<u>Part I.</u>

1. **<u>False</u>**. In a highly competitive industry in long-run equilibrium, P = MC = Minimum AC. So, economic profits are zero. When market demand declines, equilibrium price and quantity will fall in the short-run. Each firm in the industry will face a new infinitely elastic demand curve at a lower price. So, price will now be below the firm's AC, and the firm will sustain losses. In the long-run, these negative profits will induce exit from the industry. As exit occurs, the market supply curve will shift to the left (further reducing quantity supplied) until price is restored to its original long-run equilibrium value where economic profits are again zero.

2. **<u>False</u>**. Cell phone service is characterized by a few firms serving many consumers. It also has network externalities and, therefore, significant barriers to entry. Cell companies differentiate themselves on the basis of customer service, geographic range, quality of service, etc. But, unlike the Cournot model, price is set directly by the firms and is not determined as a result of market clearing after output selections have been made. So, a differentiated Bertrand model is perhaps the best fit here. Another possibility is the Sweezy oligopoly model (kinked demand curve) since the firms provide differentiated services and may believe rivals will match price cuts but not raises.

3. **<u>True or Uncertain</u>**. By internalizing the transaction within a single company, vertical integration will eliminate any form of opportunism resulting from the hold-up problem. However, in some circumstances, vertical integration can lead to other problems such as influence costs, inefficiencies, and a lack of specialization. In these cases, contracts may be more appropriate, especially when the environment is sufficiently simple to allow for effective enforcement.

4. **<u>False</u>**. Monopolies set output at MR=MC and earn rents. So, they have higher producer surplus then otherwise comparable competitive firms. However, fixed costs can consume all the profits, and a monopolist may earn zero economic profits (or even sustain losses in the short-run). Government regulations can also lower a monopolist's potential profits if price ceilings are adopted. Contestable markets also may lead to low economic profits. This occurs when a monopolist intentionally keeps price low to discourage potential entry into the market.

Part II.

Problem 1.

In industry A, total revenue is 50+10+10+10+10+10 = 100, and weights are 50/100 = 0.5 and 10/100 = 0.1, so

$FFI_A = C4_A = 0.5 + 0.1 + 0.1 + 0.1 = 0.8$ or 80%, while

$HHI_A = 10000*\{ (0.5)^2 + (0.1)^2 + (0.1)^2 + (0.1)^2 + (0.1)^2 + (0.1)^2 \} = 10000*\{0.3\} = 3,000.$

In industry B, total revenue is 40 + 40+40+40 = 160, and weights are 40/160 = 0.25 so

$FFI_B = C4_A = 4*).25 = 1.00$ or 100%, while

1, 15

10, 10

$HHI_B = 10000\{ 4*(.25)^2 \} = 2{,}500$.

Looking at the FFI, it seems that A is less concentrated, while looking at the HHI, it seems that B is less concentrated. Here criteria split. HHI is more comprehensive, since it contains all firms. In addition, there is a large firm in industry A that might have significant market power, while revenue of industry B is equally distributed among four different firms. Consequently, industry B is probably more competitive.

Problem 2.

a).

		Rival	
		Ad	No Add
You	Ad	1	
	No Add		

This is a one shot pay-off matrix where the dominant strategy (NE) for both players is (Ad, Ad). Therefore advertise and expect profit of 5 mil.

b). The reasoning is that year 5 is last, so it will look like a one-shot game. If so, then Year 4 is like the last year and will be played as a one-shot game too. Iterating, you reach the same conclusion for year 3, etc. <u>Conclusion:</u> Advertise and get profits of \$5mil. each year.

c). Now trigger strategies can be used. For the strategy "Do not be the first to advertise but advertise ever after your rival does", the gain to advertising is 15-10=5 in the current person, and the (loss) in future periods is 5-10=-5. The decision to advertise has a PV=(1- $1/(1+r) - 1(1+r)^2$ ....) = 5- 5/r

For reasonable interest rates, e.g. r=.1 or 10%, the gain is negative , e.g. 5-5/0.1=-45, so neither will be the first to advertise. <u>Prediction:</u> No Ads, profits of 10 mil. each for both firms forever.

Problem 3.

a.) Since the firms set a price and not quantity, the Bertrand model is more appropriate. Best Response of firm one to price of firm two is: $BR_1(p_2)= p_2-.01$ if $p_1>MC$
Similarly, $BR_2(p_1)= p_1-.01$ if $p_2>MC$.

b). NE means simultaneous BR: when $p_1=p_2=MC=5$ so that the economic profits are zero

c). If the products were not perfect substitutes → the reactions functions will move, so that the prices will go higher, and the profits will go higher as well. The differentiated goods Bertrand model does not predict what happens to the quantities.

Problem 4.

a). The profit maximization condition must satisfy simultaneously the following conditions:

1). $MR = MC_1 \rightarrow 78 - 30\,(Q_1+Q_2) = 3Q_1$
2). $MR=MC_2 \rightarrow 78 - 30\,(Q_1+Q_2) = 2Q_2$

Equating the right hand sides of 1-2) gives $3Q_1= 2Q_2$ or $Q_2=3/2\ Q_1$.
Substituting Q_2 in equation 1) gives

$78-30(Q_1+ 3/2Q_1) =3Q_1$, and solving yields $Q_1=1$ unit.

b). $Q_2 =3/2\ Q_1 =1.5$ units.
Price $=78 - (1+1.5)*15=40.5$
Profit for Q_2= (Price – Variable Cost)*Q_2= $(40.5-Q_2^2) *Q_2= (40.5-2.25)*1.5=$ \$57.38.