Instructions: Mark the letter for your chosen answer for each question on the computer readable answer sheet using a No.2 pencil. Note a)=1, b)=2 and so forth. Please note that some questions have four choices, others have five choices. On the answer sheet make sure that you have written and coded your name, your student ID number and the number of the recitation section you attend (A list of recitations shown on the screen will help you identify your section number). Each failure to follow directions will result in a one question deduction. All questions are weighted equally.

Information for Questions 1-5. The table below is showing John’s total utility while consuming different numbers of donuts per day. The total and marginal utility is measured in dollars. You can use the information provided to fill in any blanks in the table. (Hint: complete the table before you start the questions)

<table>
<thead>
<tr>
<th>Number of donuts consumed</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Utility (dollars)</td>
<td>0</td>
<td>3</td>
<td>7</td>
<td>12</td>
<td>16</td>
<td>19</td>
<td>21</td>
<td>22</td>
<td>21</td>
</tr>
<tr>
<td>Marginal Utility (dollars)</td>
<td>0</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>-1</td>
</tr>
</tbody>
</table>

1. After what quantity does John first experience diminishing marginal utility?
   a) 0  b) 2  c) 3  d) 5  e) 8

2. If the donuts are free of charge, how many donuts per day is John going to consume?
   a) 0  b) 3  c) 4  d) 7  e) 8
   John will continue to consume until marginal utility become negative. Eating the 8th donut would reduce total utility so the consumer will stop after 7.

3. If donuts cost $3.50 a piece, how many donuts will John choose to consume per day?
   a) 4  b) 5  c) 6  d) 7  e) 8
   Consumer will purchase an additional donut so long as MU>P (Note: answer has to be in the range where diminishing marginal utility has set in if consumer surplus is positive.

4. If donuts cost $3.50 a piece, how much consumer surplus will John receive at his chosen consumption level.
   a) $1.00  b) $2.00  c) $3.00  d) $4.00  e) $4.50
   Consumer surplus is total utility-total expenditure. Since John will consume 4 donuts if the price is $3.50,
   Consumer surplus = total utility(4) - $3.50 x 4 = 16 - 14 = 200

5. John is given the opportunity to join the Columbia Donut Club. For just $5 a day membership fee he can buy donuts for $2.50 a piece. If John does not join the club, he can still purchase as many donuts as he wishes for $3.50 a piece. Should he join and if he does, how many donuts should he purchase each day?
   a) no, should not join
   b) yes, should join and buy 5 donuts per day
   c) yes, should join and buy 7 donuts per day
   d) uncertain, from the information given it is not possible to tell whether he should join or not.
   Need to figure out what John’s consumer surplus would be if he joined the club. Again consumer surplus would be total utility-total expenditure. If he only has to pay an additional $2.50 for one more donut if he joins the club, he would purchase 5 donuts. (Last donut for with MU>2.50) Total utility of 5 donuts is 19 Total expenditure would be $5 to join and 5*2.50 to buy 5 donuts = $17.50 Consumer surplus would be 19-17.50= $1.50. He got $2.00 of consumer surplus if he paid the regular price of $3.50, so he would not buy the deal.
**Information for questions 6 and 8.**
The current price pizza in Chapel Hill is $10 per unit. A 1% increase in price of pizzas would result in a 2% decrease in the quantity demanded.

6. Given the information above, the demand for pizzas is
   a) unitary elastic.  
   b) inelastic.  
   c) zero.  
   d) elastic.  

7. If the price of pizzas increases by a small amount, we can conclude
   a) that total revenue in the pizza market will decrease.  
   b) that total revenue in the pizza market will increase.  
   c) that total revenues for the firm will be unchanged.  
   d) nothing about the way total revenues would change.

8. An increase in the income of pizza consumers will result in ________ consumption of pizza
   a) increased  
   b) decreased  
   c) unchanged  
   d) a), d), and c) are all possible.

