Part 1 Multiple Choices (22 questions)

Use the following to answer questions 1-2:

Figure: Home's Import-Competing Industry

1. (Figure: Home's Import-Competing Industry) What is the consumer surplus after trade?
   A) triangle ADB  
   B) triangle AEC  
   C) quadrangle DEBC  
   D) triangle EFG

2. (Figure: Home's Import-Competing Industry) How would we measure the “gains” from trade in this diagram?
   A) triangle AFB  
   B) triangle AEC  
   C) quadrangle DECB (consumer gains) – DEBG (producer losses)  
   D) triangle EFC
Use the following to answer question 3:

![Figure: Home Market II](image)

3. (Figure: Home Market II) The government tariff revenue for Home is:
   A) $50.
   B) $150.
   C) $0.
   D) $100.

Use the following to answer questions 4:

**Table: Export Supply Elasticities**

*The supplied table gives the foreign elasticity of supply for several types of U.S. steel imports.*

<table>
<thead>
<tr>
<th>Product</th>
<th>Elasticity of Export Supply</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alloy Steel</td>
<td>0.27</td>
</tr>
<tr>
<td>Steel bars and rods</td>
<td>0.80</td>
</tr>
<tr>
<td>Steel tubes and pipes</td>
<td>90</td>
</tr>
<tr>
<td>Steel flat-rolled products</td>
<td>750</td>
</tr>
</tbody>
</table>

4. (Table: Export Supply Elasticities) It is almost certain that the 2002 imposition of 13% to 15% tariffs on steel tubes and pipes resulted in:
   A) terms-of-trade gains that were greater than deadweight losses.
   B) terms-of-trade gains that equaled deadweight losses.
   C) deadweight losses that were greater than terms-of-trade gains.
   D) no deadweight losses.
5. According to the GATT, a WTO member country can use _______ to protect its import-competing industry against some specific country:
   A) safeguard
   B) tariff
   C) quota
   D) export subsidy without declaration

6. In contrast to the Ricardian model, international trade in the specific-factors model will:
   A) lead to gains for all resources.
   B) lead to losses for all resources.
   C) lead to gains for some resources and losses for other resources.
   D) not cause changes in the returns of any resources.

7. Which of the following entries are considered to be exports of services?
   A) Japanese buying soybeans from the United States
   B) Chinese selling iPods to the United States
   C) Mexican tourists visiting the Grand Canyon
   D) French wine sold to the United States

Use the following and apply the specific factor model to answer question 8 – 9:

**Table: Sales and Payments**

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Manufacturing sales revenue</td>
<td>$1000</td>
</tr>
<tr>
<td>Total wages paid to labor in manufacturing</td>
<td>$500</td>
</tr>
<tr>
<td>Total wages paid to labor in agriculture</td>
<td>$500</td>
</tr>
<tr>
<td>Total payments to land</td>
<td>$500</td>
</tr>
</tbody>
</table>

9. (Table: Sales and Payments) Suppose that the price of the manufactured good increases with no change in the price of the agricultural good. Which resource will gain the most?
   A) capital
   B) labor
   C) land
   D) capital and labor

10. (Table: Sales and Payments) Now suppose that the price of the manufactured good rises by 20% with no change in the price of the agricultural good. Wages in both sectors rise by 10%. Find the new value of the payment to capital.
   A) $700
   B) $650
   C) $600
   D) $500
Use the following to answer question 10:

**SCENARIO: CHILE AND ARGENTINA**

Chile and Argentina each produce jellybeans and peanut butter using labor as their only resource. Each country has 1,000 hours of labor. In Chile, 1 hour produces 1 pound of jellybeans and 2 hours produce 1 pound of peanut butter. In Argentina, 1 hour produces 1 pound of jellybeans and 3 hours produces 1 pound of peanut butter. When they do not trade with each other, Chile consumes 600 pounds of jellybeans and 200 pounds of peanut butter, and Argentina consumes 400 pounds of jellybeans and 200 pounds of peanut butter.

