Exam Statistics  Mean = 18.10, Median = 18.75, Standard Deviation = 3.5

Tentative Grade Thresholds
If I had to base grades only on this exam I would use the following thresholds:  A (21),  A- (19),  B+ (18),  B (15),  B- (14),  C+ (13),  C (12)

Part One, Multiple Choice Questions (one point each)

Part Two, Short-Answer Questions (4 points each)
For each question, a clear statement of the correct answer was worth two points.  The remaining two points were awarded based on the quality of the argument offered in support of the answer.  The following are sketches of the correct answer.  They are not ideal answers.

1. Suppose that, in an attempt to induce citizens to conserve energy, the government enacted regulations requiring that all air conditioners be more efficient in their use of electricity.  After the regulation was implemented, government officials were surprised to discover that people used even more electricity than before.

   a. Draw the demand and supply schedules for “chilled air” and explain how the imposition of the regulation will affect market equilibrium.

      The correct diagram shows no shift in the demand schedule and an increase in supply, that is a shift in the supply schedule toward higher quantities.  The supply increase implies a decrease in the equilibrium price of chilled air.  The reason for the shift in supply is that the government regulation mandates that chilled air is produced more efficiently.  This is not to say that every consumer will buy a new air conditioner.  It is to say that those consumers who do buy a new air conditioner will face the new supply schedule for chilled air.

   b. Using the concept of price elasticity, explain how this increase in electricity use might have occurred.

      If demand for chilled air is price elastic, then consumers will increase the quantity of chilled air consumed by a higher percent than the percentage decrease in price.  It would be true that if consumers did not change their thermostats that the government regulation would lower the quantity of electricity used for home cooling.  However, if chilled air now has a lower price and if demand for chilled air is elastic, consumers might lower their thermostats so much that they actually increased their use of electricity for home cooling.

2. The Paducah Slugger Company makes baseball bats out of lumber supplied to it by Acme Sporting Goods, which pays Paducah $10.00 for each finished bat.  Paducah’s only factors of production are lathe operators and a small building with a lathe.  The wood it uses is freely available in a forest that Paducah owns.  The number of bats per day Paducah produces depends on the number of employee hours per day, as shown in the table.

<table>
<thead>
<tr>
<th>Bats per day</th>
<th>Number of Employee Hours per day</th>
<th>Marginal Product (bats per hour)</th>
<th>Marginal Benefit of hiring an additional hour (Price of bat is $10.00)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
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<td>0</td>
<td>$0.00</td>
</tr>
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<td>5</td>
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<td>2</td>
<td>5</td>
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</table>
a. If the wage is $15.00 per hour and Paducah’s daily fixed cost for the lathe and building is $60.00, what is the profit maximizing quantity of bats? A complete answer will consider the possibility that Paducah should produce zero bats.

As the third column of the table shows, additional hours of employment have lower marginal products measured as bats per hour. Therefore, the marginal benefit of employing more hours falls as the fourth column shows. Provided that it is optimal to produce bats, marginal benefit remains above marginal cost for all hours up to 7 but falls below marginal cost after 7 hours. Therefore, if Paducah operates at all, it should employ 7 hours and supply 20 bats.

b. Should Paducah operate? If Paducah hires 7 hours of labor it earns $200 in revenue and pays $105 dollars in labor. The surplus is therefore more than sufficient to pay the $60 cost of operating the lathe and building. So Paducah should operate and supply 20 bats.

c. What is Paducah’s reservation price for supplying 25 bats?
In effect, the question asks you to derive a second point on Paducah’s supply schedule. Paducah will be just willing to supply 25 bats if the marginal benefit just equals the marginal cost for the 25th bat. The marginal cost of bats in the range of 21 through 25 is (4 hours * $15.00 per hour)/(5 bats) = $12.00 per bat. So Paducah’s reservation price to supply 21-25 bats is $12.00. Note that if the price of a bat is $12.00, Paducah will earn sufficient surplus ($300-$165) to pay the daily cost of the lathe and building.

3. While natural gas prices have plummeted to 10-year lows, heating oil prices have been steadily rising for years and are expected to reach record levels this winter, precipitated by higher costs for crude oil and the shutdown of several crucial refineries in the Northeast and in Europe. The Energy Department projects a price of $3.79 a gallon over the next few months, more than a dollar above the winter average for the last five years. Analysts do not expect much relief in the longer term, either, because global oil prices are expected to stay high amid political instability in the Middle East and rising demand from developing countries.


Use the understanding of Economics that you developed in the first part of this course to predict what kind of household will be able to avoid the increased cost of heating their homes due to higher heating oil prices and those that will not. Would it be economically rational for some households to continue to use heating oil rather than switching to natural gas? Why or why not?

A good essay will make clear that some home owners are able to substitute natural gas for heating oil at lower cost than others. For example, a home owner with a worn out oil furnace has the opportunity to purchase a new furnace that uses either natural gas or heating oil. For that home owner, the marginal cost of switching to gas is the cost differential (if any) between a natural gas furnace and a heating oil furnace. The situation is very different for a home owner who has an oil furnace in good repair. For that person, the marginal cost of switching to gas is very high because it includes the price of a new furnace. Of course, for households that do not have natural gas piped to their neighborhoods, the cost of switching to gas is much higher.

In class and in your reading you encountered the idea that long-run demand schedules are more price elastic than short run demand schedules. In the long run, everyone has the opportunity to select their furnace type and they will select the type that provides home heating at the lowest cost. In the long run, those who lay pipelines can place them anywhere that is justified by long run economic and demographic conditions. But in the short run, home owners generally find it rational to wait to replace their furnace until their old furnace wears out. That means that demand for heating oil is more price sensitive in the long run than in the short run.

Given political instability in the Middle East and given newly developed techniques for harvesting natural gas, one should expect the price difference between the two to increase for some time. But price differences will not endure forever, because consumers will switch from the higher cost to the lower cost fuel when they have the opportunity to do so.