Final Exam (Sample)

Friday, May 21

1 hour, 30 minutes

Name: ________________________________

Instructions

1. This is closed book, closed notes exam.
2. No calculators and electronic devices of any kind are allowed.
3. Show all the calculations.
4. If you need more space, use the back of the page.
5. Fully label all graphs.

Good Luck ☺
1. U.S. and China produce computers (X) and toys (Y). The time required for an average worker to produce one unit of each good is given in the next table.

<table>
<thead>
<tr>
<th>Country</th>
<th>Time required (in hours) to make one unit</th>
<th>Opportunity cost of one unit</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>X</td>
<td>Y</td>
</tr>
<tr>
<td>U.S.</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>China</td>
<td>8</td>
<td>4</td>
</tr>
</tbody>
</table>

a. Calculate the opportunity costs of X and Y for each country, and complete the above table.

b. Which country has **absolute** advantage in X? In Y?

__________ has absolute advantage in X and ____________ has absolute advantage in Y.

c. Which country has **comparative** advantage in X? In Y?

__________ has comparative advantage in X and ____________ has comparative advantage in Y.

d. Both countries can gain from trade if ____________ switches resources from X to Y and ____________ switches resources from Y to X.
2. The next table provides data on prices and output in some economy for the years 2000 – 2002. The goods are labeled 1 and 2, so that $P_1, P_2, Q_1, Q_2$ are prices and quantities of the two goods respectively.

<table>
<thead>
<tr>
<th>Year</th>
<th>$P_1$</th>
<th>$Q_1$</th>
<th>$P_2$</th>
<th>$Q_2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000</td>
<td>2</td>
<td>60</td>
<td>8</td>
<td>20</td>
</tr>
<tr>
<td>2001</td>
<td>2.5</td>
<td>65</td>
<td>9</td>
<td>25</td>
</tr>
<tr>
<td>2002</td>
<td>3</td>
<td>80</td>
<td>8</td>
<td>30</td>
</tr>
</tbody>
</table>

a. Calculate the nominal GDP in 2002.

b. Calculate the real GDP in 2002 using the year 2000 as the base year.

c. A person buys a new house. This transaction will be recorded in the NIPA as part of:
   
i. Consumption only
   
ii. Investment only
   
iii. Consumption and Imports
   
iv. Investment and imports
3. Department of commerce in Vegistan conducted a Consumption Expenditure surveys in 2005 and 2006, and the results are in the next table:

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Broccoli</td>
<td>10</td>
<td>$3.00</td>
<td>15</td>
<td>$3.00</td>
</tr>
<tr>
<td>Carrots</td>
<td>15</td>
<td>$2.00</td>
<td>10</td>
<td>$4.00</td>
</tr>
</tbody>
</table>

a. Suppose the CPI basket consists of 10 broccoli and 10 carrots. Calculate the price of the CPI basket in 2005.

b. Suppose the CPI basket consists of 10 broccoli and 10 carrots. Calculate the price of the CPI basket in 2006.

c. Calculate the inflation rate Vegistan during 2006.
4. (10 points). The following table contains data from the labor market of some country (in millions).

<table>
<thead>
<tr>
<th>Civilian noninstitutional population</th>
<th>100</th>
</tr>
</thead>
<tbody>
<tr>
<td>Civilian labor force</td>
<td>50</td>
</tr>
<tr>
<td>Employed</td>
<td></td>
</tr>
<tr>
<td>Unemployed</td>
<td>10</td>
</tr>
<tr>
<td>Not in the labor force</td>
<td></td>
</tr>
</tbody>
</table>

a. Complete the above table.

b. Find the unemployment rate in this country.

c. Find the labor force participation rate in this country.