10. (Scenario: Chile and Argentina) Which country has a comparative advantage in jellybean production?
   A) Chile
   B) Argentina
   C) both Argentina and Chile
   D) neither Argentina nor Chile

Use the following to answer questions 11-12:

**Table: Production in the United States and China**

<table>
<thead>
<tr>
<th></th>
<th>United StatesSales/Employee</th>
<th>ChinaSales/Employee</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apparel</td>
<td>$120,000</td>
<td>$13,500</td>
</tr>
<tr>
<td>Textiles</td>
<td>$40,000</td>
<td>$9,000</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Bushels/Hour</th>
<th>Bushels/Hour</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wheat</td>
<td>27.5</td>
<td>0.1</td>
</tr>
</tbody>
</table>

11. (Table: Production in the United States and China) In the table above the productivity of workers in the textile and apparel and wheat sectors is given for the United States and China. The average worker in the United States produces _____ more apparel sales than the average worker in China.
   A) 0.88
   B) 8.8
   C) 80
   D) 10.9

12. (Table: Production in the United States and China) Consider the productivity of workers in the table. In the United States to produce an additional $1,000 worth of apparel sales, _____ bushels of wheat must be forgone. In China to produce an additional $1,000 worth of apparel sales, _______ bushels of wheat must be forgone.
   A) 0.23; 7.0
   B) 0.23; 0.007
   C) 0.10; 0.7
   D) 6.9; 70
13. The Heckscher-Ohlin model of international trade uses _____ and _____ to explain trade patterns.
   A) comparative; absolute advantage  
   B) factor abundance; factor intensity  
   C) factor availability; factor usability  
   D) tariffs; quotas

Use the following to answer questions 14-15:

**SCENARIO: CHILE AND THE UNITED STATES**

Chile and the United States use capital and labor to produce wheat and automobiles. The United States is capital abundant, and Chile is labor abundant. Wheat production is more labor intensive than automobile production.

14. (Scenario: Chile and the United States) According to the Heckscher-Ohlin model:
   A) The United States should export automobiles to Chile.
   B) The United States should export wheat to Chile.
   C) Chile should export automobiles to the United States.
   D) Chile should import wheat from the United States.

15. (Scenario: Chile and the United States) According to the Heckscher-Ohlin model:
   A) Chilean workers should support U.S.-Chile free trade.
   B) Chilean owners of capital should support U.S.-Chile free trade.
   C) U.S. owners of capital should oppose U.S.-Chile free trade.
   D) Both U.S. and Chilean owners of capital should oppose U.S.-Chile free trade.

16. If Home is capital abundant, then when it begins to freely trade with the rest of the world, the return to capital in Home should _______ and the real wage in Home should _______.
   A) fall; rise  
   B) fall; fall  
   C) rise; rise  
   D) rise; fall

17. Which model can we use to analyze the short-run effects of migration?
   A) specific-factors  
   B) Ricardian  
   C) Heckscher-Ohlin  
   D) purchasing power parity
18. In the long run, when there is immigration of labor and all domestic factors of production are mobile:
   A) resources move out of the labor-intensive industry into the other sectors of the economy.
   B) the excess labor cannot be absorbed into the economy, and eventually workers will seek to emigrate.
   C) the excess labor is absorbed, but it raises the unemployment rate and drives down wages, and the owners of capital are the clear winners.
   D) the capital-labor ratio in each industry is unchanged, and the additional labor in the economy is fully employed.

19. In the long run, an increase in FDI in the manufacturing sector will:
   A) increase marginal product of labor in the agriculture sector.
   B) increase marginal product of labor in the manufacturing sector.
   C) decrease marginal product of labor in the agriculture sector.
   D) not change the marginal product of labor in either sector.

20. What is the value of the intra-industry trade index for an industry in which exports are $100 million and imports are zero?
   A) 0.50
   B) 2.00
   C) 1.00
   D) 0.00

21. Other things equal, the level of bilateral trade between two countries will increase as their GDP:
   A) rises.
   B) falls.
   C) stays the same.
   D) becomes less equal.

