Part I: Multiple Choice. Circle the best answer. Put a square around your second choice if you want. Half-credit is given for second choice, no penalty. (4 points each).

1. The most profitable level of fertilizer to apply to a corn crop can be found when:
   a. The maximum yield is achieved.
   b. The selling price is equal to the total cost per bushel.
   c. The extra revenue from applying more fertilizer is above the additional cost of the fertilizer.
   d. The extra revenue from applying the fertilizer is equal to the additional cost of the fertilizer.

2. Which of the following is not an accepted method for estimating the opportunity cost of land in an enterprise budget?
   a. Estimated current land value times the opportunity cost of capital.
   b. Current land payment.
   c. Current cash rent value.
   d. Value of crop share lease.

3. What would be the best decision rule(s) for a farm manager to use if they were trying to determine the least cost feed ration for a given average daily gain (i.e. least cost input combination)?
   b. Marginal Revenue = Marginal Cost.
   c. Input Substitution Ratio = Inverse Price Ratio
   d. Total Revenue = Total Cost
   e. Either “a” or “b”
   f. Either “a” or “c”

4. The Equal Marginal (equi-marginal) principle states that:
   a. You will apply resources in production until the marginal revenue from the last unit of output is equal to the marginal cost for producing that unit of output.
   b. A limited input should be allocated among alternative uses in such a way that the marginal value products of the last unit for each alternative are equal.
   c. The marginal physical product has a value that is equal to or greater than the marginal input cost.
   d. All of the above.
5. After evaluating the short run average total costs for the farm’s main enterprise, the farm manager finds that the revenue from the enterprise for the next production cycle is not great enough to cover total costs (i.e. marginal revenue < average total costs). However, there is enough revenue to cover all of the variable costs (i.e. marginal revenue > average variable costs). The farm manager should:
   a. Call the auctioneer and schedule a sale.
   b. Go to church and pray for higher prices.
   c. Quit producing because the enterprise is losing money.
   d. Keep producing because the enterprise will cover all the variable costs and some of the fixed costs.

6. When a farm manager can increase the level of one enterprise and it has a positive influence on another enterprise, like a wheat/fallow rotation in an arid growing region, these are considered enterprises.
   a. Supplementary.
   b. Complementary.
   c. Competitive.
   d. Associative.

Part II: Circle the best answer.

7. Please classify each of the following management decisions as either Strategic (S) or Tactical (T): (2 points each)
   a. Including dried distillers grain in a feed ration for finishing cattle. S or T
   b. Harvesting corn when the grain is 18% moisture. S or T
   c. Producing and selling certified organic alfalfa. S or T
   d. Constructing a 1000 head dairy facility. S or T
   e. Applying corn herbicides at the five leaf stage. S or T

8. Below are several cost items that are commonly included in crop and livestock enterprise budgets. Please indicate if they would normally be considered Fixed Costs (FC) or Variable Costs (VC): (2 points each)
   a. Interest on field tillage equipment (ex. plow, cultivator, disk). FC or VC
   b. Depreciation on hog farrowing barns. FC or VC
   c. Fuel used to harvest soybeans. FC or VC
   d. Insurance on the farm shop. FC or VC
   e. Fertilizer for corn enterprise. FC or VC
   f. Interest on the fertilizer expense. FC or VC
Part III: The following information is required for questions 9 through 12.

**Corn Price = $3.00/bu.  Nitrogen Fertilizer = $0.30/lb.**

<table>
<thead>
<tr>
<th>Nitrogen Fertilizer (Pounds/Acre)</th>
<th>Corn Yield (Bushels/Acre)</th>
<th>Marginal Value Product (dollars)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>30</td>
<td>120</td>
<td>2.00</td>
</tr>
<tr>
<td>60</td>
<td>130</td>
<td>1.00</td>
</tr>
<tr>
<td>90</td>
<td>135</td>
<td>0.50</td>
</tr>
<tr>
<td>120</td>
<td>138</td>
<td>0.30</td>
</tr>
<tr>
<td>150</td>
<td>140</td>
<td>0.20</td>
</tr>
<tr>
<td>180</td>
<td>141</td>
<td>0.10</td>
</tr>
<tr>
<td>210</td>
<td>135</td>
<td>-0.60</td>
</tr>
</tbody>
</table>
Circle the best answer. Put a square around your second choice if you want. Half-credit is given for second choice, no penalty.

