A. Multiple choices (55 pts)

1. Assume a firm is using 10 units of labour and 10 units of capital to produce 10 units of output. Now both inputs are doubled resulting in output increasing from 10 to 22. The firm is experiencing
   a. Increasing average costs.
   x Decreasing average costs.
   c. Decreasing returns to scale.
   d. Constant returns to scale.
   e. Both a and c.

2. A monopoly will be earning economic profits
   a. at all times, since it controls the market.
   b. when price is marginal cost.
   x c. whenever marginal revenue equals marginal cost.
   d. whenever marginal revenue is positive.
   e. whenever marginal revenue exceeds average total cost.

3. The implication of the long-run equilibrium in the competitive industry is that
   a. resources are allocated efficiently.
   b. price of the product is the lowest price possible.
   c. there is no incentive for firms to enter or leave the industry.
   x d. All of the above.
   e. None of the above.

4. Suppose we compare two imaginary monopolists that have identical cost and demand conditions. Monopolist A charges a single price while monopolist B engages in price discrimination. Which of the following statements is CORRECT?
   a. Monopolist B will produce less than A, resulting in a deadweight loss.
   b. Monopolist B will produce more than A, resulting in less deadweight loss.
   c. Monopolist A will produce less than B, resulting in smaller deadweight loss.
   d. Monopolist A will produce more than B, resulting in larger deadweight loss.
   e. Monopolists A and B will both produce the same amount.

5. A rise in the quantity demanded of lemons can be attributed to
   a. a leftward shift in the supply curve of lemons.
   b. a rightward shift in the supply curve of lemons.
   x c. a decline in the number of people drinking lemonade.
   d. a decrease in the price of artificial lemon flavouring.
   e. a cold spell which makes people want less lemonade.

6. All of the following are true of the firm's short-run cost curves, as conventionally drawn, EXCEPT:
   a. AFC declines as output increases.
   b. ATC decreases as long as MC<ATC.
   x c. AVC decreases as long as MC < ATC.
   d. the MC curve intersects the AVC and ATC curves at their minimum points.
   e. None of the above.

7. If the income elasticity of demand is 0.5, then a 10 percent increase in income results in a
   a. 50 percent reduction in quantity demanded.
   b. 5 percent increase in quantity demanded.
   x c. 5 percent decrease in total revenues.
   d. 5 percent decrease in quantity demanded.
   e. 0.5 percent decrease in quantity demanded.

8. Suppose the price of good A falls and the consumption of good B rises. We can conclude that
   a. A is a normal good.
   b. B is a normal good.
   x c. A is an inferior good.
   d. B is an inferior good.
   e. both A and B are normal goods.
Question 9-11 are based on the figure 1, which shows the budget constraint and the indifference curves of Jean. Jean is in equilibrium with an income of $300, facing prices \( P_x = $4 \) and \( P_y = $10 \).

![Figure 1](image)

9. How much \( X \) does Jean consume?
   a. 30
   b. 35
   c. 43
   d. 75
   e. Indeterminable with data provided.

10. If the price of \( X \) falls to $2.50, while income and the price of \( Y \) stay constant, how much \( X \) will Jean consume?
    a. 30
    b. 35
    c. 43
    d. 75
    e. Indeterminable with data provided.

11. The income effect corresponds to the movement from
    a. E to F.
    b. E to C.
    c. F to C.
    d. C to E.
    e. Indeterminable with data provided.

12. If a profit-maximizing monopoly is producing at an output at which marginal cost exceeds marginal revenue, it
    a. Should raise price and lower output.
    b. Should lower price and raise output.
    c. Should lower price and lower output.
    d. Is making losses.
    e. Is maximizing profit.

13. Consumer surplus
    a. is the sum of the marginal values to the consumer.
    b. is the total value that a consumer receives from a purchase of a particular good.
    c. is the difference between what the consumer is willing to pay and what he/she actually paid.
    d. is the consumption of a commodity above and beyond the amount required by the consumer.
    e. None of the above.

