Answers:

1. A
2. B
3. A
4. B
5. A
6. C
7. C
8. D
9. D
10. B
11. E
12. E
13. A
14. C
15. A
16. B
17. B
18. A
19. A
20. D
21. C
22. A
23. C
24. A
25. C
26. C
27. A
28. C
29. A
30. B

Solutions:

1. F(L,K) = $\sqrt{LK}$. F(aL,aK) = $\sqrt{aLaK}$ = $\sqrt{a^2LK}$ = a$\sqrt{LK}$ = aF(L,K) → constant returns to scale. **A**

2. Q = $\sqrt{LK}$ so K = Q^2/L. TC = wL + rK. Substituting in for K gives TC = wL + rQ^2/L. **B**

3. We need to take the derivative of TC with respect to L and set it equal to zero. dTC/dL = w – $rQ^2/L^2 = 0$ → $L^2 = rQ^2/w$ → $L = Q\sqrt{\frac{r}{w}}$. **A**

4. $K = Q^2/L$. Plugging in $L = Q\sqrt{\frac{r}{w}}$ gives $K = Q\sqrt{\frac{w}{r}}$. **B**

5. TC = wL + rK. Plugging in the optimum values of L and K gives TC = 2Q$\sqrt{rw}$. **A**

6. The derivative of TC = 2Q$\sqrt{rw}$ with respect to Q is MC = 2$\sqrt{rw}$. **C**

7. Q(p) = 10 – p. Solving for p gives p(Q) = 10 – Q. **C**

8. TR = price times quantity = p(Q)*Q = $10Q - Q^2$. **D**

9. We need to take the derivative of TR with respect to Q. We get 10 – 2Q. **D**

10. P = TR – TC. In order for profit to be maximized, its derivative must be equal to zero. P' = TR' – TC' = MR – MC = 0 → MC = MR. **B**

11. There is not enough information to determine this based on the given information. **E**

12. There is not enough information to determine this based on the given information. **E**

13. P = TR – TC. Plugging in Q = 5 - $\sqrt{rw}$ to $(10Q - Q^2)$ - 2Q$\sqrt{rw}$ gives P = 25 + rw – 10$\sqrt{rw}$. **A**

14. $TR_1 = pQ_1 = Q_1*(100 - Q_1 - Q_2)$ → $MR_1 = 100 - Q_2 - 2Q_1$. $MC_1 = 2Q_1$. MC = MR → $\underline{4Q_1 + Q_2 = 100}$. Same process for firm 2. $MR_2 = 100 - Q_1 - 2Q_2$. $MC_2 = 12$. MC = MR → $\underline{Q_1 + 2Q_2 = 88}$. Solving system of underlined equations gives $Q_1 = 16$ and $Q_2 = 36$. **C**

15. **A**

16. $p = 100 - Q = 100 - Q_1 - Q_2 = 100 - 16 - 36 = 48$. **B**

17. 7500-2400P=600P, P=2.5. Q=600(2.5)=1500.

18. $Es=\frac{\Delta Qs/Qs}{\Delta P/P} = 600 * \left(\frac{2.5}{1500}\right) = 1$

19. Draw a diagram and use triangle area formula. CS=.5(3125-2500)(1500-0)=46875000

20. Now, Price suppliers receive is higher than price consumers pay. Ps=Pd+.3. Thus, 7500-2400Pd=600(Pd+.3) and Pd=2.44. Consumers thus pay 2440, and Q=7500-2440(2.44)=1644

21. There is not enough information to determine the net effect to society. We have too many unknowns (e.g., positive externalities, government multiplier).

22. 5/120=4.2%.

23. False. For example, in the short run if the price of automobiles increases, consumers can defer purchases of new cars because cars are durable (demand is elastic). In the long run, however, durable goods eventually wear out and will likely be replaced (demand is inelastic).

24. True

25. False. The manufacturer will maximize profits by producing at each plant until the point where marginal cost equals marginal revenue, in this case $50.

26. False. If a firm with seller market power faces a positive network externality, it will set price and quantity in any period taking account of the effect of the marginal unit on future demand and marginal revenue.

27. 5000(.25)=1250

28. 1/(1-.8)=5

29. Yes. Calculate the Net Present Value and see that it is positive.

30. Long run Philips curve is vertical. Thus, unemployment should remain the same.