**Information for Questions 9-16: Figure 1 shows a market demand and supply curve for green peas.**

9. If the market for peas is competitive, the equilibrium price per ton of peas will be
   a) $20  
   b) $25  
   c) $30  
   d) $35  
   e) $40

10. If the price of peas was fixed by government decree at $35 a ton, there would be an excess ________ of ________ tons per year
    a) demand, 2  
    b) demand, 4  
    c) supply, 2  
    d) supply, 4  
    e) demand, 8

11. Carrots and green peas are complements on the demand side only. Carrots are sold on a competitive unregulated market where normal assumptions about supply and demand hold. If the price of carrots were to increase then we would expect the price of peas to ________ and the output of peas to ________.
    a) rise, raise  
    b) rise, fall  
    c) fall, rise  
    d) fall, fall  
    e) uncertain

12. Given the information in question 11, the cross price elasticity of the demand for carrots with respect to the price of green peas must be
    a) equal to 1  
    b) greater than 1  
    c) less than 1  
    d) greater than 0  
    e) less than 0

13. For a price change from $25 a ton to $20 a ton, the arc price elasticity of demand is
a) .25  

\[ \text{arc elasticity} = \frac{\text{change in } Q}{\text{average } Q} = \frac{(2)}{(13)} = \frac{154}{22} \approx .692 \]

c) 1  

d) 1.444  

e) 2.5

14. At a price of $30 per ton, the **point price elasticity** of the demand for green peas is

a) 1.0  

b) $1.2  

c) 1.5  

d) 1.667  

e) 2.667

Point elasticity is \( \frac{\Delta Q}{\Delta P} \). The point elasticity is \( \frac{\Delta Q}{\Delta P} \). The slope of the demand curve is \( \frac{5}{2} \). So \( \eta = \frac{30}{5} = 1.2 \).

15. A drop in price from $25 to $20 per ton will increase consumer surplus by.

a) $5  

b) $12  

c) $60  

d) $65  

e) $70

*Area shown in diagram = (5 x 12) = 1/2(5 x 2)*

16. If this is a normal good and the income of consumers increases what will happen

a) Price and Quantity will increase. An increase in income shifts the demand curve for a normal good out, the new market equilibrium will have a higher price and quantity.

b) Price will increase and Quantity will decrease

c) Price and Quantity will decrease

d) Price will decrease and Quantity will increase

17. Your boss is currently able to sell 100 pizzas a day for $9.00 a piece. He is considering lowering the price a little so that he can sell more. If you know that the elasticity of demand is 3, how much additional revenue a day would you estimate that the Pizza Place would receive if it lowered its price by enough to sell one more pizza?

a) $9.00  

b) $6.00  

c) $4.50  

d) $1.50  

e) $0

\[ MR = P \left( 1 - \frac{1}{\eta} \right) = 9 \left( 1 - \frac{1}{3} \right) = 6 \]

18. If the industry’s long-run average costs fall with increased output, the industry shows

a) constant marginal returns

b) decreasing returns to scale

c) increasing returns to scale

d) decreasing marginal returns
Information for Questions 19 -26. Table 1 shows a cheesecake factory's daily production of cakes. The only inputs used in production are ovens and workers. In the short run, the factory has rented 3 ovens at a price of $5 per oven per day and is unable to change the number of ovens in the short run. Each one of the workers is paid $3 a day.

Table 1 (with all possible calculation made)

<table>
<thead>
<tr>
<th>Ovens</th>
<th>workers</th>
<th>output</th>
<th>MPPI</th>
<th>APPL</th>
<th>TC</th>
<th>ATC</th>
<th>AVC</th>
<th>MC</th>
<th>AFC</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>0</td>
<td>0</td>
<td>10.00</td>
<td>1.80</td>
<td>15</td>
<td>1.00</td>
<td>0.30</td>
<td>0.30</td>
<td>1.50</td>
</tr>
<tr>
<td>3</td>
<td>1</td>
<td>10</td>
<td>12.00</td>
<td>0.95</td>
<td>21</td>
<td>0.95</td>
<td>0.27</td>
<td>0.25</td>
<td>0.68</td>
</tr>
<tr>
<td>3</td>
<td>2</td>
<td>22</td>
<td>10.00</td>
<td>0.75</td>
<td>24</td>
<td>0.75</td>
<td>0.28</td>
<td>0.30</td>
<td>0.68</td>
</tr>
<tr>
<td>3</td>
<td>3</td>
<td>32</td>
<td>8.00</td>
<td>0.68</td>
<td>27</td>
<td>0.68</td>
<td>0.30</td>
<td>0.38</td>
<td>0.65</td>
</tr>
<tr>
<td>3</td>
<td>4</td>
<td>40</td>
<td>6.00</td>
<td>0.65</td>
<td>30</td>
<td>0.65</td>
<td>0.33</td>
<td>0.50</td>
<td>0.66</td>
</tr>
<tr>
<td>3</td>
<td>5</td>
<td>46</td>
<td>4.00</td>
<td>0.66</td>
<td>33</td>
<td>0.66</td>
<td>0.36</td>
<td>0.75</td>
<td>0.69</td>
</tr>
<tr>
<td>3</td>
<td>6</td>
<td>50</td>
<td>2.00</td>
<td>0.69</td>
<td>36</td>
<td>0.69</td>
<td>0.40</td>
<td>1.50</td>
<td>0.74</td>
</tr>
<tr>
<td>3</td>
<td>7</td>
<td>52</td>
<td>1.00</td>
<td>0.70</td>
<td>39</td>
<td>0.70</td>
<td>0.45</td>
<td>3.00</td>
<td>0.45</td>
</tr>
<tr>
<td>3</td>
<td>8</td>
<td>53</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

