

## Strategic Interaction, Oligopoly and Monopolistic Competition [Revised]

*Multiple Choice (MC) questions usually have only one correct answer, although you may be able to defend different answers. Other kinds of questions often have more than one correct answer. Having good reasons for your answers is more important than what your answer is. If you don't understand the meaning of a question, you may write to your own TF, but do not expect him/her to give you answers. The problem set will not be graded, but the way you discuss the problems in your discussion section will affect your discussion-section participation score. You are allowed to work on the problem sets with other students.*

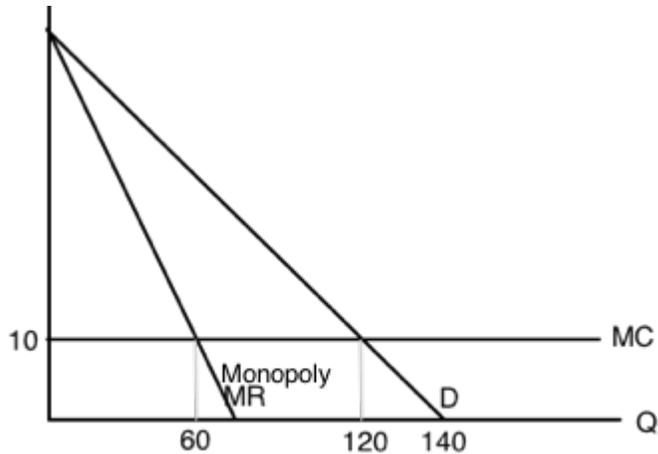
1. Rock-paper-scissors is a hand game usually played between two people, in which each player simultaneously forms one of three shapes with an outstretched hand. These shapes are "rock" (a closed fist), "paper" (a flat hand), and "scissors" (a fist with the index and middle fingers extended, forming a V). Suppose Rock beats Scissors, Scissors beats Paper, and Paper beats Rock.
  - i. Represent the situation as a normal form game. Include all details.
  - ii. Is there a pure-strategy equilibrium of this game? Explain.
  - iii. What do you think each person should do? (You can guess without doing any calculations.)
  
2. Which of the following is true? Explain.
  - i. In the long-run equilibrium of monopolistic competition, firms produce at the minimum of average total cost.
  - ii. In the equilibrium of a Bertrand game, firms produce the socially optimal quantity.
  - iii. A market with thousands of firms is one in which each firm considers the strategies other firms when deciding its own strategy.

3. [MC] What is the Nash equilibrium of the following game? Explain

		Player 2		
		X	Y	Z
Player 1	A	6, 6	8, 20	0, 8
	B	10, 0	5, 5	2, 8
	C	8, 0	20, 0	4, 4

- a. B,Y
  - b. C,Z
  - c. A,X
  - d. A,Y
- 
4. Due to recent events, there is increasing tension between the free city of Karalis and the evil kingdom of Tiscali. Both Karalis and Tiscali are considering attacking the other city to solve the dispute. If Karalis attacks and Tiscali does not, Karalis gets 100 units of cork from Tiscali. If Tiscali attacks and Karalis does not, Tiscali obtains 150 units of cork from Karalis. If they both attack, they fight and 50 units of cork are destroyed for each party. If no party attacks, no cork is destroyed.
    - i. Represent the situation as a normal form game. Include all details.
    - ii. Find the dominant strategy for Tiscali, if any. Explain.
    - iii. Find the Nash equilibrium/equilibria of the game. Explain.
    - iv. Is the equilibrium/equilibria of the game Pareto efficient? Explain.

The next three questions are based on the following graph of the market demand curve for luxury toothpaste. There are two producers, Colgate and Sensoshine, each with constant marginal cost of \$10.



5. [MC] The socially efficient level of output for this industry is:
  - a. 60 tubes of toothpaste
  - b. 120 tubes of toothpaste
  - c. 40 tubes of toothpaste
  - d. 30 tubes of toothpaste
  
6. [MC] Suppose the two firms sign a contract whereby they agree to act as a monopoly and split the market equally. Then each firm will produce:
  - a. 60 tubes of toothpaste
  - b. 120 tubes of toothpaste
  - c. 40 tubes of toothpaste
  - d. 30 tubes of toothpaste
  
7. [MC] In the Nash equilibrium of the Cournot game, each firm will produce. [Hint: You won't have to solve for the equilibrium to figure out which of the four choices is correct.]
  - a. 60 tubes of toothpaste
  - b. 120 tubes of toothpaste
  - c. 40 tubes of toothpaste
  - d. 30 tubes of toothpaste
  
8. [MC] A monopolistically competitive market is \_\_\_\_\_.
  - a. efficient when all firms are making zero economic profit
  - b. efficient when all firms make zero accounting profit
  - c. inefficient because zero economic profits are inefficient
  - d. inefficient because in the long run, there are too many firms
  
9. [MC] Which of the following statements is NOT true under monopolistic competition in the long run?
  - a. Firms operate below the efficient level of production.
  - b. Because of free entry, firms produce the socially efficient quantity.
  - c. Firms make zero economic profit.
  - d. Each firm's ATC is tangent to its demand curve at the quantity produced.

10. [MC] If in monopolistic competition in the short run, firms make economic profits, then in the long run, new firms will enter the market. In the long run, the \_\_\_\_\_ each individual firm's product will \_\_\_\_\_. In the new long-run equilibrium firms will make \_\_\_\_\_ profit.
- demand for; increase; zero economic
  - supply of; increase; zero economic
  - demand for; decrease; zero economic
  - supply of; decrease; an economic
11. [MC] One important difference between monopoly and monopolistic competition is
- the slope of the demand curve that the industry faces.
  - that in the long run, there are no barriers to entry in monopolistic competition.
  - the greater restriction of output in monopolistic competition.
  - that marginal revenue and the demand curve are the same for a monopoly.
12. [Error on original problem set: This question was a repeat of Q2. Please ignore it.]

13. [The demand and MC for this problem have been revised. If you already did this problem, you can use the original question. If you understand the idea, it's good enough.] All firms in this market have a constant marginal cost of \$10 for every unit and face no fixed costs. The market demand for the product is shown in the table on the right. In the following situations, what will be the price, quantity supplied, and profits of the firms? Also, what will be the total quantity supplied and the consumer surplus? [Hint: You can solve this without deriving the equilibria. See the lectures.]
- Duopoly in a Bertrand game
  - Duopoly in a Cournot game
  - Oligopoly with 4 firms in a Cournot game
  - Oligopoly with 9 firms in a Cournot game

Price	Quantity demanded
60	0
50	10
40	20
30	30
20	40
10	50
0	60