts a drop in $p$ and an increase in $Q$, which increases welfare. However, because the Bertrand model already predicts marginal-cost pricing, there is no change in $p$ and $Q$ and thus no change in welfare. So the Bertrand model predicts a smaller change in welfare than Cournot.