Part A: Multiple Choice Questions (2 points each, total 40 points)

1. When an economist talks of scarcity, the economist is referring to the
   A) ability of society to employ all of its resources.
   B) ability of society to consume all that it produces.
   C) inability of society to satisfy all human wants because of limited resources.
   D) ability of society to continually make technological breakthroughs and increase production.

2. The study of the choices made by individuals is part of the definition of
   A) microeconomics.
   B) positive economics.
   C) macroeconomics.
   D) normative economics.

3. When an economy produces more houses and fewer typewriters, it is answering the ________ part of one of
   the two big economic questions.
   A) "what"
   B) "how"
   C) "where"
   D) "for whom"

4. Which of the following are considered factors of production used to produce goods and services?
   I. Land
   II. Labor
   III. Capital
   IV. Entrepreneurship
   A) I and II only
   B) I and III only
   C) I, II and III only
   D) I, II, III and IV

5. The forgone highest-valued alternative defines the concept of
   A) marginal benefit.
   B) scarcity.
C) entrepreneurship.
D) opportunity cost.

6. If a consumer is relatively insensitive to changes in the price of a good, then the consumer's demand for the good is
A) elastic.
B) unit elastic.
C) inelastic.
D) perfectly elastic.

7. Positive and normative statements differ in that
A) positive statements can be tested, whereas normative statements cannot.
B) normative statements can be tested, whereas positive statements cannot.
C) normative statements depict "what is" and positive statements depict "what ought to be."
D) normative statements never use the word "should."

8. The production possibilities frontier itself illustrates
A) all goods that can be produced by an economy.
B) the combination of goods and services that can be produced efficiently.
C) all goods and services that are desired but cannot be produced due to scarce resources.
D) all possible production of capital goods.

9. The "law of demand" states that changes in
A) demand are related directly to changes in supply.
B) the quantity demanded of a good are not related to changes in the quantity supplied.
C) the quantity demanded of a good are inversely related to changes in its price.
D) demand are inversely related to changes in supply.

10. Which of the following influences people's buying plans and does NOT shift the demand curve?
A) the price of the good
B) the prices of related goods
C) income
D) preferences

11. The price of a tomato increases and people buy more lettuce. You infer that lettuce and tomatoes are
A) complements
B) normal goods
C) substitutes
D) inferior goods

12. The demand for a good increases when the price of a substitute ________ and also increases when the price of a complement ________.
A) rises; rises
B) rises; falls
C) falls; rises
D) falls; falls

13. A normal good is a good for which demand
A) decreases when income increases.
B) increases when income increases.
C) decreases when population increases.
D) increases when population increases.
14. The statement that "demand increases" means that there is a
A) movement to the right along a demand curve.
B) movement to the left along a demand curve.
C) rightward shift of the demand curve.
D) leftward shift of the demand curve.

15. The "law of supply" states that, other things remaining the same, firms produce
A) more of a good the less it costs to produce it.
B) less of a good the more it costs to produce it.
C) more of a good the higher its price.
D) less of a good as the required resources become scarcer.

16. A rise in the price of a good causes producers to supply more of the good. This statement illustrates
A) the law of supply.
B) the law of demand.
C) a change in supply.
D) the nature of an inferior good.

17. When a market is in equilibrium,
A) everyone has all they want of the commodity in question.
B) there is no shortage and no surplus at the equilibrium price.
C) the number of buyers is exactly equal to the number of sellers.
D) the supply curve has the same slope as the demand curve.

18. The price elasticity of demand measures
A) how often the price of a good changes.
B) the slope of a budget curve.
C) how sensitive the quantity demanded is to changes in demand.
D) the responsiveness of the quantity demanded to changes in price.

19. If the demand for a good is elastic, when the price increases, the
A) demand will decrease.
B) quantity demanded will increase.
C) quantity demanded will decrease by a smaller percentage than the price increased.
D) quantity demanded will decrease by a greater percentage than the price increased.

