

**REVIEW QUESTIONS****1. Why would a firm that incurs losses choose to produce rather than shut down?**

Losses occur when revenues do not cover total costs. Revenues could be greater than variable costs, but not total costs, in which case the firm is better off producing in the short run rather than shutting down, even though they are incurring a loss. The firm should compare the level of loss with no production to the level of loss with positive production, and pick the option that results in the smallest loss. In the short run, losses will be minimized as long as the firm covers its variable costs. In the long run, all costs are variable, and thus, all costs must be covered if the firm is to remain in business.

**2. Explain why the industry supply curve is not the long-run industry marginal cost curve.**

In the short run, a change in the market price induces the profit-maximizing firm to change its optimal level of output. This optimal output occurs when price is equal to marginal cost, as long as marginal cost exceeds average variable cost. Therefore, the supply curve of the firm is its marginal cost curve, above average variable cost. (When the price falls below average variable cost, the firm will shut down.)

In the long run, the firm adjusts its inputs so that its long-run marginal cost is equal to the market price. At this level of output, it is operating on a short-run marginal cost curve where short-run marginal cost is equal to price. As the long-run price changes, the firm gradually changes its mix of inputs to minimize cost. Thus, the long-run supply response is this adjustment from one set of short-run marginal cost curves to another.

Note also that in the long run there will be entry and the firm will earn zero profit, so that any level of output where  $MC > AC$  is not possible.

**3. In long-run equilibrium, all firms in the industry earn zero economic profit. Why is this true?**

The theory of perfect competition explicitly assumes that there are no entry or exit barriers to new participants in an industry. With free entry, positive economic profits induce new entrants. As these firms enter, the supply curve shifts to the right, causing a fall in the equilibrium price of the product. Entry will stop, and equilibrium will be achieved, when economic profits have fallen to zero.

**4. What is the difference between economic profit and producer surplus?**

While economic profit is the difference between total revenue and total cost, producer surplus is the difference between total revenue and total variable cost. The difference between economic profit and producer surplus is the fixed cost of production.

**5. Why do firms enter an industry when they know that in the long run economic profit will be zero?**

Firms enter an industry when they expect to earn economic profit. These short-run profits are enough to encourage entry. Zero economic profits in the long run imply *normal* returns to the factors of production, including the labor and capital of the owners of firms. For example, the owner of a small business might experience positive accounting profits before the foregone wages from running the business are subtracted from these profits. If the revenue minus other costs is just equal to what could be earned elsewhere, then the owner is indifferent to staying in business or exiting.

6. At the beginning of the twentieth century, there were many small American automobile manufacturers. At the end of the century, there are only three large ones. Suppose that this situation is not the result of lax federal enforcement of antimonopoly laws. How do you explain the decrease in the number of manufacturers? (Hint: What is the inherent cost structure of the automobile industry?)

Automobile plants are highly capital-intensive. Assuming there have been no impediments to competition, increasing returns to scale can reduce the number of firms in the long run. As firms grow, their costs decrease with increasing returns to scale. Larger firms are able to sell their product for a lower price and push out smaller firms in the long run. Increasing returns may cease at some level of output, leaving more than one firm in the industry.

7. Industry X is characterized by perfect competition, so every firm in the industry is earning zero economic profit. If the product price falls, no firms can survive. Do you agree or disagree? Discuss.

Disagree. As the market price falls, firms cut their production. If price falls below average total cost, firms continue to produce in the short run and cease production in the long run. If price falls below average variable costs, firms cease production in the short run. Therefore, with a small decrease in price, i.e., less than the difference between the price and average variable cost, the firm can survive. With larger price decrease, i.e., greater than the difference between price and minimum average cost, the firm cannot survive. In general, we would expect that some firms will survive and that just enough firms will leave to bring profit back up to zero.

8. An increase in the demand for video films also increases the salaries of actors and actresses. Is the long-run supply curve for films likely to be horizontal or upward sloping? Explain.