9. What is the marginal input cost as the farm manager increases the nitrogen fertilizer level from 30 lbs/acre to 60 lbs/acre? (4 points)
   a. 60.00
   b. 18.00
   c. 9.00
   d. 1.00
   e. 0.30

10. What is the marginal physical product as the farm manager increases the nitrogen fertilizer level from 30 lbs/acre to 60 lbs/acre? (4 points)
    a. 130.00
    b. 60.00
    c. 30.00
    d. 10.00
    e. 3.00
    f. 0.33

11. What is the profit maximizing level of nitrogen fertilizer the farm manager should apply? (4 points)
    a. 30 lbs/a.
    b. 60 lbs/a.
    c. 90 lbs/a.
    d. 120 lbs/a.
    e. 150 lbs/a.

12. What would the price of nitrogen fertilizer have to be for the farm manager to profitably apply 180 lbs/a.? (4 points)
    a. $0.30/lb.
    b. $0.25/lb.
    c. $0.20/lb.
    d. $0.15/lb.
    e. $0.10/lb.
**Part IV:** The following information is required for Questions 13 – 15.

Price of Hay = $0.03/pound  
Price of Grain = $0.06/pound

<table>
<thead>
<tr>
<th>Ration Number</th>
<th>Hay Fed (Pounds)</th>
<th>Grain Fed (Pounds)</th>
<th>Substitution Ratio (Δ Hay / Δ Grain)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1050</td>
<td>250</td>
<td>3.00</td>
</tr>
<tr>
<td>2</td>
<td>750</td>
<td>350</td>
<td>2.40</td>
</tr>
<tr>
<td>3</td>
<td>510</td>
<td>450</td>
<td>2.10</td>
</tr>
<tr>
<td>4</td>
<td>300</td>
<td>550</td>
<td>1.50</td>
</tr>
<tr>
<td>5</td>
<td>150</td>
<td>650</td>
<td>1.00</td>
</tr>
<tr>
<td>6</td>
<td>50</td>
<td>750</td>
<td>0.50</td>
</tr>
<tr>
<td>7</td>
<td>0</td>
<td>850</td>
<td></td>
</tr>
</tbody>
</table>

Circle the best answer. Put a square around your second choice if you want. Half-credit is given for second choice, no penalty.

13. What would be the least cost ration if the price of hay is $0.03/pound and the price of grain is $0.06/pound? (4 points)
   a. Ration 2
   b. Ration 3
   c. Ration 4
   d. Ration 5
   e. Ration 6
14. If the price of hay were to increase to $0.06/pound and the price of grain were to increase to $0.12/pound, the farm manager should: (4 points)
   a. Make no change and use the same ration.
   b. Increase the amount of grain fed.
   c. Increase the amount of hay fed.
   d. Quit producing.

15. What would the price of grain have to be for the farm manager to select Ration #2 as the least cost ration? (4 points)
   a. 0.03
   b. 0.06
   c. 0.09
   d. 0.12
   e. 0.15

Part V: Please use the attached “Finishing Feeder Pigs” enterprise budget on the last page to answer Questions 16 - 22. (2 points each)

16. What is the “Budget Unit” for this enterprise budget? ________________.

17. What is the “Total Income” for this enterprise budget? ________________.

18. What is the “Total Fixed Cost” for this enterprise budget? ________________.

19. What is the “Gross Margin” or “Return Over Variable Cost” for this enterprise budget? ________________.

20. What is the “Total Variable Cost” for this enterprise budget? ________________.

21. What is the “Profit” for this enterprise budget? ________________.

22. Assume that all of the fixed costs would continue if no pigs were fed. What is the breakeven price required to cover all variable production costs? (show your work!)
23. Please provide a definition for the term “opportunity cost” that your mother would understand. (4 points)

24. Please list at least one resource (input) that would be assigned an opportunity cost within a typical economic cost enterprise budget and describe how you would value that resource (input). (4 points)

25. Why would a farm manager want to prepare enterprise budgets with an opportunity cost for all inputs when considering alternative enterprises for their farming operation? (4 points)

Extra Credit: The “classical” or “S” shaped production function (TPP) we discussed in class can be divided into three different sections or stages. What section or stage will farm managers choose to produce in (i.e. where is “all the action at”)? (4 points)
## Enterprise Budget for Finishing Feeder Pigs (one market hog)

