MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Table 11-3

<table>
<thead>
<tr>
<th>Quantity of Workers</th>
<th>Quantity of Boxes</th>
<th>Marginal Product of Labor</th>
<th>Average Product of Labor</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
<td>-----</td>
<td>-----</td>
</tr>
<tr>
<td>1</td>
<td>50</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>200</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>240</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>264</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>284</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1) Refer to Table 11-3. The table above refers to the relationship between the quantity of workers employed and the number of cardboard boxes produced per day by Manny's House of Boxes. The capital used to produce the boxes is fixed. The highest value of the average product is labor is _______ when Manny hires _______ workers.

A) 100; 3  
B) 80; 4  
C) 80; 3  
D) 100; 2

2) The total output produced by a firm divided by the quantity of workers employed by the firm is the definition of

A) the division of labor.  
B) the average product of labor.  
C) the marginal product of labor.  
D) the average cost of production.

3) Which of the following is a reason why a firm would experience diseconomies of scale?

A) As the size of the firm increases it becomes more difficult to coordinate the operations of its manufacturing plants.  
B) As the size of the firm increases, it becomes more difficult to find markets where it doesn’t already have operations.  
C) As the size of the firm increases, it must operate in other countries where differences in language, customs, and laws increase its average costs.  
D) To finance an increase in the size of its plant a firm must borrow more money or sell more shares of stock.

4) Which of the following statements correctly describes the distinction between technology and technological change?

A) Technology is product-centered; its refers to developing new products with limited resources while technological change is process-centered in that it focuses on developing new production techniques.  
B) Technology refers to the processes used by a firm to transform inputs into output of goods and services while technological change is a change in a firm’s ability to produce a given level of output with a given quantity of inputs.  
C) Technology involves research and development while technological change involves the use of more efficient machinery.  
D) Technology refers to the ability of a firm to increase its maximum output from a given quantity of inputs and technological change is the process by which the firm achieves this productivity gain.
5) Which of the following is not a reason why firms experience economies of scale?
   A) As output increases, the managers can begin to have difficulty coordinating the operations of their firms.
   B) Workers and managers can become more specialized, enabling them to be more productive.
   C) Larger firms may be able to purchase inputs at lower costs than smaller competitors.
   D) Technology can make it possible to increase production with a smaller increase in at least one input.

6) If, when a firm doubles all its inputs, its average cost of production decreases, then production displays
   A) diminishing returns.  
   B) diseconomies of scale.  
   C) economies of scale.  
   D) declining fixed costs.

7) Refer to Figure 11-4. What happens to the average fixed cost of production when the firm increases output from 150 to 200?
   A) It could rise or fall depending on what happens to total cost.
   B) It falls.
   C) It remains constant.
   D) It rises.

TRUE/FALSE. Write 'T' if the statement is true and 'F' if the statement is false.

8) If a firm is experiencing diseconomies of scale, its long-run average cost curve is increasing.

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

9) Over the past twenty years, the number of small family farms has fallen significantly and in their place there are fewer, but larger, farms owned by corporations. Which of the following best explains this trend?
   A) diminishing returns to labor in farming  
   B) diseconomies of scale in farming  
   C) economies of scale in farming  
   D) declining productivity
Table 11-2

<table>
<thead>
<tr>
<th>Number of Workers</th>
<th>Apples per Day (bushels)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>50</td>
</tr>
<tr>
<td>2</td>
<td>120</td>
</tr>
<tr>
<td>3</td>
<td>180</td>
</tr>
<tr>
<td>4</td>
<td>230</td>
</tr>
<tr>
<td>5</td>
<td>270</td>
</tr>
<tr>
<td>6</td>
<td>300</td>
</tr>
</tbody>
</table>

Table 11-2 summarizes production at the Crunchy Apple Orchard for the month of April.

10) **Refer to Table 11-2.** What is the average product of labor when the orchard employs 5 workers?

A) 270 bushels  
B) 54 bushels  
C) 40 bushels  
D) 8 bushels

11) TRUE/FALSE. Write 'T' if the statement is true and 'F' if the statement is false.

11) If the long-run average total cost curve is downward sloping, then the firm is experiencing decreasing returns to scale.

12) A downward sloping marginal product of labor curve demonstrates the law of diminishing marginal returns.

13) If a firm is producing no output in the short run, then its total costs are zero.

14) MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

14) In a diagram showing the average total cost and average variable cost curves, the minimum point of the average total cost is

A) at a larger level of output than the minimum point of the average variable cost.  
B) at the same level of output as the minimum point of the average variable cost.  
C) at a lower level of output than the minimum point of the average variable cost.  
D) at the same level of output as the maximum of the total product curve.

15) Stan owns a software design business. He does not have time to expand his office space or redesign the layout of his office. He can increase the amount of work he does by working more hours, asking his current employees to work more hours, or hiring more employees. The relationship between Stan’s inputs and the maximum output his firm can produce is called his

A) long-run production function.  
B) cost function.  
C) short-run production function.  
D) production possibilities frontier.

16) TRUE/FALSE. Write 'T' if the statement is true and 'F' if the statement is false.

16) Average total cost is equal to average variable cost minus average fixed cost.

17) Assume that price is greater than average variable cost. If a perfectly competitive firm is producing at an output where price is $114 and the marginal cost is $102, then the firm is probably producing more than its profit-maximizing quantity.
MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

18) Hogrocket, which developed the Tiny Invaders game for the iPhone, found that to maintain sales in a profitable competitive market, the price of a product
A) will usually fall.  
B) will usually rise.  
C) will usually remain stable.  
D) will eventually fall to zero.

TRUE/FALSE. Write 'T' if the statement is true and 'F' if the statement is false.

19) In the short run, a firm might choose to produce rather than shut down even if its market price is less than its average total cost of production.

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

20) Which of the following is a characteristic of a firm in a perfectly competitive market?
A) The firm must lower its price in order to increase quantity demanded.  
B) The firm can make a profit in the long run but not in the short run.  
C) The firm cannot make a profit in the short run because it is too small a part of the total market.  
D) The firm can sell as much as it wants without having to lower its price.

**Figure 12-9**

Figure 12-9 shows cost and demand curves facing a profit-maximizing, perfectly competitive firm.

21) Refer to Figure 12-9. At price $P_4$, the firm would
A) make a profit.  
B) shut down.  
C) lose an amount equal to its fixed cost.  
D) lose an amount less than fixed cost.
ESSAY. Write your answer in the space provided or on a separate sheet of paper.

22) What assumptions are necessary for a market to be perfectly competitive? Explain why each of these assumptions is important.

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

23) A constant-cost, perfectly competitive market is in long-run equilibrium. At present, there are 1,000 firms each producing 400 units of output. The price of the good is $60. Now suppose there is a sudden increase in demand for the industry’s product which causes the price of the good to rise to $64. In the new long-run equilibrium, how will the average total cost of producing the good compare to what it was before the price of the good rose?

A) The average total cost will be lower than it was before the price increase because of economies of scale.
B) The average total cost will be higher than it was before the price increase since the increase in demand will drive up input prices.
C) The average total cost will be the same as it was before the price increase.
D) The average total cost will be higher than it was before the price increase because of diseconomies of scale arising from the increased demand.

ESSAY. Write your answer in the space provided or on a separate sheet of paper.

24) Under what conditions should a competitive firm shut down in the short run?

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

25) Refer to Figure 12-5. What is the minimum price the firm requires to produce output?

A) $20
B) $14
C) $5
D) It cannot be determined

Figure 12-5 shows cost and demand curves facing a typical firm in a constant-cost, perfectly competitive industry.
### Table 12-2

<table>
<thead>
<tr>
<th>Apples (pounds)</th>
<th>Market Price per Pound</th>
<th>Total Revenue (TR)</th>
<th>Average Revenue (AR)</th>
<th>Marginal Revenue (MR)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>$3</td>
<td>$0</td>
<td>-----</td>
<td>-----</td>
</tr>
<tr>
<td>100</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>150</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>200</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>250</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>300</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>350</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>400</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 12-2 lists the various pounds (lbs.) of apples that Margie Stattler can sell. Assume that Margie operates in a perfectly competitive market.

26) Refer to Table 12-2. What is Margie's total revenue if she sells 250 pounds of apples?  
A) $250  
B) $500  
C) $750  
D) There is not enough information in the table to determine Margie's total revenue.

27) To maximize profit, a perfectly competitive firm  
A) should sell the quantity of output that results in a value for total revenue that is equal to total cost.  
B) should produce the quantity of output that results in the greatest difference between marginal revenue and marginal cost.  
C) should sell the quantity of output determined by the interaction between industry demand and supply.  
D) should produce the quantity of output that results in the greatest difference between total revenue and total cost.

TRUE/FALSE. Write 'T' if the statement is true and 'F' if the statement is false.

