Problem Set 5
(ANSWERS)

I. Multiple Choice Questions

1. c) WHY? For a firm to be in equilibrium of any sort, they must be profit maximizing. Thus, we know that MR=MC, so MR in the short run is $3.50 and in the long run is $3, so a) and b) and d) are wrong. To confirm that c) must be right, note that ATC in the short run is $3500/1000=$3.50 and this equals MC, so it must be a minimum.

2. c) WHY? We know the firm is not perfectly competitive, because P>MC, so the firm faces a downward sloping demand curve. In the long run, though, profits are zero, since TR=$6*500=$3000=TC, so there must have been entry, implying the firm is monopolistically competitive.

3. b) WHY? A monopsonist faces an upward sloping supply curve, implying that the supply curve (and hence the wage) will be below the marginal cost of labor. In this case we see that the wage is $10 and the marginal cost of labor is $20, showing it is a monopsony. We also know that in order to profit maximize, the firm must set the marginal revenue product of labor equal to the marginal cost of labor. Thus, MRP=$20. Since MRP=MP*MR=10*MR, we know that MR=$2. Since the price is $2, we know that the firm is perfectly competitive in the output market.

4. b) WHY? First, it could never be a), since a long run equilibrium is always also a short run equilibrium. However, this cannot be a long run equilibrium, since in the long run there are zero profits and “excess capacity.” Here we have positive profits and are at minimum average total cost. It may be a short run equilibrium, though. Since we are at min ATC, we know MC=$12, and since it is monopolistic competition we know P>MR, so MR<$14 and could be $12.

5. d) WHY? By definition, a natural monopoly is an industry characterized by declining average total costs over the entire range of demand. If average cost is falling, then marginal cost must be below it. Thus, if a regulator were to set P=MC, since ATC>MC it would be the case that ATC>P.

II. Short Answer Questions

1. Left to its own devices, a firm with cost curves as shown would not produce at all, since MR never equals MC, and demand is always below AC, meaning the firm would always lose money. A block pricing scheme will allow the firm to produce at the socially efficient level of 4, where P=MC. First, note that the total cost of 4 units of the good is $400. (WHY? AC at 4 is labeled as being $100 and TC=Q*AC) Thus, we need to come up with at least $400 in total revenue, but we can't make people pay more than they want. So, we should set up a scheme that charges $150 for the first unit, $125 for the second unit, $100 for the third unit and $75 for the fourth unit. This gives us $450 in total revenue. Thus, the firm is making $50 of profits.

While not part of the question, it is worth noting that there will, of course, be some problems implementing the scheme. First, all the typical problems of regulation could crop up. So, for example, we may not really know what the firm's cost curves are, the firm has no incentive to cost minimize, etc. Second, all the problems of price discrimination could arise. We have to be sure you can't resell the good, we have to be able to identify who pays what price, etc.
II. In-Depth Problems

a) With a price ceiling of $3 imposed on the market, firms will only supply 10 thousand sandwiches, so even though consumers would like to buy 14 thousand, only 10 thousand will be sold. This is obviously less than the 12 thousand sold in equilibrium.

b) The marginal revenue curve is below the demand curve, bisecting the quantity axis. Since MR=MC at 8, that is how many thousands of sandwiches are sold. The price comes from the demand curve, so it is $6.

c) With a price ceiling of $3, the monopoly becomes a price taker, at least until 14 thousand sandwiches, when the normal downward sloping demand curve and MR matters again. Thus, MR is also $3 and the firm will be willing to sell 10 thousand sandwiches, since this is where MR=MC. Note this is the same number as in a), but more than in b).

d) This is the same as c), except the normal demand and MR take over at 10 thousand sandwiches. This is where MR=MC so 10 thousand are sold, the same as in c). If the market were perfectly competitive, this price ceiling would be nonbinding, and 12 thousand would be sold.