<table>
<thead>
<tr>
<th>Item</th>
<th>Unit</th>
<th>Quantity</th>
<th>Price</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Income</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Market Hog (250 lbs x 0.96)</td>
<td>lbs.</td>
<td>240.00</td>
<td>$0.55</td>
<td>$ ????</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td></td>
<td></td>
<td>$ ????</td>
</tr>
<tr>
<td><strong>Operating Expenses</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Feeder Pig (50 lb.)</td>
<td>hd.</td>
<td>1.00</td>
<td>$60.00</td>
<td>$60.00</td>
</tr>
<tr>
<td>Interest @ 7% for 124 days</td>
<td>hd.</td>
<td>1.00</td>
<td>$1.43</td>
<td>$1.43</td>
</tr>
<tr>
<td>Feed:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Corn</td>
<td>bu.</td>
<td>9.20</td>
<td>$3.20</td>
<td>$29.44</td>
</tr>
<tr>
<td>Supplement &amp; Mineral</td>
<td>lbs.</td>
<td>95.00</td>
<td>$0.14</td>
<td>$13.30</td>
</tr>
<tr>
<td>Feed Additives</td>
<td>hd.</td>
<td>1.00</td>
<td>$4.00</td>
<td>$4.00</td>
</tr>
<tr>
<td>Vet. &amp; Medical</td>
<td>hd.</td>
<td>1.00</td>
<td>$1.50</td>
<td>$1.50</td>
</tr>
<tr>
<td>Fuel, repairs, utilities</td>
<td>hd.</td>
<td>1.00</td>
<td>$1.22</td>
<td>$1.22</td>
</tr>
<tr>
<td>Marketing &amp; Misc.</td>
<td>hd.</td>
<td>1.00</td>
<td>$4.00</td>
<td>$4.00</td>
</tr>
<tr>
<td>Interest @ 7% for 2 mo.</td>
<td>hd.</td>
<td>1.00</td>
<td>$0.61</td>
<td>$0.61</td>
</tr>
<tr>
<td>Labor</td>
<td>hours</td>
<td>0.50</td>
<td>$9.00</td>
<td>$4.50</td>
</tr>
<tr>
<td><strong>Total listed costs</strong></td>
<td></td>
<td></td>
<td></td>
<td>$120.00</td>
</tr>
<tr>
<td><strong>Net over listed costs</strong></td>
<td></td>
<td></td>
<td></td>
<td>$ ????</td>
</tr>
<tr>
<td><strong>Ownership Expense</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mach. &amp; Facilities</td>
<td>hd.</td>
<td>1.00</td>
<td>$13.00</td>
<td>$13.00</td>
</tr>
<tr>
<td><strong>Total All listed costs</strong></td>
<td></td>
<td></td>
<td></td>
<td>$133.00</td>
</tr>
<tr>
<td><strong>Net Income or “Profit”</strong></td>
<td></td>
<td></td>
<td></td>
<td>$ ????</td>
</tr>
</tbody>
</table>
Test #1 Key:

1. d.
2. b.
3. c.
4. b.
5. d.
6. b.
7. 
   a. Tactical
   b. Tactical
   c. Strategic
   d. Strategic
   e. Tactical
8. 
   a. Fixed Cost
   b. Fixed Cost
   c. Variable Cost
   d. Fixed Cost
   e. Variable Cost
   f. Variable Cost
9. e.
10. f.
11. d.
12. e.
13. c.
14. a.
15. c.
16. One market hog
17. $132.00
18. $13.00
19. $12.00
20. $120.00
21. $ -1.00
22. $120.00 Variable Cost / 240 lbs. marketed = $0.50/lb. or $50.00/cwt.

23. Opportunity Cost: The value of the resource (input) in its next best use; or, the value given up by using a resource (input) in activity “A” rather than activity “B”.

24. Selected examples and possible valuations
   a. Land: Cash rent, crop share rent or (estimated land value x opportunity cost of capital).
   b. Labor: Hired labor wage plus benefits offered.
   c. Equity Capital:
i. Return from alternative investments like money market funds or certificates of deposit.
ii. Interest rate on borrowed capital. A risk premium could include be added.
   d. Farm raised corn fed to livestock: market value of corn.

25. To allow the farm manager to accurately compare enterprises that require different types and/or levels of resources (inputs) on an equal basis. This is especially important when some of the resources (inputs) are being provided by the farm manager (and family members) and/or produced on the farm rather than being purchased.

Extra Credit: Stage II