22. In the long run, a monopolistically competitive firm that trades internationally will _____ than it would in autarky.
   A) produce more output
   B) earn more monopoly profits
   C) have higher average costs
   D) produce more output and earn more monopoly profits
Part 2 Short Answer Questions with Calculation (6 questions)

1. Suppose that computers use 2 units of capital for each worker, so that $K_c = 2L_c$, whereas shoes use 0.5 units of capital of each workers, so that $K_s = 0.5L_s$. There are 100 workers and 100 units of capital in the economy.

   a. Solve for the amount of labor and capital used in each industry.

   b. Suppose that the number of workers increases to 125 due to immigration, keeping total capital fixed at 100. Again, solve for the amount of labor and capital used in each industry.

   c. Explain how your results in b are related to the Rybczynski theorem.
2. Suppose that each worker in the Home country can produce three cars or two TVs. Home has four workers. Suppose that each worker in the Foreign country can produce two cars or three TVs. Assume that Foreign also has four workers. Suppose that in the absence of trade, home consumes nine cars and two TVs, while Foreign consumes two cars and nine TVs.

a. Graph the production possibilities frontier for the Home country. What is the no-trade relative price of cars at Home? (Hint: draw the graph large enough as d and f below require you to draw on this graph too.)

b. Graph the production possibilities frontier for the Foreign country. What is the no-trade relative price of cars in Foreign? (Hint: draw the graph large enough as d and f below require you to draw on this graph here too.)

c. In which good does Foreign have a comparative advantage, and why?
d. Label the production possibilities frontier, indifference curve, and the no-trade equilibrium consumption and production for each country. (Draw on graphs in a and b.)

e. Suppose the world relative price of cars is $P_C/P_{TV} = 1$. In what good with each country specialize? Briefly explain why.

f. Graph the new world price line for each country, and add a new indifference curve ($U_2$) for each country in the trade equilibrium. Label the exports and imports for each country. (Draw on graphs in a and b.)

g. Does each country gain from trade? Compare each country’s consumptions before and after trade.
3. Consider the following hypothetical information pertaining to a country’s imports, consumption, and production of T-shirts following the removal of the Multifibre Arrangement quota:

<table>
<thead>
<tr>
<th></th>
<th>With MFA</th>
<th>Without MFA (Free Trade)</th>
</tr>
</thead>
<tbody>
<tr>
<td>World price ($/shirt)</td>
<td>$2.00</td>
<td>$2.00</td>
</tr>
<tr>
<td>Domestic price ($/shirt)</td>
<td>$2.50</td>
<td>$2.00</td>
</tr>
<tr>
<td>Domestic consumption (million shirts/year)</td>
<td>100</td>
<td>125</td>
</tr>
<tr>
<td>Domestic production (million shirts/year)</td>
<td>75</td>
<td>50</td>
</tr>
<tr>
<td>Imports (million shirts/year)</td>
<td>25</td>
<td>75</td>
</tr>
</tbody>
</table>

MFA, Multifibre Arrangement.

a. Graph the effects of the quota removal on domestic consumption and production. (Hint: draw two graphs, home market and import market. On the home market graph, draw demand and supply curves, and label imports and prices before and after quota removal. On the import market graph, draw domestic import demand and export supply curves, label imports and prices before and after quota removal.)

b. Determine the gain in consumer surplus from the removal of the quota. (Hint: label the area on the home market graph and write a brief explanation below.)

c. Determine the loss in producer surplus from the removal of the quota. (Hint: label the area on the home market graph and write a brief explanation below.)
d. Calculate the quota rents that were earned under the quota.

e. Determine how much the country has gained from the removal of the quota if quota was implemented through auctions at home.
4. The United States, France, and Italy are among the world’s largest producers. To answer the following questions, assume that their markets are monopolistically competitive, and use the gravity equation with $B = 93$ and $n = 1.25$.

<table>
<thead>
<tr>
<th>GDP in 2009 ($bn)</th>
<th>Distance from the United States (miles)</th>
</tr>
</thead>
<tbody>
<tr>
<td>France</td>
<td>2,635</td>
</tr>
<tr>
<td>Italy</td>
<td>2,090</td>
</tr>
<tr>
<td>United States</td>
<td>14,270</td>
</tr>
<tr>
<td>France</td>
<td>5,544</td>
</tr>
<tr>
<td>Italy</td>
<td>6,229</td>
</tr>
<tr>
<td>United States</td>
<td>—</td>
</tr>
</tbody>
</table>

a. Using the gravity equation, compare the expected level of trade between the United States and France and between the United States and Italy.

b. The distance between Paris and Rome is 694 miles. Would you expect more French trade with Italy or with the United States? Explain what variable (i.e., country size or distance) drives your result.
5. Illustrate the potential channels of gains from trade for the new trade model with increasing returns to scale and differentiated products.

