

## Homework 5 – KEY

Average: 83.19 + Opts GI bonus

Due on 24/9/2024, by 23:00

The tasks in this assignment were designed for the average student to solve independently after mastering the material. The answers provided here are written in an instructional manner to help you understand the problem-solving process for each task. If you continue to struggle with a task after reviewing this key, the difficulty may stem not from the task itself, but from having missed or overlooked some parts of the required material.

- 1✓ Which of the following is true for a profit maximizing monopolistically competitive firm in the L-R?
- A.  $P = LAC$ . [Because of entry in the L-R]
  - B.  $MR = MC$ . [Because the firm maximizes profit]
  - C.  $P > MR$ . [Because the demand for the firm is downward sloping]
  - 87%D. All of the above.
- 2✓ Which of the following is the case regarding goods traded in monopolistically competitive markets?
- A. They are inferior.
  - B. They are homogeneous.
  - 88%C. They are highly substitutable.
  - D. They are entirely heterogeneous.  
[They are heterogeneous but substitutable]
- 3✓ Which of the following market structures brings about the highest DWL, given the same market demand and cost curves?
- A. A perfectly competitive market.
  - B. A Monopolistically competitive market.
  - 90%C. A collusive oligopoly (cartel).
  - D. A Cournot oligopoly.
  - E. A Bertrand oligopoly.  
[A cartel operates as a monopoly and supplies the lowest quantity at the highest price relatively to the other market structures, which results in the highest DWL]
- 4✓ Is there a DWL in monopolistically competitive markets?
- A. No, there is not.
  - B. Yes, there is in the S-R but not in the L-R.
  - C. Yes, there is in the L-R but not in the S-R.
  - 85%D. Yes, there is, both in the S-R and in the L-R.  
[The DWL comes from the market power that results from the (small) amount of product heterogeneity between brands. Because the demand is downward sloping, optimal output in monopolistic competition is less than PC output]
- 5\* Which of the following is true for a kinked-demand oligopoly?
- A. Firms will immediately update the price when MC increases. [No, they may prefer to keep price constant to not send the wrong signal to rivals]
  - 73%B. Firms have not formed a cartel. [False. Firms have established a price agreement]
  - C. Both A and B are true.
  - 23%D. None of the above.

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**Scenario 5.1:** Firm 1 and firm 2 share a market with demand  $p = 2,000 - 10Q$ , where  $Q$  denotes the total quantity sold in the market by both firms. Each firm's cost is  $FC = 4,000$  and  $MC = 200$ .

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6✓ According to scenario 5.1, how much would each firm produce, if the firms competed in quantities?

- A. Around 30 units.
- 98%B. **Around 60 units.**
- C. Around 90 units.
- D. Around 120 units.
- E. Around 150 units.
- F. Around 180 units.

[We can solve this for the first firm as:  $MR_1 = MC$  or  $2,000 - 10q_2 - 20q_1 = 200$  or  $20q_1 = 1,800 - 10q_2$  or  $q_1 = 90 - 0.5q_2$ , which is the optimal reaction function for firm 1. Since we know that at equilibrium  $q_1 = q_2$ , we can write  $q_1 = 90 - 0.5q_1$  or  $q_1 = 60$ , which implies that  $q_2 = 60$ , as well]

7✓ According to scenario 5.1, what will the profit for each firm be, if the firms competed in quantities?

- A. Zero.
- B. Around 12,000 dollars.
- C. Around 24,000 dollars.
- 78%D. **Around 32,000 dollars.**
- 14%E. Around 36,000 dollars.
- F. Around 40,000 dollars.
- G. Around 48,000 dollars.

[Price will be given by the demand curve:  $p = 2,000 - 10(60 + 60) = 800$ . In addition, since MC is constant, every next unit costs the same and therefore AVC should be also constant and equal to the MC. So, profit can be calculated as  $(p - AVC) \cdot q - FC = (800 - 200)60 - 4,000 = 32,000$ ]

8✓ According to scenario 5.1, what would the total quantity in the market ( $Q$ ) be, if the two firms colluded?

- A. Around 30 units.
- B. Around 60 units.
- 94%C. **Around 90 units.**
- D. Around 120 units.
- E. Around 150 units.
- F. Around 180 units.

[The  $MR = 2,000 - 20Q$ , must be equal to the  $MC$ . That is,  $2,000 - 20Q = 200$  or  $Q = 90$ ]

9✓ According to scenario 5.1, what would the profit for each firm be, if the two firms colluded?

- A. Zero.
- B. Around 12,000 dollars.
- C. Around 24,000 dollars.
- D. Around 32,000 dollars.
- 79%E. **Around 36,000 dollars.**
- 14%F. Around 40,000 dollars.
- G. Around 48,000 dollars.

[Price can be calculated by the demand curve:  $p = 2,000 - 10 \cdot 90$  or  $p = 1,100$ . Each firm would produce  $90/2 = 45$  units. So, profit can be calculated as  $(p - AVC) \cdot q - FC = (1,100 - 200)45 - 4,000 = 36,500$ ]

10✓ The two firms in scenario 5.1 collude but firm 2 alone decides to cheat. How much will firm 2 produce?

- A. Around 35 units.
- 94%B. **Around 70 units.**
- C. Around 100 units.
- D. Around 130 units.
- E. Around 165 units.
- F. Around 200 units.

*[Firm 2 will assume that  $q_1 = 45$  and will plug this into its reaction function:  $q_2 = 90 - 0.5q_1$  or  $q_2 = 90 - 0.5 \cdot 45$  or  $q_2 = 67.5$  is the optimal quantity for firm 2 when it assumes that its rival will not cheat]*

11✓ The two firms in scenario 5.1 collude but firm 2 alone decides to cheat. How much will the profit for firm 2 be given that firm 1 indeed does not cheat?

- A. Zero.
- B. Around 12,000 dollars.
- C. Around 24,000 dollars.
- D. Around 32,000 dollars.
- E. Around 36,000 dollars.
- 83%F. **Around 40,000 dollars.**
- 10%G. Around 48,000 dollars.

*[Price will again be given by the demand curve:  $p = 2,000 - 10(67.5 + 45) = 875$ . So, profit for firm 2 is  $(p - AVC) \cdot q - FC = (875 - 200)67.5 - 4,000 = 41,562.50$ ]*

12✓ The two firms in scenario 5.1 collude but firm 2 alone decides to cheat. How much will the profit for firm 1 be given that it indeed does not cheat?

- A. Zero.
- B. Around 12,000 dollars.
- 81%C. **Around 24,000 dollars.**
- 10%D. Around 32,000 dollars.
- E. Around 36,000 dollars.
- F. Around 40,000 dollars.
- G. Around 48,000 dollars.

*[Profit for firm 1 is  $(p - AVC) \cdot q - FC = (875 - 200)45 - 4,000 = 26,375$ ]*