19. If the cheese cake factory produces 40 cheesecakes per day, what is the average fixed cost per cheese cake?
   a) $15  b) $5  c) $375  d) $.30  e) $.15
   \[ AFC = \frac{Total\ Fixed\ cost}{Q} \]

20. If the cheese cake factory produces 40 cheesecakes per day, what is the average variable cost per cheese cake?
   a) $.30  b) $.67  c) $1.00  d) $1.33  e) $3.00
   \[ AVC = \frac{Total\ VC}{Q} \]

21. What is your best estimate of the marginal cost of the 40th cheese cake?
   a) $.30  b) $.375  c) $.60  d) $.75  e) $3.00
   \[ SRMC = \frac{P_e}{MPP_L} \]

22. Given that the market price for the cakes is $.76 each and that the cheesecake market is perfectly competitive, how many workers will be hired in the Cheesecake factory? (Consider only the discrete number of laborer shown in the table)
   a) 7  b) 6  c) 5  d) 4  e) 3
   \[ Point\ where\ P = MC\ (or\ closest\ point\ to\ that\ where\ P>MC.) \]

23. If the Cheesecake factory is a profit maximizing perfectly competitive firm and the market price is $.76, then the firm will choose to supply ____ cheesecakes in short run equilibrium. (Consider only the discrete output levels shown in the table)
   a) 32  b) 40  c) 46  d) 50  e) 52
   \[ Point\ where\ P = MC\ (or\ closest\ point\ to\ that\ where\ P>MC.) \]

24. In short run competitive equilibrium, the profits of the cheesecake factory will be _____. (Consider only the discrete output levels shown in the table)
   a) -$15  b) $0  c) $3.40  d) $5.00  e) $6.50
   \[ Profits = total\ revenue - total\ cost \]
25. The break even point for this firm will occur at a quantity of about ____. (Consider only the discrete output levels shown in the table)

<table>
<thead>
<tr>
<th>Quantity</th>
<th>12</th>
<th>10</th>
<th>8</th>
<th>6</th>
<th>5</th>
<th>4</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost ($)</td>
<td>5</td>
<td>10</td>
<td>15</td>
<td>20</td>
<td>25</td>
<td>30</td>
<td>35</td>
</tr>
</tbody>
</table>

Point where ATC reached its minimum.

26. If the factory is currently producing 40 cheesecakes per day and you have the additional information that at that level of output the marginal product of an additional oven is 7 cheesecakes, can the firm reduce its total cost of production of 40 cheesecakes per day in the long run?

a) Yes if it decreases the number of ovens it rents and increases the amount of labor it uses.
b) Yes if it increases the number of ovens it rents and decreases the amount of labor it uses.
c) No, it is not possible for the factory to lower its cost in the long run.
d) Uncertain, there is not enough information to tell.

Need to have \( P_{labor}/MPP_{labor} = P_{oven}/MPP_{oven} \) to minimize cost. At 40 cakes \( P_{labor}/MPP_{labor} = \$0.375 \) but \( P_{oven}/MPP_{oven} = \$0.71 \). Cost more to expand output with ovens than labor, so should replace ovens with labor.