14. Which of the following is not an assumption of perfect competition?
    a. The number of suppliers is large enough that no one produces a significant proportion of the output, and all demanders and suppliers are price-takers.
    b. All individuals have perfect knowledge.
    c. The products sold by all firms in the market are identical.
    d. Each firm faces a downward-sloping demand curve.
    e. All the above are assumptions of perfect competition.
15. A monopoly is distinguished from a firm operating under any other market structure in the following way:
   a. the monopoly charges a price higher than its average revenue.
   b. the monopoly can choose its output level.
   c. the monopoly can choose its level of cost.
   d. the monopoly does not produce at a profit-maximizing level of output.
   e. the monopoly has a demand curve which is identical to the market demand curve.

16. A firm in a perfectly competitive industry is maximizing its short-run profits by producing 500 units of output. At 500 units of output, which of the following must be false?
   a. MC<AVC.
   b. MC<ATC.
   c. MC>ATC.
   d. AR<ATC.
   e. AR>AVC.

17. When a firm practices price discrimination, we can expect:
   a. The firm to segment consumers based on their preferences and charge them the same price for different goods.
   b. The firm to segment consumers based on their elasticity of demand and charge consumers with an inelastic demand a higher price.
   c. The firm to segment consumers based on their elasticity of demand and charge consumers with an elastic demand a higher price.
   d. The firm to segment consumers based on their elasticity of demand and charge all consumers the same price.
   e. None of the above.

18. The consumers' burden associated with a sales tax will be least when demand is
   a. elastic.
   b. unitary elastic.
   c. perfectly inelastic.
   d. perfectly elastic.
   e. vertical.

19. Suppose that in 1997, 100,000 cell phones were sold at a price of $30 each, and in 1998, 200,000 cell phones were sold at a price of $50 each. One possible explanation for this is that from 1997 to 1998 the _________ curve shifted to the _________.
   a. Supply; left
   b. Supply; right
   c. Demand; left
   d. Demand; right
   e. Indeterminable with data provided

20. Which of the following is true for both perfect competition and single-price monopoly?
   a. Homogeneous product.
   b. Zero long-run economic profits.
   c. Short-run profit-maximizing quantity where MR=MC.
   d. Easy entry and exit.
   e. None of the above.

21. If a firm in a perfectly competitive market were to raise its price, its
   a. revenue would decrease if market demand were elastic.
   b. revenue would increase if market demand were inelastic.
   c. total costs would increase.
   d. revenue would fall to zero.
   e. profits would increase as long as costs remained constant.

22. Suppose that capital costs $10 per unit and labour costs $5 per unit. For a profit-maximizing firm operating at its optimal factor mix, if the marginal product of capital is 50, the marginal product of labour is
   a. 10.
   b. 20.
   c. 25.
   d. 50.
   e. 100.
B. (15 pts) (SHOW YOUR WORK) Here is the market for cashew nuts:

<table>
<thead>
<tr>
<th>Price per unit</th>
<th>20</th>
<th>40</th>
<th>60</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quantity Demanded</td>
<td>30</td>
<td>20</td>
<td>10</td>
</tr>
<tr>
<td>Quantity Supplied</td>
<td>15</td>
<td>35</td>
<td>55</td>
</tr>
</tbody>
</table>

(a) Find the elasticity of demand at equilibrium. Is the curve elastic here?

\[ D: \alpha^d = 40 - \frac{1}{2}P \implies P = 80 - 2\alpha^d \]
\[ S: \alpha^s = -5 + P \implies P = 80 - \alpha^s + 5 \]
\[ 40 - \frac{1}{2}P = P - 5 \]
\[ \implies \begin{cases} P^* = 30 \\ \alpha^* = 5 \end{cases} \]

Equilibrium is inelastic.

(b) At which point will the total PROFIT reach its maximum? (find both P and Q)

\[ MR = 80 - 4\alpha = \alpha + 5 \]
\[ \implies \begin{cases} \alpha = 15 \\ P = 80 - 30 = 50 \end{cases} \]

(c) Complete this table showing the effects of the following policy:
A price ceiling = 20

<table>
<thead>
<tr>
<th>( P^c )</th>
<th>( P_s )</th>
<th>( Q_c )</th>
<th>( Q_s )</th>
<th>( \Delta CS )</th>
<th>( \Delta PS )</th>
<th>( \Delta GR )</th>
<th>DWL</th>
</tr>
</thead>
<tbody>
<tr>
<td>20</td>
<td>20</td>
<td>15</td>
<td>15</td>
<td>50</td>
<td>-200</td>
<td>0</td>
<td>-150</td>
</tr>
</tbody>
</table>

\[ \Delta CS = 15 \times 10 - \frac{1}{3} \times 20 \times 10 = 150 - 100 = 50 \]
\[ \Delta PS = -\frac{1}{3} (15 + 25) \times 10 = -200 \]
Notation for C and D: \( x = \) firm's output, \( Q^d = \) market demand, \( Q^s = \) market supply