The long-run supply curve depends on the cost structure of the industry. If there is a fixed supply of actors and actresses, as more films are produced, higher salaries must be offered. Therefore, the industry experiences increasing costs. In an increasing-cost industry, the long-run supply curve is upward sloping. Thus, the supply curve for videos would be upward sloping.

9. True or false: A firm should always produce at an output at which long-run average cost is minimized. Explain.

False. In the long run, under perfect competition, firms will produce where long-run average costs are minimized. In the long-run, the firm will have adjusted its mix of capital and labor so that average costs are minimized. In addition, entry and exit will force price to adjust so it is close to minimum average cost. In the short run, however, the firm might not be producing the optimal long-run output. For example, if there are any fixed factors of production, the firm does not always produce where long-run average cost is minimized. Also, in the short run the firm may be producing at a point where price equals marginal cost at a quantity that is different than that which corresponds to minimum long-run average cost.

10. Can there be constant returns to scale in an industry with an upward-sloping supply curve? Explain.

Constant returns to scale imply that proportional increases in all inputs yield the same proportional increase in output. Proportional increases in inputs can induce higher prices if the supply curves for these inputs are upward sloping. For example, production that uses rare or depleting inputs will see higher costs of production as production increases in scale. Doubling inputs will still yield double output, but because of rising costs, the firm cannot offer increasing amounts of the good without higher prices. Therefore, constant returns to scale does not always imply long-run horizontal supply curves.

**11. What assumptions are necessary for a market to be perfectly competitive? In light of what you have learned in this chapter, why is each of these assumptions important?**

The two primary assumptions of perfect competition are (1) all firms in the industry are price takers, and (2) there is free entry and exit of firms from the market. This chapter discusses how competitive equilibrium is achieved under these assumptions. The first assumption is important because it means that no firm has any market power. Given no firm has market power, firms will produce where price is equal to marginal cost. In the short run, price could equal marginal cost at a quantity where marginal cost is greater than average cost, implying positive economic profits. With free entry and exit, positive economic profits would encourage other firms to enter. This entry exerts downward pressure on price until price is equal to both marginal cost and minimum average cost.

**12. Suppose a competitive industry faces an increase in demand (i.e., the demand curve shifts upward). What are the steps by which a competitive market insures increased output? Will your answer change if the government imposes a price ceiling?**

If demand increases with fixed supply, price and profits increase. The price increase induces the firms in the industry to increase output. Also, with positive profit, firms enter the industry, shifting the supply curve to the right. This results in a new equilibrium with a higher quantity produced and a price that earns all firms zero economic profit. With an effective price ceiling, profit will be lower than without the ceiling, reducing the incentive for firms to enter the industry. With zero economic profit, no firms enter and there is no shift in the supply curve.

**13. The government passes a law that allows a substantial subsidy for every acre of land used to grow tobacco. How does this program affect the long-run supply curve for tobacco?**

A subsidy on tobacco production decreases the firm's costs of production. These cost decreases encourage other firms to enter tobacco production, and the supply curve for the industry shifts out to the right.

**14. A certain brand of vacuum cleaners can be purchased from several local stores as well as from several catalogue or web site sources.**

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**a. If all sellers charge the same price for the vacuum cleaner, will they all earn zero economic profit in the long run?**

Yes by charging the same price they will all earn zero economic profit in the long run. If economic profit was greater than zero then firms would enter the industry and if economic profit was less than zero firms would exit the industry.

**b. If all sellers charge the same price and one local seller owns the building in which he does business, paying no rent, is this seller earning a positive economic profit?**

No this seller would still earn zero economic profit. If he pays no rent then the accounting cost of using the building is zero, but there is still an opportunity cost, which represents the value of the next best alternative use of the building.

**c. Does the seller who pays no rent have an incentive to lower the price he charges for the vacuum cleaner?**

No he has no incentive to charge a lower price because this will lower his economic profit. Given all firms sell an identical good, they will charge the same price for that good. By charging a lower price, the firm is no longer maximizing profit.