20. If demand is inelastic, an increase in the price will
A) decrease total revenue.
B) increase total revenue.
C) not change total revenue.
D) increase the quantity demanded.
Part B: Essay Questions (65 points)

1. Suppose the market for CD-Rs has the demand and supply schedules shown in the table below. (16 points)

<table>
<thead>
<tr>
<th>Price (dollars per disk)</th>
<th>Quantity demanded (millions of disks per month)</th>
<th>Quantity supplied (millions of disks per month)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.50</td>
<td>50</td>
<td>0</td>
</tr>
<tr>
<td>1.00</td>
<td>40</td>
<td>15</td>
</tr>
<tr>
<td>1.50</td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td>2.00</td>
<td>20</td>
<td>45</td>
</tr>
<tr>
<td>2.50</td>
<td>10</td>
<td>60</td>
</tr>
<tr>
<td>3.00</td>
<td>0</td>
<td>75</td>
</tr>
</tbody>
</table>

A. On the same diagram (below) draw the demand and supply curves (label them as $D_0$ and $S_0$ respectively). (8 points)

B. What is the equilibrium price and the equilibrium quantity in this market? (2 points)

**Answer:** As shown by point $E_0$ in the graph above, the market is in equilibrium at the price $1.5$ and quantity 30 million per month.

C. Suppose the current price is $2.00. (i) What is the quantity of CD-Rs sold? Explain. (ii) Is there a shortage or a surplus? (iii) How big is it? Explain. (2+2+2 points)

**Answer:** (i) When the price is $2$, there are 20 million disks sold (quantity demanded) per month (point A). (ii) As shown by point A in the graph above, the quantity supplied (produced) of disks per month is 45 million when the price is $2$. Therefore, and given that it is a price above the equilibrium, there is a surplus of disks in the market. (iii) The amount of surplus is equal to 25 million disks per month, i.e. 45-20.
2. The table below reports the market demand schedule of Coca-Cola and Pepsi. (16 points)

<table>
<thead>
<tr>
<th>Quantity demanded of Coca-Cola (millions per day)</th>
<th>Quantity demanded of Pepsi (millions per day)</th>
<th>Price per Coca-Cola ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>135</td>
<td>20</td>
<td>1</td>
</tr>
<tr>
<td>110</td>
<td>35</td>
<td>2</td>
</tr>
<tr>
<td>85</td>
<td>42</td>
<td>3</td>
</tr>
<tr>
<td>60</td>
<td>70</td>
<td>4</td>
</tr>
<tr>
<td>35</td>
<td>90</td>
<td>5</td>
</tr>
<tr>
<td>15</td>
<td>100</td>
<td>6</td>
</tr>
</tbody>
</table>

A. (i) Calculate the elasticity of demand for Coca-Cola when its price increases from $4 to $5.
   (ii) Is the demand elastic, inelastic or unit elastic at this price range? Briefly explain. (4+2 points)

   **Answer:** As shown above, when the price of coca-cola increases from $4 to $5, the quantity demanded of coca-cola decreases from 60 to 35 million units per day.

   (i) Therefore, we can calculate the price elasticity of demand for coca-cola as follows.

   \[
   PED = \frac{\Delta Q^D}{\Delta P} \times \frac{P_{avg}}{Q_{avg}} = \frac{-25}{1} \times \frac{4.5}{47.5} = -2.4
   \]

   This means that as a result of a 1% increase in the price of coca-cola, quantity demanded of coca-cola decreases by 2.4%.

   (ii) Given that the absolute value of PED (2.4) is greater than 1, the demand for coca-cola is elastic in this price range.

B. If the demand for Coca-Cola is inelastic, what would happen to the total revenue if price increases? Briefly explain. (2 points)

   **Answer:** Price elasticity of demand is calculated as the ratio of the percentage change in the quantity demanded to the percentage change in the price of the good.

