2. The John Lamb Company, a profit-maximizing firm producing widgets, is in a perfectly competitive widget market. Assume John Lamb employs a fixed number of employees and rents a machine for a variable number of hours from a perfectly competitive market.

   (a) Using correctly labeled side-by-side graphs of the factor market for machines and the John Lamb Company, show each of the following.

      (i) The equilibrium rental price of machines in the factor market, labeled as P_R

      (ii) John Lamb's equilibrium rental quantity of machines, labeled as Q_L

   (b) Assume that the popularity of widgets declines, decreasing the demand for widgets. What will happen to each of the following?

      (i) Marginal product curve for machine-hours

      (ii) Marginal revenue product curve for machine-hours. Explain.

   (c) John Lamb is employing the cost-minimizing combination of inputs. The marginal product of labor is 28 widgets per worker hour and the wage rate is $14 per hour. The marginal product of the machine is 60 widgets per machine-hour. What is the hourly rental price of a machine?

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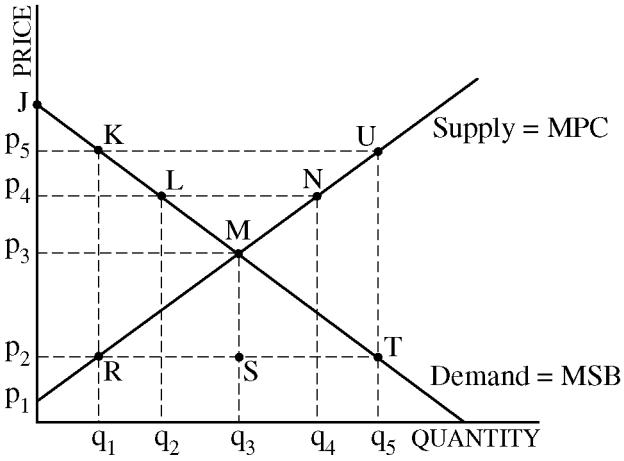

3. The graph above shows the perfectly competitive market for hard candies in Country Alpha. In the graph the letters correspond to points, not areas. MPC denotes marginal private cost and MSB denotes marginal social benefit.

   (a) Using the labeling on the graph, identify the area representing each of the following at the market equilibrium.

      (i) The consumer surplus

      (ii) The producer surplus

   (b) Assume that the production of each unit of candy creates a negative externality equal to $(p_5\text{-}p_2)$. Using the labeling on the graph, identify the socially optimal quantity.

   (c) Assume that the government imposes a per-unit tax of $(p_5\text{-}p_2)$ to correct for the negative externality. Using the labeling on the graph, identify the area representing each of the following.

      (i) The consumer surplus

      (ii) The deadweight loss

STOP

END OF EXAM

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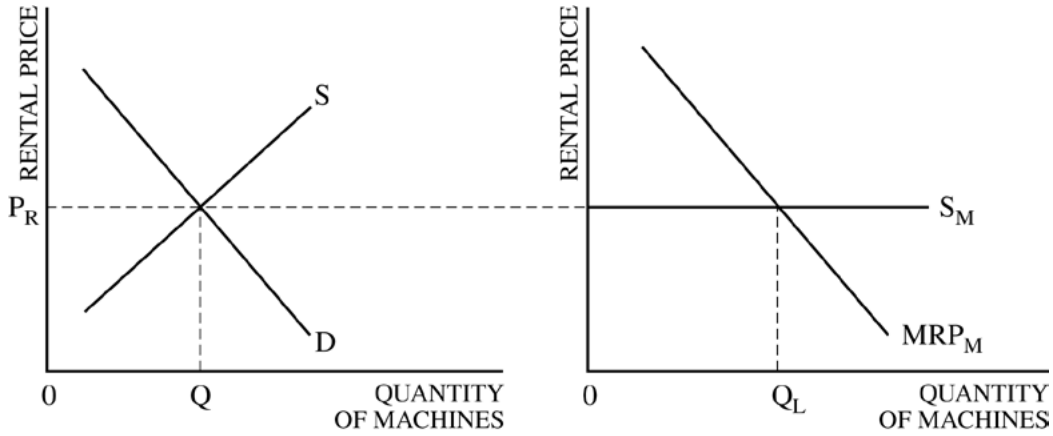
Question 2

5 points (2+2+1)



(a) 2 points:

- One point is earned for the correct side-by-side graphs with a horizontal machine supply curve for John Lamb (S, D, P_R, S_M).
- One point is earned for showing the equilibrium rental quantity of machines, Q_L, at the intersection of MRP and the horizontal supply curve.

(b) 2 points:

- One point is earned for stating that there will be no change to the marginal product curve for machine-hours.
- One point is earned for explaining that the MRP curve for machine-hours will decrease (shift to the left) because the decrease in demand decreases the price of widgets.

(c) 1 point:

- One point is earned for correctly calculating the rental price of a machine: $MP_L/w = MP_K/r = 28/14 = 60/r$. Therefore, r = \$30.

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