Answer the following questions in a large blue book. Don’t be too wordy, of course, but make sure that you clearly answer each and every question.

1. (25%) The United States is a major exporter of agricultural products such as cotton, and has a significant effect on the world price. The U.S. government provides a significant production subsidy to U.S. farmers, often equal to as much as two-thirds of the costs of production. The market is very competitive, and though individual producers have significant internal economies of scale the overall market exhibits the standard upward sloping marginal cost (supply) curve.
   a) Show a graph for the U.S. cotton market, for both market equilibria (with and without the government subsidy). What happens to the market price of cotton, domestic production of cotton, and the domestic consumption of cotton?
   b) Using your graph, explain the distributional effects of the subsidy on domestic producer surplus, domestic consumer surplus, and the government budget. Assuming there are no externalities from cotton production, what happens to overall welfare in the United States?
   c) Using a second graph for the cotton market in East Asia, where the cotton industry is small and imports of cotton are high, show the effects on foreign prices, production and consumption. Explain the distributional effects of the U.S. subsidy on these foreign cotton producers and consumers. How does the U.S. subsidy affect overall welfare in East Asia?
   d) Use a third graph for the cotton market in Africa, which also export cotton, explain the distributional effects of the U.S. subsidy on these foreign cotton producers and consumers. How does the U.S. subsidy affect overall welfare in Africa?
   e) Using a fourth graph combining U.S. export supply and foreign import demand (we can ignore Africa because its cotton industry is small), show the effects of the subsidy on domestic and foreign prices and the volume of trade. Use the graph to explain the efficiency effects of the subsidy on both home and foreign countries. (Your answer should match that given in parts a, b, and c, more or less).

2. (10%) Suppose that two similarly-sized countries are engaged in free trade of goods, where the home country exports good X to the foreign country, and imports good Y. Suppose that there are no flows of labor or capital (i.e., savings) between countries, but they have a free market exchange rate between them.
   a) Suppose that the foreign country suddenly becomes much more productive, so that the goods it produces become much cheaper. Holding the exchange rate fixed, how would this affect the quantities of their exports and their imports? Allowing exchange rates to adjust to the new equilibrium, how would this then affect the exchange rate for the foreign country’s currency? How would this in turn affect their exports and their imports?
   b) Suppose that the foreign country becomes protectionist and implements tariffs and non-tariff barriers on their imports. Holding the exchange rate fixed, how would this affect the quantities of their imports? Allowing exchange rates to adjust to the new equilibrium, how would this then affect the exchange rate for the foreign country’s currency? How would this in turn affect their exports and their imports?
3. (15%) Suppose that two similarly-sized countries are engaged in free trade, where the home country exports good X to the foreign country, and imports good Y. Their governments are each considering whether or not to impose tariffs on the other. If neither imposes a tariff, they both neither gain nor lose. If one country imposes a tariff but the other country does not, the tariff-imposing country will gain $3 billion while the other country will lose $8 billion. If both countries impose tariffs, then each country will lose $5 billion.

a) Show how this problem leads to a Prisoner's Dilemma if both countries try to maximize their net welfare, taking the actions of the other country as independent or given. What is each country’s dominant strategy? What is the Nash equilibrium?

b) What is the World Trade Organization, how did it evolve, and what are its key principles? How did one of these principles help to change the payoff matrix of the Prisoner's Dilemma in the postwar period? What effect did this have on world trade?

4. (20%) The U.S. both produces and imports petroleum, which is then converted into gasoline, heating oil, and other byproducts. Consumption of these petroleum byproducts has a significant external (spillover) cost, including air pollution, urban sprawl, congestion, noise, fatalities, and global warming. Suppose that the Administration begins to take this external cost seriously, and is considering alternative policies.

Consider the effect on just the market for gasoline. Assume that the current world price of gasoline is $1.50 per gallon, and at that price the U.S. produces 30 billion gallons per year and consumes 60 billion gallons. The marginal external cost is $2 per gallon. Suppose, for simplicity’s sake, that U.S. imports do not significantly affect the world price of oil (this, of course, is absurd).

a) Suppose that the U.S. government adds a $1 tariff to each gallon of imported gasoline, and this raises the domestic price to $2.50, increases domestic production to 40 billion gallons, and decreases consumption to 55 billion gallons. Show, calculate and explain the effects of this tariff on domestic producer surplus, domestic consumer surplus, and the government budget. In the absence of an externality, would this tariff improve or worsen efficiency? Considering now the effects of reduced consumption on reducing the consumption externality, would this tariff improve or worsen efficiency?

b) Assuming that domestic demand and supply are linear, what would be the amount of the prohibitive tariff? Show, calculate and explain the effects of this tariff on domestic producer surplus, domestic consumer surplus, the government budget, and the consumption externality. Would a prohibitive tariff improve or worsen efficiency, relative to the $1 tariff?

c) Suppose that the U.S. government instead puts a $1 tax on the consumption of gasoline, and this effectively shifts the demand curve vertically down by $1, so that at a market price of $1.50 consumption of gasoline falls to 55 billion gallons. Show, calculate and explain the effects of this consumption tax on domestic producer surplus, domestic consumer surplus, the government budget, and the consumption externality. Would this tax improve or worsen efficiency, relative to the $1 tariff?

d) Given the consumption externality, which is the optimal policy, an import tariff or a consumption tax? What is the optimal amount of the tariff or tax? Explain.
5. (15%) According to the *Wall Street Journal*, last week's direct spot price for the Canadian Dollar (CD) was 76.26 cents.

a) Suppose the one-year forward rate of the CD is 75.12 cents. What is the approximate expected percentage change in the CD over the next year? If the U.S. return on a one-year treasury bond is 1.0%, what is the equivalent Canadian interest rate?

b) Suppose the Canadian interest rate were identical to the U.S. rate. What would an arbitrageur do to make a profit? In which direction would this arbitrage change the spot price for the CD, the forward price for CD, the U.S. interest rate, and the Canadian interest rate?

c) If the dollar direct spot price of the Euro is $1.17, what is the cross-price of the Euro in Canadian Dollars? What forces this to be true?

d) Suppose that recent news -- that the U.S. may finally be recovering from the recession, and that the government deficit is increasingly large -- leads investors to now expect U.S. interest rates to increase one year from now. Canadian interest rates are expected to remain constant. Use a diagram to predict how this would affect the direct price for the Canadian Dollar in two years. Then use another diagram to predict how this should affect the current direct spot price for the Canadian Dollar.

6. (15%) In 2002, the U.S. exported $682 worth of goods or merchandise and $292 in services (all amounts are actually in billions). Imports of goods amounted to $1,165, and imports of services amounted to $227. Foreign-owned private assets in the United States increased by $612, with $260 in factor income paid to foreigners (most of which came from income on foreign-owned assets in the U.S.). U.S.-owned private assets abroad increased by $175, with $256 in factor income received from abroad (most of which came from U.S.-owned assets abroad), and U.S. government assets abroad increased by $32. There was also $59 in net payments in unilateral transfers, some from U.S. government grants but mostly from private remittances by U.S. residents. Finally, the U.S. central bank increased its foreign currency reserves by $4, and foreign central banks increased their U.S. Dollar reserve assets by $95, and there were no capital account transactions to speak of.

a) What is the (i) merchandise trade balance, now also called the balance on goods, (ii) the balance on services, (iii) the balance on factor income, and (iv) the balance on the current account?

b) What is (i) the balance on the non-reserve financial account, (ii) the reserve financial account, and (iii) the statistical discrepancy?

c) Based on their interventions, were foreign central banks attempting to cause their currencies to appreciate or depreciate against the U.S. Dollar?