   When demand is found to be inelastic, i.e. absolute value of price elasticity is less than 1, it means that the percentage change in the quantity demanded is less than the percentage change in the price:

   \[
   \%\Delta Q < \%\Delta P
   \]

   We know that if the price of a (normal) good increases, its quantity demanded will decrease. Because the demand in this part of the question is given to be inelastic and the price of coca-cola (a normal good) is increasing, we conclude that the decrease in the quantity demanded will be less than the increase in the price.

   \[
   \downarrow Q < \uparrow P
   \]

   Finally, given that:

   \[
   TR = P \times Q
   \]
we conclude that the total revenue (TR) is going to increase as a result of the rise in the price.

C. Find the cross-price elasticity between Coca-Cola and Pepsi when the price of Coca-Cola increases from $2 to $3. (6 points)

Answer: We see from the table above that when price of coca-cola increases from $2 to $3, the quantity demanded of pepsi increases from 35 to 42 million units per day. Therefore, the cross-price elasticity between coca-cola and pepsi is calculated as follows.

\[
P E D_{Cola-Pepsi} = \frac{\Delta Q^D_{Pepsi}}{\Delta P_{Cola}} \times \frac{P_{Cola}}{Q^D_{Pepsi,avg}} = \frac{7}{1} \times \frac{2.5}{38.5} = 0.45
\]

We conclude that a 1% increase in the price of coca-cola leads to 0.45% increase in the quantity demanded of pepsi.

D. What can you say about these two goods? Are they substitute or complementary goods? Briefly explain. (2 points)

Answer: The cross-price elasticity between the goods, which is found to be positive, suggests that the goods are substitute to each other. That is to say that when the price of one of the goods increases, the quantity demanded of the other good increases.

3. Suppose country X production possibilities are as below. (16 points)

<table>
<thead>
<tr>
<th>Alternative combinations</th>
<th>Sugar (tonnes/month)</th>
<th>Oil (barrels/month)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>0</td>
<td>300</td>
</tr>
<tr>
<td>B</td>
<td>50</td>
<td>200</td>
</tr>
<tr>
<td>C</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>D</td>
<td>150</td>
<td>0</td>
</tr>
</tbody>
</table>

A. Draw a graph of production possibility frontier (PPF) from the given alternative combinations in the table above. Label the combinations as A, B, C, and D on the graph below. (6 points)
B. Show on the graph above (i) one point representing an unattainable combination, (ii) one point representing an efficient combination, and (iii) one inefficient combination and label them as E, F, G, respectively. (3 points)

C. If producer supplies 100 barrels of oil, how much sugar must be produced to achieve production efficiency? (2 points)

Answer: In order to achieve production efficiency, 100 tonnes of sugar need to be produced together with 100 barrels of oil. This point on the PPF is labeled as C.

D. What is the opportunity cost of producing 1 barrel of oil from combination C to B? (5 points)

Answer: Whereas the production of oil increases by 100 units from the combination C to B, the production of sugar decreases by 50 units. That is to say, the opportunity cost of 100 units of oil is 50 units of sugar. Therefore, the opportunity cost of producing 1 barrel of oil from combination C to B is equal to 0.5 tonnes of sugar, i.e. 50/100=0.5.

E. What you can say about the shape of the PPF curve by relating it to the concept of the opportunity cost? (Bonus 5 points)

Answer: Because the PPF curve is a straight line, we conclude that the opportunity of producing one additional unit of a good (oil or sugar) in terms of the production of the other good is constant. That is to say that, while the opportunity cost of producing one additional unit of oil is always 0.5 units of sugar, the opportunity cost of producing one additional unit of sugar from point A to B, from B to C, and from C to D is always 2 units of oil.
4. The figure below illustrates the market demand and supply for a product. (12 pts.)

A. (i) Shade on the graph above and (ii) calculate the consumer surplus when the price is $6. (6 pts.)

**Answer:** When the price is $6, the consumer surplus is the area of the triangle labeled above as CS which is equal to $4, i.e. (8-6)*4/2.

B. (i) Shade on the graph above and (ii) calculate the producer surplus when the price is $4. (6 pts.)

**Answer:** When the price is $4, the producer surplus is the area of the triangle labeled above as PS which is equal to $2, i.e. (4-2)*2/2.