Part 1: Short Answer. Credit depends entirely upon your explanation.

Answer 4 of 6 questions (6 points each, 24 points total).

1.1. The short-run marginal cost of adding a passenger to an already-scheduled flight is probably less than $15. Since American charged more than this during price wars with new entrants in the Dallas-Ft. Worth market, it cannot have engaged in predatory pricing. True, False, or Uncertain?

1.2. Andreas Antonius Gonzalez, Chief of Staff for the Mexican Energy Minister, argued that the Rotemberg-Saloner model of dynamic oligopoly pricing is useful in understanding both the renewed cohesion of OPEC in 1999 and the March 2000 OPEC agreement to increase its aggregate output quota. Briefly explain what he meant by this.

1.3. Sears provides lifetime warranties on its Craftsman-brand hand tools (screwdrivers, pliers, hammers, etc.). If they ever break, Sears will replace them at no charge, no questions asked. Craftsman-brand power tools (electric drills, saws, sanders, etc.) come with limited (e.g., one-year) warranties. Why might Sears find lifetime warranties to be profit-maximizing for hand tools? Why might this not extend to offering lifetime warranties on power tools?

1.4. Many states have "divorcement" laws that prohibit gasoline refiners (e.g. Mobil) from owning and operating retail gasoline stations. Under these laws, refiners may sell their brand of gasoline through franchisee-owned gas stations, but not through company-owned gas stations. A recent FTC study found that retail gasoline prices are about 2.7¢/gallon *higher* in states with divorcement laws than in states without these restrictions. Describe a model of the vertical structure of gasoline markets that is consistent with this finding.

1.5. A downtown restaurant sells a one-lobster dinner for $15.00 and a two-lobster dinner for $20.00. Under what conditions could this type of pricing be a profit-maximizing strategy? Why might the restaurant require that each person purchase an entrée?

1.6 In a model of localized competition, such as Hotelling's linear city or Salop's competition on a circle, reductions in the "transportation" cost, or a consumer's disutility from buying a product that is located further away from her preferred location, increase firms' profits because this enables firms to raise their equilibrium price. True, False, or Uncertain?

Part 2: Numerical problem. Answer all parts. 32 points total.

Two firms produce micro-cassette voice recorders. Demand for these recorders is given by P
= 100 – Q. Firm 1 has developed a proprietary technology that enables it to produce recorders
at a constant marginal and average cost of $10 each. Firm 2 has an older technology that
enables it to produce recorders at a constant marginal and average cost of $15 each.

2.1. (16 points) Assume the two firms compete in quantities (Cournot).

   (i)   What are the equilibrium quantities, market price, and profits for each firm?

   (ii)   Suppose firm 2 could develop a "copycat" technology with identical costs to firm 1
           (MC = AC = 10). How much, if anything, should it be willing to spend to develop
           that technology?

   (iii)   What is the social value of developing this "copycat" technology given Cournot
           comnpetition? (Value = $\Delta\Sigma\pi$ + ΔConsumer Surplus)

2.2. (12 points) Now assume the two firms compete in prices (undifferentiated Bertrand).

   (i)   What are the equilibrium price, quantities, and firm profits if firm 1 uses its
           proprietary technology and firm 2 uses its old technology?

   (ii)   Suppose firm 2 could develop a "copycat" technology with identical costs to firm 1
           (MC = AC = 10). How much, if anything, should it be willing to spend to develop
           that technology?

   (iii)   What is the social value of developing this "copycat" technology given Bertrand
           competition? (Value = $\Delta\Sigma\pi$ + ΔConsumer Surplus)

2.3. (4 points) Both the social value and the incentives for firm 1 to develop its proprietary
           technology (MC=10), given that both firms were initially using the public technology
           (MC = 15), are larger under Bertrand competition than under Cournot competition.
           (Take this as a fact; you could derive the result if you had time!)   How does this
           compare to your findings for the social value and firm 2's incentives to develop the
           "copycat" technology? Provide a brief explanation of why the results are similar or
           different.

Part 3: Tobacco industry discussion question. Answer all parts. 24 points total.

3.1. (9 points) We might represent demand for cigarettes by a differentiated product demand curve that depends on both price and advertising. For example, suppose the demand for cigarettes produced by firm i (i = 1,…n firms) takes the form:

$$D_i(P_1,…P_n; A_1,…A_n) = (b_0 + b\ln A_i - \beta\sum_{j\neq i}\ln A_j) * (a - d\ln P_i + \delta\sum_{j\neq i}\ln P_j)$$

where P denotes price, A denotes advertising expenditures and b_0, b, ß, a, d, and δ are all non-negative parameters.

  (i)   If $b > 0$ and $\beta = 0$, describe (qualitatively, in economic terms) the effect advertising would have on demand in this market?

  (ii) If $b > 0$ and ß > 0, describe (qualitatively, in economic terms) the effect advertising would have on demand in this market? What effect would advertising have if $b > 0$, ß $= b/$(n-1$)$ and firms are identical? (Hint: consider demand under a symmetric equilibrium in advertising). Would you expect to observe too little or too much advertising, relative to the social optimum, in this case?

  (iii) Based on what you know about the cigarette industry, what do you think are the likely effects of firm-level advertising on demand in this market. Explain briefly.

3.2. (9 points) In November 1998, the major tobacco companies settled multi-state litigation with an agreement to pay nearly $250 billion to the states over the next 25 years to compensate for smoking-related health care costs and to abide by significant restrictions on the nature of cigarette marketing and promotional activity. While this settlement was being negotiated, but before it was signed, cigarette firms engaged in intense price competition as well as extensive advertising and marketing activity. Briefly sketch an economic rationale for this behavior.

3.3 (6 points) Immediately following the settlement, major cigarette manufacturers raised their wholesale prices by 45 cents/pack. This was about 20% of the average retail price at the time, and a much larger percentage increase in the wholesale price net of taxes. Some retail outlets responded to this by beginning to offer "export" versions of branded cigarettes. These are branded cigarettes produced by the manufacturer but intended to be exported and sold outside the U.S. Assume that the relevant state and federal taxes are paid for these packages. Nonetheless, they sell at discounts from the standard domestic package price.
  (i)   What might explain the price discount for these "export" packages relative to cigarettes packaged for domestic consumption?
  (ii) Evaluate the claim that a major cigarette manufacturer shouldn't care which type of package a consumer buys since either way the manufacturer gets the sale.