27. You are the manager of a perfectly competitive firm and are faced with the following situation. The market price for your product is $2.50 and you are currently selling 1,000 units. Your total fixed costs are $9,000 while your total variable costs are $3,000. Your short run marginal cost is $2.50 per unit. Given this information, to maximize profit in the short run you should decide to:

a) immediately stop all production. \( AVC = 3000/1000 = \$3 \), since price is only $2.50 you lose fixed cost + an additional $.50 for every unit you produce. Losses are minimized at output=0.
b) continue to produce 1,000 units.
c) expand output to cover more of fixed costs.
d) decrease output so that you can cut down on variable costs.
e) uncertain, there is not enough information in the problem deduce an answer.

28. Marginal cost necessarily intersects which of the curves at its minimum?

a) average fixed cost 

b) average total cost 

c) average variable cost 

d) total cost 

e) both b and c

Check out the diagram below

Information for Questions 29-32: The Graph in Figure 2 shows the Short Run marginal (SRMC), average variable (SRAVC), and average total (SRATC) cost curves for a firm in a perfectly competitive market.

29. If the market price in a perfectly competitive market is $10 in the short-run, the quantity the firm will produce is approximately

a) 7 

b) 23 

c) 30 

d) 35

30. If the market price in a perfectly competitive market is $8, the firm

a) earns a positive profit in the short-run 

b) earns a negative profit in the short-run 

c) earns zero profit in the short-run \( P = AC \) so profits will be zero 

d) will exit the market in the long-run
31. Again consider the short run with the market price equal to $8 per unit. If all firms in the market look exactly like the firm in Figure 2, we can expect that the long run competitive equilibrium price in this market will be
a) exactly $8
b) more than $8
c) less than or equal to $8 These are short run curves. Long run average cost (when you can choose the optimal amount of all inputs, will be lower than SR curves at all but one point.
d) uncertain. Can’t tell if the LR equilibrium price will be higher or lower than $8.

32. If, in the short run, the market price falls below $5, the firm
a) earns zero profit
b) should increase production
c) should produce 10 units of output
d) should produce zero output definition of shut down point

Graphs for Questions 33-36

33. Of the graphs shown in Figure 3, which most likely represents short run total cost?
   a) 1  
   b) 2  
   c) 3  
   d) 4

34. Of the graphs shown in Figure 3, which most likely represents average fixed cost?
   a) 1  
   b) 2  
   c) 3  
   d) 4

35. Of the graphs shown in Figure 3, which most likely represents short run average cost?
   a) 1  
   b) 2  
   c) 3  
   d) 4

36. If a firm's production technology is subject to increasing returns to scale, which of the graphs shown in Figure 3, most likely represents long run average cost?
   a) 1  
   b) 2  
   c) 3  
   d) 4
Information for Questions 37-38. Figure 4 represents a production possibility frontier for a farm producing wheat and barley.

37. According to Figure 1, the opportunity cost of one more bushel of wheat is
a) higher at A than at B.
b) lower at E than at D.
c) equal at B and D.
d) higher at D than at C. *Slope of the curve is steeper at D than at C*
e) impossible to determine from the information given

38. If all of the resources in the economy are devoted to wheat production, the maximum amount of wheat that could be produced is shown by point ___.

   a) A        b) B        c) C        d) D
   e) E

39. If a consumer's demand curve for a product X is price inelastic, then which of the following statements is true?
    a) An increase in the price of X will increase the consumer's total expenditure on the good X.
    b) An increase in the price of X will decrease the consumer's total expenditure on the good X.
    c) An increase in the price of X will leave the consumer's total expenditure on good X unchanged.
    d) The problem does not provide enough information to determine whether a price increase will change total expenditure on good X.

40. The price elasticity for McDonald’s burgers is 2.0, the income elasticity of demand for McDonald’s hamburgers is -0.05 and the cross price elasticity of McDonald’s hamburgers and Tum’s antacid is -1.3. From this we can conclude
   a) McDonald’s hamburgers are a normal good and that Tum’s and burgers are complements.
   b) McDonald’s hamburgers are an inferior good and that Tum’s and burgers are complements.
   c) McDonald’s hamburgers are a normal good and that Tum’s and burgers are substitutes.
   d) McDonald’s hamburgers are an inferior good and that Tum’s and burgers are substitutes.
When you have completed your exam:

Print your Name_______________________________

Write your Student ID number (PID)____________________________

Print your recitation section number (A list of recitations will be on the screen) Section____________________

Sign the honor Pledge affirming that you have neither given nor received aid on this exam and have complied with all of the rules of this exam.

Signature______________________________________

Tear this form off the back of your exam and turn it in with your answer sheet. You may keep the rest of the exam.