28) In the short run, if a firm shuts down it avoids its variable cost but not its fixed cost.
MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Table 12-4

<table>
<thead>
<tr>
<th>Quantity</th>
<th>Average Fixed Cost</th>
<th>Average Variable Cost</th>
<th>Marginal Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>20</td>
<td>$40</td>
<td>$18</td>
<td>$18</td>
</tr>
<tr>
<td>40</td>
<td>20</td>
<td>14</td>
<td>10</td>
</tr>
<tr>
<td>60</td>
<td>13.1</td>
<td>16</td>
<td>20</td>
</tr>
<tr>
<td>80</td>
<td>10</td>
<td>22</td>
<td>40</td>
</tr>
<tr>
<td>100</td>
<td>8</td>
<td>30</td>
<td>62</td>
</tr>
<tr>
<td>120</td>
<td>6.61</td>
<td>40</td>
<td>90</td>
</tr>
</tbody>
</table>

Table 12-4 shows the short-run cost data of a perfectly competitive firm. Assume that output can only be increased in batches of 20 units.

29) Refer to Table 12-4. If the market price is $45 the firm will produce
   A) 60 units.          B) 80 units.          C) 100 units          D) 120 units

30) Which of the following is not an assumption of perfectly competitive markets?
   A) Each firm produces a similar but not identical product.
   B) There are many sellers and many buyers, all of which are small relative to the market.
   C) There are no barriers to new firms entering the market.
   D) The products sold by all firms in the market are identical.

ESSAY. Write your answer in the space provided or on a separate sheet of paper.

31) Assuming a market price of $4, fill in the columns in the following table. What is the profit-maximizing level of production? What are the two ways to determine the profit-maximizing level of production?

<table>
<thead>
<tr>
<th>Quantity</th>
<th>Total Revenue (TR)</th>
<th>Total Cost (TC)</th>
<th>Profit</th>
<th>Marginal Revenue (MR)</th>
<th>Marginal Cost (MC)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>5</td>
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<td>2</td>
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</tr>
<tr>
<td>3</td>
<td>9</td>
<td>9</td>
<td>6</td>
<td></td>
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</tr>
<tr>
<td>4</td>
<td>14</td>
<td>14</td>
<td>8</td>
<td></td>
<td></td>
</tr>
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<td></td>
</tr>
<tr>
<td>6</td>
<td>28</td>
<td>28</td>
<td>12</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>40</td>
<td>40</td>
<td>20</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

32) If a perfectly competitive firm’s price is above its average total cost, the firm
   A) should shut down.          B) is incurring a loss.
   C) is breaking even.          D) is earning a profit.
ESSAY. Write your answer in the space provided or on a separate sheet of paper.

33) Consider the market for wheat which is a perfectly competitive market. Is the market demand curve the same as the demand curve facing an individual producer? If not, explain how and why they are different? Illustrate your answer graphically.

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

34) Refer to Figure 12-3. Suppose the prevailing price is $P_1$ and the firm is currently producing its loss-minimizing quantity. Identify the area that represents the loss.

A) $P_2\ deP_1$  
B) $P_3\ caP_0$  
C) $P_3\ cbP_1$  
D) $0P_1\ bQ_1$
The assumptions necessary for a market to be perfectly competitive are:

1. There are many buyers and sellers, all of whom are small relative to the market. This assumption ensures that each seller (or firm) and buyer is a price taker. A price taker cannot affect the market price.
2. All firms sell identical products. This condition excludes the possibility of any product differences which might justify different prices. Because the consumer cannot differentiate between products of different producers, any firm that charges a higher price will lose all its customers.
3. No barriers to new firms entering the market or exiting the market. This assumption guarantees that economic profits earned in the short run will be eliminated in the long run. In the long run, perfectly competitive firms will break even.

23) C
24) When market price is below average variable cost at the output where marginal revenue equals marginal cost, the firm should shut down in the short run.

25) C
26) C
27) D
28) TRUE
29) B
30) A
31) The profit-maximizing level of production is 3 units, which can be determined by the greatest difference between total revenue and total cost, which is equal to profit, and can also be determined where marginal revenue is equal to marginal cost (or marginal revenue is the closest to marginal cost, without being below marginal cost).

32) D

33) The market demand is downward sloping while the demand for an individual firm’s output is horizontal at the equilibrium market price. This is because an individual producer is too small to influence the market price and must take the market price as given. At the market price, the individual seller can sell all the output she desires. The figure below shows the market demand curve and the demand curve for a single firm.

34) C