C. (30 pt) Let \( x = L^{1/2}K^{3/2} \), \( P_L = 4 \) and \( P_K = 3 

(a) Find the equation for the long run total cost and marginal cost functions

\[
TC_{LR} = 4L + 3K = \frac{2 \sqrt{K}}{N^2} + \frac{6 \sqrt{x}}{4} = \frac{8 \sqrt{x}}{N^2} = 4 \sqrt{2} \sqrt{x} = 5 \sqrt{2} \sqrt{x}
\]

\[
MRS_{KL} = -\frac{\frac{1}{2} L^{-\frac{1}{2}} K^\frac{3}{2}}{\frac{3}{2} L^\frac{1}{2} K^{-\frac{1}{2}}} = -\frac{k}{3L} = -\frac{4}{3} \Rightarrow k = 4L
\]

\[
X = L^{\frac{1}{2}} (4L)^{\frac{3}{2}} = 8L^2 \Rightarrow L = (\frac{X}{8})^{\frac{1}{2}}
\]

\[
k = \frac{2 \sqrt{K}}{N^2} = 5 \sqrt{x}
\]

\[
MC_{LR} = \frac{4}{N^2} X^{-\frac{1}{2}} = \frac{4}{N^2} \frac{1}{\sqrt{X}} = \frac{2 \sqrt{2}}{N^2}
\]

(b) I want to produce 64 units of output, how much L and K should I use to produce 64 units of output in the cheapest manner possible?

\[
k = 4L
\]

\[
L^{\frac{1}{2}} K^{\frac{3}{2}} = 64
\]

\[
L^{\frac{1}{2}} (4L)^{\frac{3}{2}} = 64
\]

\[
L^2 = 8
\]

\[
L = \sqrt{8} = 2 \sqrt{2} = 2.82
\]

\[
k = 4L = 8 \sqrt{2} = 11.31
\]

(c) Find the equation for the short run total cost for \( K = 4 \)

\[
X = L^{\frac{1}{2}} 4^{\frac{3}{2}} = 8L^{\frac{1}{2}}
\]

\[
L = \frac{X^2}{64}
\]

\[
TC_{SR} = \frac{X^2}{16} + 12
\]
(d). Suppose $Q^d = 644 - 2P$ and there are 40 identically sized firms (all stuck at $K=4$) in this perfectly competitive industry. Find the equilibrium price, quantity per firm and profit/loss per firm?

\[ MC = \frac{X}{8} \]
\[ P = MC \Rightarrow x = 8P \]
\[ \alpha = 40x = 320P = 644 - 2P \]
\[ \Rightarrow \frac{P}{x} = 2 \]
\[ x = 16 \]
\[ \pi = 2 \times 16 - \frac{16^2}{16} - 12 = 4 \]

(e). Suppose there is free entry/exit in this perfectly competitive industry, all the firms are identically sized firms ($K=4$). What will the long run price, quantity per firm and number of firms be?

\[ MC = ATC \Rightarrow \frac{x}{8} = \frac{X}{16} + \frac{12}{x} \]
\[ \frac{x}{16} = \frac{12}{x} \]
\[ x = 13.86 \]
\[ P = 1.73 \]
\[ \alpha = 644 - 2 \times 1.73 = 640.4 \]
\[ N = 46.2 \]

(f). Suppose one firm gains control of this industry and no one else was allowed to produce this good. If this firm is stuck at $K=4$, what price would it set to maximize its profit? How many units would the firm sell and how much profit would this monopoly make?

\[ D : P = 322 - \frac{Q^d}{2} \]
\[ MR = 322 - \alpha = \frac{8}{8} \]
\[ 2576 - 8Q = \alpha \]
\[ \alpha = 286.22 \]
\[ P = 322 - 143.11 \]
\[ = 178.89 \]
\[ \pi = 178.89 \times 286.22 - \frac{286.22^2}{16} - 12 \]
\[ = 51,261.9 - 5,120.12 - 12 \]
\[ = 46,069.78 \]

😊 < Good Luck! > 😊