1. Choose 10 questions from “The Energy Crisis? A True/False Quiz” and answer them using excerpts from The Quest. Be sure to include the page number(s) you used in answering the question. The quiz can be found in the lecture notes section of the course website.

*Question 1:* The first energy crisis in 1974 occurred because of a shortage of oil production capacity.

**False.** Page 527 explains: energy crisis was due to an oil embargo of political motive imposed by the oil exporting countries (later known as OPEC).

*Question 2:* Climate change due to human caused greenhouse gas emissions is occurring and its impact is evident and is measureable today.

**True.** The entirety of chapter 4 has been dedicated to the issue of carbon emission associated climate change. Specifically in pg 497, the author talks about the IPCC report by the U.S. department of energy which indicate that with over 90% confidence that climate change is caused by anthropogenic emissions.

*Question 3:* Continuing massive oil imports will seriously damage the U.S. economy

**True.** This claim is not explicitly stated but the author does bring up two issues that are directly caused by U.S. oil dependencies on the world supply. In pg. 223, Yergin states the rising conflict of interest with China due to their increasing energy demand could lead to rivalries and clashes of interest. In addition, massive oil import from world market increases the susceptibility of U.S. economies to political and regional instabilities especially in the gulf coast region. This viewpoint can be seen in Pg. 128 of the Quest, where author claims that this “symbiotic” relationship is both “dependence” and a “danger”.

*Question 4:* Gasoline is more expensive today than in 1975 (in constant dollar terms).

**True.** Using data provided on Pg 186, the current gasoline prices are roughly at $3.25/gallon. At the peak of 1975, the gasoline price is at about $1.80/gallon. These prices are discounted to 2010 base price terms (inflation adjusted), so a straightforward comparison concludes that current day gas prices are already more expensive than 1975 terms.

*Question 5:* OPEC controls the price of oil

**False.** OPEC’s influence on world oil market has been dwindling ever since the energy crisis of 1980s due to the counter-measures put in place to prevent a similar event from occurring-- introduction of more efficient vehicles and the development of non-OPEC reserves world-wide. For example, in Pg 270, Yergin pointed out that the International Energy Agency was created for industrial countries to counterbalance OPEC. In Pg 166, Yergin explicitly stated this new global pricing order: “Although OPEC was still trying to manage prices, it had a new competitor – the global market. And, specifically, a new marketplace emerged to help buyers and sellers manage the risk of fluctuating prices.”
Question 6: The invasion of Iraq was partly driven by a need for stability in and access to oil supplies, comparable to other justifications (weapons of mass destruction or Saddam Hussein’s reign of terror).

True. In Pg 142, Yergin described Iraq as “Iraq was an oil country. Its only export was oil. And as such was a country of great significance to the global energy markets.” Furthermore, in Pg 148, Yergin outlined one of the key reasons that Iraq is such an attractive investment opportunity for oil companies: Iraq has not seen much modern development of its oil industry since 1970s. The need for military action (or a change of government) was also pointed out: Iraq is closed-off and inaccessible to the world market. Although U.S. does not want to impose a 1920s mercantile invasion to control Iraq oil directly, U.S. had a direct interest to open up Iraq for the world market.

Question 7: At a high enough price for fuel, (e.g., $100/bbl oil) over a 20 year horizon in the future, potential energy supplies will be plentiful, including solar and biomass.

True. One of the key reasons for the failure of the solar industry in the 1980s was due to the plummeting of world oil prices. “[solar company] found instead that his business was on the ropes without the support and expectation of relatively high energy prices”. (Pg 533). In pg 684, Yergin pointed out, “As oil prices headed toward $100 a barrel in the second half of 2007 and as conflict continued in the Middle East, political opposition to higher fuel-efficiency standards melted away.”

Question 8: Hydrogen is the best non-polluting fuel to use (burning it yields H2O), so we should convert to a hydrogen-based economy.

False. Fuel cells continue to faced major challenges, as pointed out in Pg 707. The challenges are summarized as follows:

- Fuel cells are expensive and requires technological breakthroughs for commercialization, their price need to be reduced by a factor of 20 for them to become economical.
- Hydrogen are mainly produced in oil refineries, it does not exist independently in nature, which in turn makes it an expensive source of energy
- Storing and transporting hydrogen is technically complex and very costly.

In light of these limitations, natural gas seems to be a much better alternative than hydrogen.

Question 9: Massive use of hybrid autos and outlawing SUVs are the best near-term solution for reducing oil consumption.

