Questions and Problems, 1a (maximum of 55 points out of 50)

Instructions: Each problem is keyed by the number of points it is worth and the minimum page length. The page length refers to a page with one inch margins, times new roman font, and a font size of 12. A page will have a minimum of 23 double spaced lines. Include your name and question/problem number at the top of the page. This allows 20 lines for your response. Your response is to be typed, however, you may do mathematical calculations and graphs neatly in pen or pencil. Question/problems prefaced with an asterisk (*) are required. You may turn in as many questions/problems as you like, but the maximum number of points that can be earned is given at the top for each set. No questions/problems will be accepted after the assigned due date.

1-1 (10 pts, 1 page) Consider a competitive market for oil, with an estimated yearly demand and supply of \( Q_{DO} = 50 - 0.5P_O \) and \( Q_{SO} = 2P_O \) respectively. Units are in billions of barrels per year. Assume a marginal external cost of $15 per barrel. Calculate to the nearest tenth of a billion, yearly production, revenue, producer cost, producer surplus, consumer value, consumer surplus, net economic surplus, external social cost, social cost, and net social value. Note that each of these items are yearly flows. Also calculate to the nearest cent, the equilibrium price, marginal cost, marginal revenue, and marginal social cost. Marginal revenue and producer cost can be derived from the demand and supply equations using calculus. Since calculus is not required for this course, marginal revenue, \( MR_O = 100 - 4Q_O \) and producer cost, \( TC_O = 0.25Q_O^2 \). Show your calculations and the problems graphically. Prepared a table similar to B.1, p.22 in your text with three columns: the item; your final calculations for the competitive market; and, graphic areas. Your graph will be similar to Figure 1.1, p.7 with the addition of the marginal external cost and marginal social cost curves. Use letters, e.g., “A, B, C, etc” to represent areas in your graph and include in the third column the areas of your graph that correspond to your calculation.

1-2 (10 pts, 1 page) Consider a monopoly market for oil, with an estimated yearly demand and supply of \( Q_{DO} = 50 - 0.5P_O \) and \( Q_{SO} = 2P_O \) respectively. Units are in billions of barrels per year. Assume a marginal external cost of $15 per barrel. Calculate to the nearest tenth of a billion, yearly production, revenue, producer cost, producer surplus, consumer value, consumer surplus, net economic surplus, external social cost, social cost, and net social value. Note that each of these items are yearly flows. Also calculate to the nearest cent, the equilibrium price, marginal cost, marginal revenue, and marginal social cost. Marginal revenue and producer cost can be derived from the demand and supply equations using calculus. Since calculus is not required for this course, marginal revenue, \( MR_O = 100 - 4Q_O \) and producer cost, \( TC_O = 0.25Q_O^2 \). Show your calculations and the problems graphically. Prepared a table similar to B.1, p.22 in your text with three columns: the item; your final calculations for the monopoly market; and, graphic areas. Your graph will be similar to Figure 1.1, p.7 with the addition of the marginal revenue, marginal external cost, and marginal social cost curves. Use letters, e.g., “A, B, C, etc” to represent areas in your graph and include in the third column the areas of your graph that correspond to your calculation.

*1-3 (10 pts, 1 page) Consider an efficient market for oil, with an estimated yearly demand and supply of \( Q_{DO} = 50 - 0.5P_O \) and \( Q_{SO} = 2P_O \) respectively. Units are in billions of barrels per year. Assume a marginal external cost of $15 per barrel. Calculate to the nearest tenth of a billion, yearly production, revenue, producer cost, producer surplus, consumer value, consumer surplus,
net economic surplus, external social cost, social cost, and net social value. Note that each of these items are yearly flows. Also calculate to the nearest cent, the equilibrium price, marginal cost, marginal revenue, and marginal social cost. Marginal revenue and producer cost can be derived from the demand and supply equations using calculus. Since calculus is not required for this course, marginal revenue, $\text{MR}_0 = 100 - 4Q_0$ and producer cost, $\text{TC}_0 = 0.25Q_0^2$. Show your calculations and the problems graphically. Prepared a table similar to B.1, p.22 in your text with three columns: the item; your final calculations for the efficient market; and, graphic areas. Your graph will be similar to Figure 1.1, p.7 with the addition of the marginal revenue, marginal external cost, and marginal social cost curves. Use letters, e.g., “A, B, C, etc” to represent areas in your graph and include in the third column the areas of your graph that correspond to your calculation.

2-1 (10 pts, 1 page) Use an Excel spreadsheet to show graphically Gross Domestic Product from 1929 to 2000 $\text{GDP, 1929-2000}$. Next chart real GDP using the $\text{GDP Price Deflator}$. Adjust the index so the year 2000 = 100.

2-2 (10 pts, 1 page) Use an Excel spreadsheet to show graphically nominal and real Gross Domestic Product per capita from 1929 to 2000. For GDP use, $\text{GDP, 1929-2000}$; For the price deflator use $\text{GDP Price Deflator}$, adjust the index so the year 2000 = 100; for population use, $\text{US population}$.


2-4 (10 pts, 1 page) Discuss the determination of the Human Development Index (HDI), see http://www.geohive.com/global/dev_w.htm. Compare the United States with another country of your choice.