MICROECONOMICS

Section II

Planning time—10 minutes

Writing time—50 minutes

Directions: You have fifty minutes to answer all three of the following questions. It is suggested that you spend approximately half your time on the first question and divide the remaining time equally between the next two questions. In answering the questions, you should emphasize the line of reasoning that generated your results; it is not enough to list the results of your analysis. Include correctly labeled diagrams, if useful or required, in explaining your answers. A correctly labeled diagram must have all axes and curves clearly labeled and must show directional changes.

1. Claire invented product X and obtained a patent to prevent other firms from producing X. She is currently producing product X and earning positive economic profits.

   (a) Using a correctly labeled graph, show each of the following for Claire if she maximizes profits.

   (i) Output

   (ii) Price

   (iii) Economic profits

   (b) Assume that Claire hires labor in a perfectly competitive labor market. Using correctly labeled side-by-side graphs for the labor market and for Claire, show each of the following.

   (i) The wage rate of the workers

   (ii) The number of workers Claire will hire

   (c) Assume now the patent expires and many firms produce the identical product that Claire produces. Using correctly labeled side-by-side graphs for the industry and the firm, show each of the following in long-run equilibrium.

   (i) Industry price and output

   (ii) The typical firm's price and output

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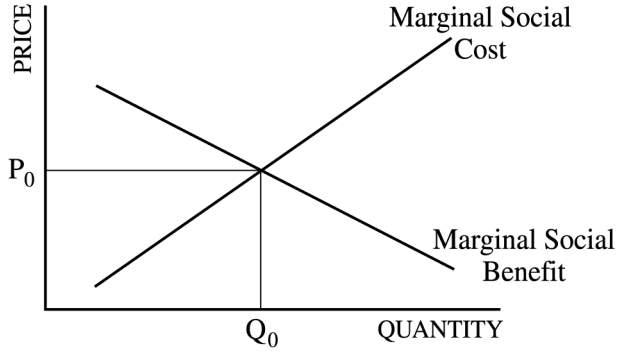
2. The graph below shows the price (P_0) and quantity (Q_0) at which there is an efficient allocation of resources.



However, in some cases the market fails to allocate resources efficiently.

(a) Assume the chemical industry is polluting the air.

(i) Using marginal benefit and marginal cost analysis, explain how the chemical industry is misallocating resources.

(ii) Identify one policy or action the government could take to correct this market failure.

(b) Assume it is difficult to exclude nonpayers from enjoying the benefits of national defense.

(i) Using marginal benefit and marginal cost analysis, explain how the private market will fail to produce the efficient level of national defense.

(ii) Identify one policy or action the government could take to correct this market failure.

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Question 1

Correct Answer:

Part a: The student should recognize that Claire is a monopolist. The firm (Claire) would have a downward-sloping product demand curve with a marginal revenue curve below the demand curve. The profit-maximizing level of output would be where marginal revenue equals marginal cost. The product price would be found on the demand curve, above the profit maximizing output level. The firm's economic profit would be the rectangle bordered vertically by the distance between price (P) and average total cost (ATC) and horizontally by the output level (Q).

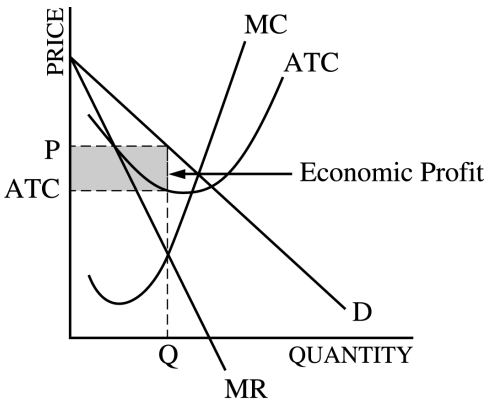
Part b: The student should show a competitive labor market with a downward-sloping labor demand curve and an upward sloping labor supply curve. There will be an equilibrium wage per unit of labor and equilibrium quantity of labor. Claire, as a wage taker, will face a perfectly elastic labor supply at the equilibrium market wage. The number of workers hired by Claire is found at the intersection of Claire's downward-sloping marginal revenue product of labor function (labor demand) and the perfectly elastic labor supply (at the market wage).

Part c: Product X is now sold in a perfectly competitive product market. The student should show a competitive output market with an equilibrium price and quantity. Claire and the other competitive firms have an output demand that is now perfectly elastic at the market-determined price of output. In the long-run equilibrium each firm will produce where the output price (also, the firm's marginal revenue) is equal to marginal cost at minimum average total cost.

