11. Minimum wage legislation requires most firms to pay workers no less than the legislated minimum wage per hour. Using marginal productivity theory, explain how a change in the minimum wage affects the employment of unskilled labor.

12. It is always better to hire a more qualified and productive worker than a less qualified and productive one regardless of cost. True or false? Explain.

13. Does the production function of Table 6-1 show constant, increasing, or decreasing returns to scale if the firm increases the quantity of labor and capital used from (a) $2L$ and $2K$ to $4L$ and $4K$? (b) $2L$ and $4K$ to $3L$ and $6K$?

14. If an estimated Cobb–Douglas production function is $Q = 10K^{0.6}L^{0.8}$ (a) what are the output elasticities of capital and labor? If the firm increases only the quantity of capital or only the quantity of labor used by 10 percent, by how much would output increase? (b) What type of returns to scale does this production function indicate? If the firm increases at the same time both the quantity of capital and the quantity of labor used by 10 percent, by how much would output increase?

15. (a) What is meant by an innovation? What are the different types of innovations? (b) What are some factors that determine the rate at which a firm introduces innovations? (c) What is meant by the closed and open innovation models?

PROBLEMS

1. Assuming that $L_1 = 1$ and $L_2 = 6$, while $K_1 = 1$ and $K_2 = 4$ in Figure 6-2, indicate the number of units of output to which (a) FE, (b) BA, and (c) DC refer by using Table 6-1.

*2. (a) From Table 6-1 construct a table similar to Table 6-2 showing the total product, the marginal product, and the average product of labor, as well as the output elasticity of labor, when capital is kept constant at 4 units rather than at 1 unit. (b) Draw a figure similar to Figure 6-4 showing the total product as well as the marginal and average products of labor from the results in part (a). (c) How do the results in parts (a) and (b) differ from those in Table 6-2 and Figure 6-4 in the text?

3. (a) From Table 6-1 construct a table similar to Table 6-2 showing the total product, and the marginal and the average products of capital, as well as the output elasticity of capital when labor is kept constant at 1 unit. (b) Draw a figure similar to Figure 6-4 showing the total product as well as the marginal and average products of capital from the results in part (a). (c) How much capital would a rational producer use?

4. Ms. Smith, the owner and manager of the Clear Duplicating Service located near a major university, is contemplating keeping her shop open after 4 P.M. and until midnight. In order to do so, she would have to hire additional workers. She estimates that the additional workers would generate the following total output (where each unit of output refers to 100 pages duplicated). If the price of each unit of output is $10 and each worker hired must be paid $40 per day, how many workers should Ms. Smith hire?

Workers hired	0	1	2	3	4	5	6
Total product	0	12	22	30	36	40	42

*5. Find the marginal revenue product of labor for the data in Problem 4 from the change in total revenue resulting from the employment of each additional unit of labor, and show that the number of workers that Ms. Smith should hire is the same as that obtained in Problem 4.

6. From the production function given in the following table, draw a figure showing (a) the isoquants for 8, 12, and 16 units of output and (b) the ridge lines.

Capital (K)							
6	4	8	14	16	13	11	
5	6	12	16	18	15	14	
4	7	13	16	20	18	16	Output (Q)
3	8	12	14	16	16	14	
2	4	7	12	13	12	8	
1	1	3	8	7	6	5	
0	1	2	3	4	5	6	
			Labor (L)				