False. Current motivations for reduction of fuel-inefficient vehicles are due to fuel prices and changes in people’s driving habits. In addition to the purchase and increased usage of hybrid vehicles such as the Prius, a lot of the reduction in oil consumption comes from increased conventional combustion engine efficiency and reduced demand of highly inefficient vehicles (trucks and SUVs). Pg. 684.
**Question 10:** A worldwide growth rate of 2% in energy use is small enough that we don't have to worry about energy supply/demand imbalances.

**False.** Supply and demand of the world energy market is very precarious and amplified by trading and hedging in the world financial markets. As explicitly stated in Pg 160, the 21st century brought a profound reshaping of the oil industry – the “globalization of demand” – that reflected the reordering of the world economy. The integrated globalizing economy meant that remote singularities in political unrest, economic collapse and other events could trigger a global wave that affects energy supply and demand worldwide, this observation is exemplified by the Iranian revolution in 1978-1979, the gulf crisis of 1990-1991, OPEC decisions throughout the 1970-present and also the recent turmoil in Lybia. In addition to random events that might shock the oil demand/supply equilibrium, the pricing structure of oil as a commodity has also undergone changes in recent years. From 1981 onward, president Ronald Raegan ended price control of oil and left oil prices fluctuating to world demand and supply (pg 167). This in turn opened up the oil market to hedgers and speculators that greatly amplifies the random up and downs of the world energy market.

2. Yergin presents a series of facts and stories throughout his book. Choose one, and look it up. Did he portray things accurately? What additional information did you learn from looking at the source?

**Fact chosen:** In introduction (pg 5). Yergin claims that Persian gulf region holds 60% of conventional oil reserves.

**Fact checking:**

In 2011, the published statistics from BP (World energy full report, 2012), Persian gulf region (middle east) now occupies 48.1% of the world reserves. In actual numbers, the total world conventional reserve in 2011 is 1,652.6 billion barrels, of which, 795 billion barrels comes from the Persian gulf region.

In contrast, in 2005, the total world oil reserve is 1,357 billion barrels, of which the middle east holds 755.5 billion barrels of oil reserves.

From the previous two data record, it can be seen that the Middle East oil reserve hasn't changed that much in the last 5 years (remained in the 750-800 billion barrel range). The decrease in percentage over the years has been due to the increase of oil reserves worldwide. Specifically, there has been a 220 billion barrels increase in oil reserves from South and Central America region. In addition, there's also slight increase in oil reserves from African nations, (50 billion barrels).

Therefore, it is reasonable to conclude that Yergin's claim of 60% of conventional oil reserve is slightly exaggerated but reasonably true. However, the data is slightly out of date as of 2012. As offshore oil exploration technologies develop, more conventional oil resources are added to the global reserves market as world energy demand keeps rising.
3. Determine the history of yearly oil imports to the U.S. since 2005. Identify the top five countries providing oil to the U.S. and approximate amounts if available. Cite your sources.

Top 5 countries that US imports oil from are: Canada, Mexico, Saudi Arabia, Venezuela, and Nigeria.

The data is tabulated below:

<table>
<thead>
<tr>
<th>Country</th>
<th>2005-2010 Cumulative Crude Oil Imports (Thousand Barrels)</th>
</tr>
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<tbody>
<tr>
<td>Canada</td>
<td>5,293,639</td>
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<tr>
<td>Mexico</td>
<td>3,175,307</td>
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<tr>
<td>Saudi Arabia</td>
<td>2,963,435</td>
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<td>Venezuela</td>
<td>2,756,199</td>
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<tr>
<td>Nigeria</td>
<td>2,276,300</td>
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</table>

Sources:

Petroleum and other liquids data provided by U.S. Energy Information Administration (EIA), accessed on September 6th, 2012. Web accessible at [http://www.eia.gov/dnav/pet/pet_move_impcus_a2_nus_ep00_im0_mbbl_a.htm](http://www.eia.gov/dnav/pet/pet_move_impcus_a2_nus_ep00_im0_mbbl_a.htm)

4. Has world oil production since 2005 increased, decreased, or remained roughly the same. Support your answer with data.
From the below chart, we can see that the total world oil production is still increasing in the last 5 years, with the exception of 2009, where we saw a large dip. This dip in 2009 can be regarded as an anomaly caused by the depression initiated by the collapse of the subprime mortgage market.

**World Annual Average Daily Oil Production Rate From 2005 to 2011 in kbbl/d**

<table>
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<tbody>
<tr>
<td>2005</td>
<td>81391</td>
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<td>2011</td>
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**Data Source:**

[http://www.bp.com/sectiongenericarticle800.do?categoryId=9037169&contentId=7068608](http://www.bp.com/sectiongenericarticle800.do?categoryId=9037169&contentId=7068608)