APEducate: MicroeconomicsAP.com

1. AP MICROECONOMICS EXAMINATION QUESTIONS

1. Use examples and explain how a profit maximizing firm will decide how many units of capital and labor to employ in its production processes. **[10 marks]**

2. Use examples to distinguish between loss minimizing and profit maximizing factor input combinations. **[10 marks]**

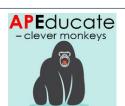## 2. AP MICROECONOMICS QUANTITATIVE EXAMINATION QUESTIONS

QUESTION ONE   [25 MARKS]

Patty Cakes is a profit-maximizing firm producing cakes and operates in a perfectly competitive cake market. Assume Patty Cakes employs a fixed number of employees and rents a cake making 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 cake machines and Patty Cakes, show each of the following:

   i.   The equilibrium rental price of machines in the factor market, labeled as P_R **[2 marks]**

   ii.   Patty Cakes' equilibrium rental quantity of cake machines, labeled as Q_L **[2 marks]**

b. Assume that in these health-conscious times the popularity of cakes declines, decreasing the demand for cakes. What will happen to each of the following?

   i.   Marginal product curve for machine-hours   **[2 marks]**

   ii.   Marginal revenue product curve for machine-hours. Explain.   **[2 marks]**

c. Patty Cakes is employing the cost-minimizing combination of inputs. The marginal product of labor is 28 cakes per worker hour and the wage rate is $14 per hour. The marginal product of the cake making machine is 60 cakes per machine-hour. What is the hourly rental price of a machine?
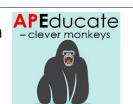
                                                                                          [2 marks]

Table 1 below shows productivity data for a firm's labor and capital inputs. The firm aims to maximize profits. Use this information to answer the following questions.

Table 1: Labor and capital inputs

Quantity of labor (L)	Quantity of output (Q)	Marginal product of labor (MP$_L$)	Cost of extra unit of output per \$ spent on wages (MP$_L$/W$_L$)	Quantity of capital (K)	Quantity of output (Q)	Marginal product of capital (MP$_K$)	Cost of extra unit of output per \$ spent on wages (MP$_L$/R$_L$)
0	0	–	–	0	0	–	–
1	12			1	22		
2	22			2	36		
3	30			3	46		
4	36			4	54		
5	40			5	58		

d. Determine the MP$_L$ **and** MP$_K$ at each quantity of labor **and** capital employed. Show this information in the table above.   **[2 marks]**

e. Given the price of labor is \$9 and the price of capital is \$12, determine the MP$_L$/W$_L$ **and** MP$_K$/R$_K$ at each quantity. Show this information in the table above.   **[2 marks]**

f. Determine the cost minimizing combination of labor and capital inputs to produce 68 units of output.   **[2 marks]**

g. Determine the respective total cost of producing 68 units of output at the cost minimizing combination of labor and capital inputs.   **[2 marks]**

Table 2 below shows productivity data for a firm's labor and capital inputs. The firm aims to maximize profits. Use this information to answer the following question.

Table 2: Labor and capital inputs

L	TP$_L$	MPL	MRP$_L$	MRP$_L$/MRC$_L$	K	TP$_K$	MP$_K$	MRP$_K$	MRP$_K$/MRC$_K$
0	0		–	–	**0**	0	–		–
1	12				**1**	22			
2	22				**2**	36			
3	30				**3**	46			
4	36				**4**	54			
5	40				**5**	58			

TP$_L$= total product labor; **MP$_L$** = marginal product of labor; **MRP$_L$** = marginal revenue product of labor; **MRP$_L$/MRC$_L$** = Ratio of marginal revenue to marginal cost of producing extra unit of output; **TP$_K$** = total product capital; **MP$_K$** = marginal product of capital; **MRP$_K$** = marginal revenue product of capital; **MRP$_K$/MRC$_K$** = Ratio of marginal revenue to marginal cost of producing extra unit of output

h. Given an output price of $3 per unit, labor cost of $20 per unit and capital cost of $30 per unit, determine:

     i.   The profit maximizing combination of resources   **[3 marks]**

     ii. The respective output level   **[2 marks]**

     iii. The firm's profit   **[2 marks]**