6. Outline the OLI view of multinational firms.
Solution

Part 1

1. B
2. C
3. D
4. C
5. A
6. C
7. C
8. A
9. B
10. B
11. B
12. B
13. B
14. A
15. A
16. D
17. A
18. D
19. D
20. D
21. A
22. A

Part 2

1. a. Solve for the amount of labor and capital used in each industry. Hint: The box diagram shown in Figure 5-7 means that the amount of labor and capital used in each industry must add up to the total for the economy, so that:

\[ K_C + K_S = 100, \quad \text{and} \quad L_C + L_S = 100 \]

Use the facts that \( K_C = 2 \cdot L_C \) and \( K_S = 0.5 \cdot L_S \) to rewrite these equations as:

\[ 2 \cdot L_C + 0.5 \cdot L_S = 100, \quad \text{and} \quad L_C + L_S = 100 \]

Use these two equations to solve for \( L_C \) and \( L_S \), and then calculate the amount of capital used in each industry using \( K_C = 2 \cdot L_C \) and \( K_S = 0.5 \cdot L_S \).

Answer: The above two equations can be solved as:

\[
\begin{align*}
2 \cdot L_C + 0.5 \cdot L_S &= 100 \\
2 \cdot L_C + 2 \cdot L_S &= 200 \\
-1.5 \cdot L_S &= -100 \\
L_S &= 66.7
\end{align*}
\]

so that \( L_S = 100 / 1.5 = 66.7 \). It follows from the same equations that \( L_C = 33.3 \), and that \( K_C = 2 \cdot L_C = 66.7 \) and \( K_S = 0.5 \cdot L_S = 33.3 \).
b. Suppose that the number of workers increases to 125 due to immigration, keeping total capital fixed at 100. Again solve for the amount of labor and capital used in each industry. 

*Hint:* Redo the calculations from part a, but using $L_C + L_S = 125$.

**Answer:** The labor equations are now solved as:

$$2 \cdot L_C + 0.5 \cdot L_S = 100$$

$$2 \cdot L_C + 2 \cdot L_S = 250$$

$$-1.5 \cdot L_S = -150$$

so that $L_S = 150 / 1.5 = 100$. It follows from the same equations that $L_C = 25$, and that $K_C = 2 \cdot L_C = 50$ and $K_S = 0.5 \cdot L_S = 50$.

d. Explain how your results in parts (b) and (c) are related to the Rybczynski theorem.

**Answer:** Comparing part (a) with part (b), the increase in the amount of labor in the economy has increased the amount of labor and capital devoted to shoes (from $L_S = 66.7$ and $K_S = 33.3$ to $L_S = 100$ and $K_S = 50$) and decreased the amount of labor and capital devoted to computers (from $L_C = 33.3$ and $K_C = 66.7$ to $L_C = 25$ and $K_C = 50$). Therefore, the output of shoes increases and the output of computers decreases, due to the overall increase in labor. Shoes are labor-intensive because they use 0.5 units of capital per unit of labor, computers are capital-intensive because they use 2 units of capital per unit of labor. So the change in outputs is in accordance with the Rybczynski theorem: the increase in labor has increased the output of the labor-intensive good and decreased the output of the other good.

Conversely, comparing part (b) with part (d), there has been an increase in the amount of capital in the economy. Consistent with the Rybczynski theorem, there has been a rise in the amount of labor and capital devoted to computer production (from $L_C = 33.3$ and $K_C = 66.7$ to $L_C = 50$ and $K_C = 100$) and a fall in the amount of labor and capital devoted to shoe production (from $L_S = 66.7$ and $K_S = 33.3$ to $L_S = 50$ and $K_S = 25$).
2.

a. Graph the production possibilities frontier for the home country.

**Answer:** See the following figure.

![Production Possibilities Frontier for Home Country](image.png)

b. What is the no-trade relative price of cars at Home?

**Answer:** The no-trade relative price of cars at Home is $P_C^* / P_{TV}^* = 2/3$.

b.

a. Graph the production possibilities frontier for the foreign country.

**Answer:** See following figure.

![Production Possibilities Frontier for Foreign Country](image.png)

b. What is the no-trade relative price of cars in Foreign?

**Answer:** The no-trade relative price of cars in Foreign is $P_C^* / P_{TV}^* = 3/2$. 
c. **Answer:** Foreign has a comparative advantage in producing televisions because it has a lower opportunity cost than Home in the production of televisions.

d.  