Grading Rubric:

4+3+3 = 10 points for parts a, b, c

(a)

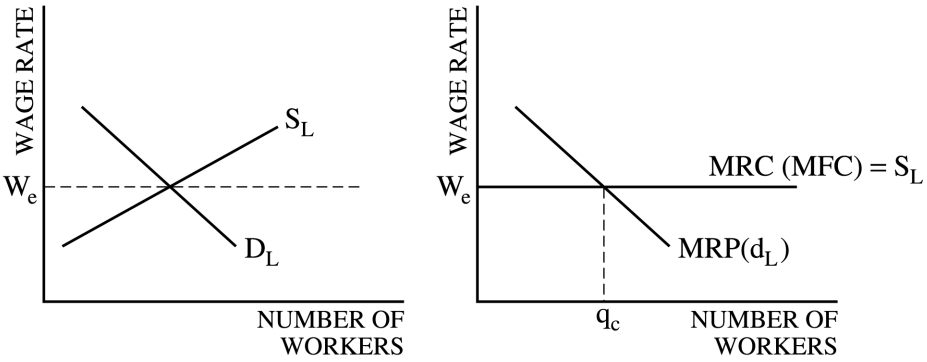


Profit-maximizing output level and price, profits - **4 points**

1 Point: correctly labeled graph with downward-sloping D and MR, with D>MR
1 Point: Q at MR = MC
1 Point: P from D, above the MR =MC point
1 Point: Profit rectangle properly shown: must use (P – ATC) x Q

Question 1 (cont'd.)

(b)



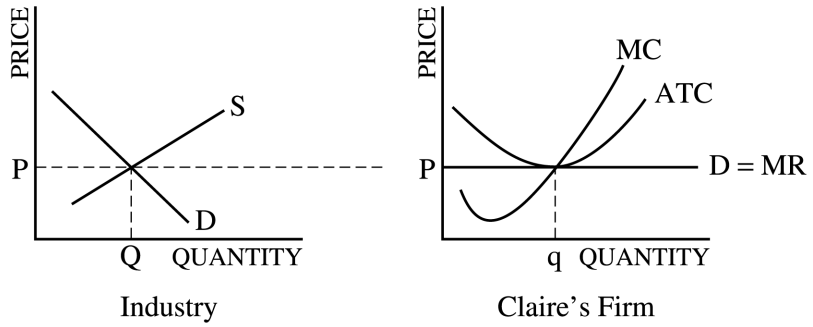
Labor hiring and wage rate – **3 points**

1 Point: correctly labeled labor market graph: must have an upward-sloping labor supply and downward-sloping labor demand

1 Point: correctly labeled firm graph as a part of the side-by-side graphs: must show linkage from labor market to indicate firm is a wage-taker (perfectly elastic labor supply curve) at the market wage

1 Point: for the correct number of workers for Claire: where Wage (labor supply, S_L) = MRP (downward sloping labor demand curve, labeled MRP or D_L)

(c)



Product Market-perfect competition – **3 points**

1 Point: correctly labeled graph of the market: showing equilibrium price and quantity of output

1 Point: correctly labeled graph of the firm as a part of the side-by-side graphs: must show linkage from the product market to indicate that the firm is a price-taker (perfectly elastic demand curve at the market output price)

1 Point: showing the firm's output level where MR=MC at minimum ATC

Question 1 (cont'd.)

Commentary:

This long microeconomics question tested the student's understanding of both output and input markets, as well as the linkage between the market and the individual firm. Also, the question included two different market structures, monopoly and perfect competition. The question was quite effective in separating across different grading points. As a general observation, it should be noted that too many students seemed unaware of the meaning of side-by-side graphs, needed in parts b and c. To show convincingly the links between a market and an individual competitive firm, these graphs are necessary.

Too frequently the student's labor market graph could not be distinguished from the output market graph; the student would have Q on the vertical axis and P on the horizontal axis for both graphs.

In both parts b and c, students frequently did not separate the market from the individual firm. A critical concept in perfect competition, both in the labor market and in the output market is that of "price taking." For the firm hiring labor in a perfectly competitive labor market, the price of labor becomes the firm's perfectly elastic labor supply, with the individual firm able to hire all the labor it wishes at the market-determined wage. Similarly, in the output market, the individual firm faces a perfectly elastic product demand at the market-determined output price.