MGT 3501 - Operations Management
Fall 2005
Sample Exam

Name (print clearly): ______________________________________________________

Instructions:
• This is a closed-book individual exam.
• There are a total of 7 pages (including this one). If there are any pages missing from your exam, please raise your hand NOW!
• You are allowed to use a calculator, but you cannot share calculators.
• You are allowed one original hand-written or typed note and formula sheet.
• You need to have your desks clear of all items (cellphone, clothes, books, backpack, notebooks, papers, etc.) except pens, pencils, erasers and calculators during the test.

The Georgia Institute of Technology Honor Code applies to this exam. I will follow through any suspicion of academic misconduct according to the formal university process. Please sign the statement below to indicate you understand the Honor Code and pledge to abide by it.

You are expected to turn in your own work. I understand and will abide by these rules and the Georgia Institute of Technology Honor Code. I pledge that I have not received assistance of any kind on this exam.

Signature: ______________________________   Date: _________________________
Questions 1 – 9 are 4 points each.

1. What is Operations Management (one sentence)?

2. Define effectiveness and efficiency.

3. Name one concept from the historical development of Operations Management and explain what it means in one sentence.

4. State Little’s Law.

5. Which of the following is one of the competitive dimensions that forms the competitive position of a company when planning its strategy?
   a. Cost
   b. Delivery speed
   c. Quality
   d. None of the above
   e. All of the above

6. Consider the service blueprint shown to the right. Which of these statements is NOT true?
   a) The activities in section A are those that are under the control of the customer.
   b) The “line of visibility” is the dashed line separating section A from section B.
   c) The “line of visibility” is the dashed line separating section B from section C.
   d) The activities in section C are those that are under the control of the company.
7. True or false? An order winner is a set of screening criteria that permits a firm’s products to be considered as possible candidates for purchase.

8. True or false? In a CPM analysis if you subtract the early finish from the late finish, the result is the activity’s slack time.

9. True or false? The critical path in a project is that sequence of activities that consume the longest amount of time in a project network of activities.

<table>
<thead>
<tr>
<th></th>
<th>2005</th>
<th>2006</th>
</tr>
</thead>
<tbody>
<tr>
<td>Output: Sales</td>
<td>$300,000</td>
<td>$330,000</td>
</tr>
<tr>
<td>Inputs: Labor</td>
<td>$40,000</td>
<td>$43,000</td>
</tr>
<tr>
<td>Raw Materials:</td>
<td>$45,000</td>
<td>$51,000</td>
</tr>
<tr>
<td>Energy:</td>
<td>$10,000</td>
<td>$9,000</td>
</tr>
<tr>
<td>Capital Employed</td>
<td>$250,000</td>
<td>$262,000</td>
</tr>
<tr>
<td>Other:</td>
<td>$2,000</td>
<td>$6,000</td>
</tr>
</tbody>
</table>

What is the percentage change in the energy partial productivity measure for SunPath between 2005 & 2006?
11. (25 pts) Below are the data for a Time-Cost Critical Path Method analysis. The time is in days and the costs include both direct and indirect costs.
   a. Draw the activity network diagram.
   b. Identify the critical path.
   c. What is the total time and the total normal cost of this project?
   d. Which activities have slack? How much?
   e. If you crash this project by one day in the most cost effective manner, what is its total cost going to be?
   f. If you crash this project by four days in the most cost effective manner, what is its total cost going to be?

<table>
<thead>
<tr>
<th>Activity</th>
<th>Immediate Predecessor</th>
<th>Normal Time</th>
<th>Normal Time</th>
<th>Normal Cost</th>
<th>Crash Cost</th>
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</thead>
<tbody>
<tr>
<td>A</td>
<td>None</td>
<td>3</td>
<td>2</td>
<td>$200</td>
<td>$400</td>
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<tr>
<td>B</td>
<td>A</td>
<td>4</td>
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<tr>
<td>C</td>
<td>A</td>
<td>2</td>
<td>1</td>
<td>$300</td>
<td>$400</td>
</tr>
<tr>
<td>D</td>
<td>B and C</td>
<td>3</td>
<td>2</td>
<td>$500</td>
<td>$550</td>
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<tr>
<td>E</td>
<td>D</td>
<td>2</td>
<td>1</td>
<td>$500</td>
<td>$900</td>
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</tbody>
</table>
12. (10 pts) Examine the following cash flow for a project.
   a. Would you go ahead with this project? Why or why not?
   b. Calculate the NPV of the project if the development cost is doubled.
13. (20 pts) Consider the following process. The throughput rate at station 1 is 20/hour and the throughput rate at station 2 is 30/hour. There is no buffer between the two stations.

a. Is there any starving or blocking in this system? If yes, where and how much?
b. Which station is the bottleneck?
c. What is the capacity of the system?
d. Assuming a make-to-stock system, what is the average work-in-process in the system?