![Diagram of TV, Q\textsubscript{TV} (units) vs Car, Q\textsubscript{C} (units)]  

**Answer:** Home would specialize in cars, export cars, and import televisions, whereas the foreign country would specialize in televisions, export televisions, and import cars. The reason is because Home has a comparative advantage in cars and Foreign has a comparative advantage in televisions.
Note: (4 TVs, 8 cars) for the home and (8 TVs, 4 cars) for the foreign is one of many after-trade equilibrium possibilities. Actually, we do not know the utility function, so we cannot solve the equilibrium accurately. As long as you show $U_2/U_2^*$ is tangent with the world price line and $U_2/U_2^*$ is higher than $U_1/U_1^*$, there are gains from trade. The answer key gives you the specific after-trade consumption equilibrium because it is then easy to show imports and exports.

**g.**
Yes, every country gains from trade because the indifference curve $U_2$ is above the indifference curve $U_1$. Home consumes nine cars and two TVs with no trade, and eight cars and four TVs with trade. Foreign consumes two cars and nine TVs with no trade, and four cars and eight TVs with trade.
3.

a. Graph the effects of the quota removal on domestic consumption and production.
   
   Answer: With the quota removal, domestic consumption increases from 100 units to 125 units, whereas production decreases from 75 units to 50 units.

b. Determine the gain in consumer surplus from the removal of the quota.
   
   Answer: Consumers gain by the areas $a + b + c + d$ with the removal of the quota.

c. Determine the loss in producer surplus from the removal of the quota.
   
   Answer: Producers lose by the area $a$ with the removal of the quota.

d. Calculate the quota rents that were earned under the quota.
   
   Answer: The quota rents are $12.5 = (2.50 - 2.00)(100 - 75)$.

e. Determine how much the country has gained from removal of the quota?
   
   Answer: The gain to the country from the removal of the quota is $12.5 + 6.25 + 6.25 = 25$.

\[
\begin{align*}
\text{area } b & = \frac{1}{2} \cdot (75 - 50) \cdot (2.50 - 2.00) \\
\text{area } b & = 6.25 \\
\text{area } d & = \frac{1}{2} \cdot (125 - 100) \cdot (2.50 - 2.00) \\
\text{area } d & = 6.25
\end{align*}
\]
4.
   a. Using the gravity equation, compare the expected level of trade between the United
      States and France and between the United States and Italy.

   **Answer:** The expected level of trade between the United States and France is
   $93(14,270 \cdot 2,635) / 5,544^{1.25} = $73,098 billion. The expected level of trade
   between the United States and Italy is $93(2,090 \cdot 14,270) / 6,229^{1.25} = $50,122
   billion.

   *(Note: These numbers are larger than is realistic because we are using the gravity equation
   estimated on the United States and Canada state/provincial trade, rather than the equation
   estimated on international trade.)*

   b. The distance between Paris and Rome is 694 miles. Would you expect more French
      trade with Italy or with the United States? Explain what variable (i.e., country size or
      distance) drives your result.

   **Answer:** The expected level of trade between Italy and France is $93(2,635 \cdot
   2,090) / 694^{1.25} = $143,784 billion. This number is so large because it reflects
   the short distance between the two countries. In particular, this number is larger
   than the predicted amount of trade between the United States and Italy, as cal-
   culated in part (a).

5. Potential channels of gains from trade

   • **Pro-competitive Effect:**
     • A drop in price and an increase in output
   • **Production Efficiency:**
     • The lower price is a result of increased productivity of the surviving firms
       coming from increasing returns to scale.
   • **Love of Variety:**
     • Although there are fewer product varieties made within each country (by fewer
       firms), consumers have more product varieties because they can choose products
       of the firms from both countries after trade.
6. Firms incur significant costs of doing business abroad relative to domestic firms in those countries. Therefore, for a firm to become a multinational, it must have offsetting advantages.

Dunning (OLI): There are three necessary conditions for firms to be willing to undertake investments abroad.

- Ownership Advantage: the firm must have a product or a production process such that the firm enjoys some market power advantage in foreign markets.

- Location Advantage: the firm must have a reason to want to locate production abroad rather than concentrate it in the home country, especially if there are scale economies at the plant level.

- Internalization Advantage: the firm must have a reason to want to exploit its ownership advantage internally, rather than license or sell its product/process to a foreign firm.