

file=trade-w08-mid.tex

Last Name (Please PRINT): .....

First Name (PRINT): .....

Your UM I.D. Number: .....

**INSTRUCTIONS (please read!)**

1. Please make sure that you have 8 pages, including this page. Complaints about missing pages will not be accepted.
2. Please answer all the questions. You are not allowed to use any course material. Calculators are permitted.
3. Maximum Time Allowed: 1 hour and 20 minutes (8:40–10:00).
4. Your grade depends on the arguments you develop for supporting your answers. Each answer must be justified by using a logical argument consisting of a model/graph. An answer with no justification will not be given any credit.
5. You must provide all the derivations leading you to a numerical solution.
6. When you draw a graph, make sure that you label the axes with the appropriate notation.
7. Maximum Score: 100 Points
8. Budget your time. If you cannot answer a certain question, skip to the next one.
9. Please always bear in mind that “somebody” has to read and understand your handwriting. Please make sure that your ink is “visible” and that your sentences are properly organized and fit into the designated blank space. If you think that your handwriting is poor, please print each word!

10. **Good Luck !**

**Instructor’s use only**

Problem #	1	2	3	4	5	6	Total
Maximum	15	25	20	20	10	10	100
Points							

**(1) [15 points]** Please answer all 5 True/False questions. Each correct answer receives 3 points (2 points for the T/F answer, and 1 point for supplying some numbers supporting your answer).

(1.a) The share of agricultural products in world merchandize exports has been rising since 1950.

(1.b) Among all internationally traded services, world exports of transport services have grown the fastest during the past 20 years.

(1.c) Agricultural products constitute the largest share in U.S. exports.

(1.d) Since World War II, the average annual percentage growth rate of world exports was lower than the world real GNP growth rate.

(1.e) In dollar terms, U.S. Imports and exports of computers and electronics are higher than any other core manufacturing industry.

(2) Consider trade between Canada and the U.S. in two goods: Machines (M) and wood (W). Labor is the only input in production. The U.S. is endowed with  $L^U = 300$  units of labor, whereas Canada with  $L^C = 30$  units of labor. The labor requirement matrix is given by

Country\Good	Wood	Machines	$L^j$
U.S.	$\ell_W^U = 6$	$\ell_M^U = 3$	$L^U = 300$
Canada	$\ell_W^C = 1$	$\ell_M^C = 1$	$L^C = 30$

All consumers in the world have identical preferences represented by the Cobb-Douglas utility function  $U(W, M) = W \cdot M$ . Solve the following problems:

**(2a) [5 points]** Draw U.S. PPF (label good  $M$  on the horizontal axis), and compute the equilibrium price ratio  $(p_M/p_W)^U$  and consumption levels  $M_c^U$  and  $W_c^U$  in the U.S. under autarky.

**(2b) [5 points]** Draw Canada's PPF (label good  $M$  on the horizontal axis), and compute the equilibrium price ratio  $(p_M/p_W)^C$  and consumption levels  $M_c^C$  and  $W_c^C$  in Canada under autarky.

**(2c) [5 points]** Draw the world PPF and compute the equilibrium world price ratio  $(p_M/p_W)^W$ , and the production levels *in each country* under free trade.

**(2d) [5 points]** Compute the equilibrium consumption levels *in each country* under free trade.

**(2e) [5 points]** Compute the equilibrium wage rate ratio  $w^U/w^C$  under free trade. Explain the differences in wage rates between these countries.

**(3)** Consider a world with three countries  $A$ ,  $B$ , and  $C$ , and two goods  $X$  and  $Y$ . Each good is produced using labor only. Countries  $A$ ,  $B$ , and  $C$  are endowed with the same amount of labor, that is,  $L^A = L^B = L^C = 12$ . The following matrix provides the amount of labor needed to produce one unit of each good in each country:

	$X$	$Y$
$A$	6	6
$B$	2	1
$C$	3	6

Suppose that all consumers have the same preferences, and that they view both goods as perfect complements. Hence, they will always consume one unit of  $X$  for every one unit of  $Y$ . Formally,  $U(x, y) \equiv \min\{x, y\}$ . Solve the following problems:

**(3a) [10 points]** Draw the world PPF and compute the equilibrium price ratio  $(p_X/p_Y)^W$  production levels of goods  $X$  and  $Y$  in each country under free trade.

**(3b) [10 points]** Compute the amount of good  $X$  imported or exported by country  $B$ .

**(4)** Brazil has  $L$  units of labor, which is the sole input in the production of two goods: Food (denote by  $F$ ) and cars (denoted by  $C$ ). In Brazil,  $\ell_F = 1$  units of labor are required to produce 1 unit of  $F$ , whereas  $\ell_C = 3$  units of labor are required to produce 1 unit of  $C$ . Suppose that the world price ratio  $(p_C/p_F)^W$  is fixed (Brazil takes it as given). Solve the following problems:

**(4a) [10 points]** Compute the range of world price ratios  $(p_C/p_F)^W$  under which Brazil imports cars (and exports food). Also compute the ratios under which Brazil imports food (and exports cars).

**(4b) [10 points]** Answer (4a) assuming now that the Brazilian government imposes an import tariff rate of  $t = 0.5$  (that is, a 50% ad valorem tariff on imports).

**(5) [10 points]** The production possibility frontier of a small island in Central America is given by

$$y = 12 - \frac{x^2}{2},$$

where  $X$  and  $Y$  are the only producible and consumable products on this island. Consumers' preferences for the two goods are given by the Cobb-Douglas utility function  $U(x, y) = x \cdot y$ .

The island is small, and therefore cannot influence world prices which are given by  $p_X^w = 8$  and  $p_Y^w = 2$ . Compute the island's import level of good  $Y$  under free trade.

**(6)** Consider a world with 2 countries:  $A$  and  $B$ ; 2 goods: Computers ( $C$ ) and food ( $F$ ); and 2 factors of productions: Labor ( $L$ ) and capital ( $K$ ).

Country  $A$  is endowed with  $L^A = 10$  units of labor and  $K^A = 5$  units of capital. Country  $B$  is endowed with  $L^B = 8$  units of labor and  $K^B = 8$  units of capital. Labor and capital are mobile between industries in the same countries, but are internationally immobile between countries.

All countries have identical technologies for producing computers and food, which are given by the constant returns to scale production functions:

$$C = L_C^{\frac{2}{3}} \cdot K_C^{\frac{1}{3}} \quad \text{and} \quad F = L_F^{\frac{1}{2}} \cdot K_F^{\frac{1}{2}}$$

Answer the following questions.

**(6a) [5 points]** Which good is capital intensive, and which good is labor intensive?

**(6b) [5 points]** Which country is labor abundant and which country is capital abundant? Using the prediction made by the Heckscher-Ohlin Theorem (H-O) conclude which country exports food and which exports computers under free trade.

**THE END**