

Sample Exam Problems Related to Chapters 5 and 6

1. The addition to total cost resulting from the addition of the last unit of output is known as
  - A. marginal product.
  - B. average product.
  - C. average variable cost.
  - D. average total cost.
  - E. **marginal cost.**
  
2. The long-run average cost curve slopes downward if there are
  - A. some factors without diminishing marginal returns.
  - B. economies of scope in the management of multiplant operations.
  - C. **economies of scale.**
  - D. diseconomies of scope in the management of multiplant operations.
  - E. no factors without diminishing marginal returns.
  
3. The long-run average cost curve slopes upward if there are
  - A. some factors without diminishing marginal returns.
  - B. diseconomies of scope in the management of multiplant operations.
  - C. economies of scale.
  - D. **diseconomies of scale.**
  - E. no factors without diminishing marginal returns.
  
4. Average variable cost is equal to the
  - A. change in total variable cost divided by the change in output levels.
  - B. **total variable cost divided by the level of output.**
  - C. marginal cost divided by the average product of the variable input.
  - D. marginal cost divided by the marginal product of the variable input.
  - E. total variable cost divided by the change in output levels.
  
5. Minimum efficient scale is the output at which
  - A. **long-run average cost is first minimized.**
  - B. long-run average cost first equals long-run marginal cost.
  - C. short-run average cost equals long-run average cost for the first time.
  - D. short-run marginal cost equals long-run marginal cost for the first time.
  - E. diseconomies are first overcome and then economies of scale set in.

6. If total cost is given by  $TC = 10Q - 5Q^2 + 0.1Q^3$ , then average cost is minimized at \_\_\_\_\_ units of output.

- A. 0.5
- B. 0.01
- C. 50
- D. 25**
- E. 0.1

**Note:** Since  $TC = 10Q - 5Q^2 + 0.1Q^3$ , average cost is  $AC = 10 - 5Q + 0.1Q^2$ .  
 $dAC / dQ = -5 + 0.2Q = 0 \Rightarrow 5 + 0.2Q \Rightarrow Q = 25$ .

7. In the model of perfect competition, there are

- A. high barriers to entry and no nonprice competition.
- B. low barriers to entry and some advertising and product differentiation.
- C. very high barriers to entry and some advertising and product differentiation.
- D. high barriers to entry and some advertising and product differentiation.
- E. low barriers to entry and no nonprice competition.**

8. A representative firm with short-run total cost given by  $TC = 50 + 2q + 2q^2$  operates in a competitive industry where the short-run market demand and supply curves are given by  $Q_D = 1,410 - 40P$  and  $Q_S = -390 + 20P$ . Its short-run profit maximizing level of output is

- A. 0 units.
- B. 1 unit.
- C. 2 units.
- D. 5 units.
- E. 7 units.**

**Note:** Setting  $Q_D = Q_S \chi 1,410 - 40P = -390 + 20P \circledast P = 30$ . In a short-run equilibrium  $P = MC$ ;  $MC = 2 + 4q$ ;  $\therefore 2 + 4q = 30 \Rightarrow$  short-run profit maximizing level of output = 7 units.

9. If a representative firm with long-run total cost given by  $TC = 50 + 2q + 2q^2$  operates in a competitive industry where the short-run market demand and supply curves are given by  $Q_D = 1,410 - 40P$  and  $Q_S = -390 + 20P$ , its long-run profit maximizing level of output is

- A. 0 units.
- B. 1 unit.
- C. 2 units.
- D. 5 units.**
- E. 7 units.

**Note:** This can be solved in two ways: 1) In the long run, the competitive firm minimizes average total cost (ATC), where  $ATC = TC/Q =$   
 $ATC = 50q^{-1} + 2 + 2q$ ; therefore,  $dATC / dq = -50q^{-2} + 2 = 0 \Rightarrow 50 = 2q^2 \Rightarrow$   
 $q = 5$  units, or 2) Set  $MC = ATC$ ;  $MC = 2 + 4q = 50q^{-1} + 2 + 2q \circledast q = 5$  units.

10. If a representative firm with long-run total cost given by  $TC = 50 + 2q + 2q^2$  operates in a competitive industry where the market demand is given by  $Q_D = 1,410 - 40P$ , the long-run equilibrium output of the industry will be

- A. 490 units.
- B. 530 units.**
- C. 570 units.
- D. 610 units.
- E. 650 units.

**Note:** Since  $q = 5$  at the firm level in the long run, this implies that the long-run equilibrium price for the industry will be  $P = MC = 2 + 4q = 2 + 4(5) = \$22$ . Thus, in a competitive long-run equilibrium,  $P = MC = 2 + 4q = 2 + 4(5) = \$22$ . Since  $P = \$22$ ,  $Q_D = 1,410 - 40(22) = 530$  units.