d. When the economy is at full employment
   i. The unemployment rate is zero
   ii. The only type of unemployment is cyclical
   iii. The only type of unemployment is frictional
   iv. The cyclical unemployment is zero
5. Suppose that the U.S. economy is described by the macroeconomic model consisting of a production function and a labor market.
   a. Suppose that the immigration laws are relaxed, and as a result 5 million immigrant workers come to the U.S. Illustrate the impact of this event on the potential real GDP, equilibrium real wage and employment in the U.S.
b. Repeat part a, but now assume that in addition to the immigrants a new technology was developed, which resulted in a higher productivity of labor in the U.S.
6. Suppose that the aggregate production function in some country is given by 
\[ Y = A\sqrt[3]{K \sqrt{L}}, \] 
where \( A \) is productivity level, \( K \) is aggregate capital and \( L \) is aggregate hours.

a. Suppose that the population in the country doubles, and as a result \( L \) doubles. What happens to labor productivity?
   i. Labor productivity doubles
   ii. Labor productivity increases by less than a double
   iii. Labor productivity falls
   iv. Labor productivity remains unchanged

b. Suppose that China’s real GDP is half of that of the U.S. Also, the real GDP in China grows at an average rate of 7% per year, while the real GDP in the U.S. grows at 2% per year. Using the rule of 70, how long will it take for China to catch up with the U.S. in terms of real GDP?

c. Suppose that real GDP in the U.S. grows at 2% per year, while the population grows at 1% per year. Using the rule of 70, how long will it take for the standard of living in the U.S. to double?

d. Draw a graph of a county’s Production Possibilities Frontier (PPF), and illustrate the effect of technology improvement in both goods.
7. Using the diagram of a loanable funds market illustrate the impact of a rise in expected profit by the firms. State what happens to the equilibrium real interest rate and equilibrium investment.
8. Suppose that the public wants to hold currency/deposit ratio of \( cd = 0.2 \), and the required reserve/deposit ratio is \( rd = 0.2 \). The initial consolidated balance sheet of commercial banks is:

<table>
<thead>
<tr>
<th>Assets</th>
<th>Liabilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>( R = )</td>
<td>( D = 25 )</td>
</tr>
<tr>
<td>( B_G = 7 )</td>
<td>( K = 10 )</td>
</tr>
<tr>
<td>( L = 23 )</td>
<td></td>
</tr>
<tr>
<td>35</td>
<td>35</td>
</tr>
</tbody>
</table>

Where \( R \) is reserves, \( D \) is demand deposits, \( B_G \) are government bonds, \( L \) denotes loans, and \( K \) denotes the shareholder’s equity (capital).

a. Find the banks’ reserves, the monetary base, the money supply and the money multiplier in this economy.

b. (5 points). If the central bank increases the required reserve/deposit ratio to 0.4, the money supply will increase/decrease (circle the correct answer) by ______.
c. The balance sheet of Citibank is presented below:

<table>
<thead>
<tr>
<th>Assets</th>
<th>Liabilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Toxic assets = 15</td>
<td>Liabilities = 30</td>
</tr>
<tr>
<td>Normal Assets = 20</td>
<td>K = 5</td>
</tr>
<tr>
<td>35</td>
<td>35</td>
</tr>
</tbody>
</table>

Calculate the leverage of Citibank.

d. Suppose that the true value of the toxic assets turns out to be only 12. The Citibank then becomes balance sheet insolvent. True/false, circle the correct answer.
9. Using the AS-AD model,
   a. Illustrate an economy which is at full employment.

   AS-AD

   b. Illustrate on the above graph, the effect lower labor taxes.
   c. **Induced taxes** are an example of automatic/discretionary fiscal policy. Circle the correct answer.
   d. Mention 2 difficulties that lower the usefulness of *discretionary* fiscal policy.
Formulas

I. NIPA:
1. GDP expenditure approach: \( GDP = C + I + G + \frac{X - IM}{NX} \)
2. GDP income approach (\( GDI \)):
   a. \( NDP_f = W + Int + Rent + \pi \) (Net Domestic Product at factor cost)
   b. \( GDI = NDP_f + T_i + Dep \)
3. \( GDP = GDI + SD \) (how the two measures compare).

II. Money:
1. \( MB = CU + R \) (monetary base)
2. \( M = CU + D \) (money supply)
3. \( mm = \frac{cd + 1}{cd + rd} \) (money multiplier)
4. \( MV = PY \) (quantity equation in levels)
5. \( \dot{M} + \dot{V} = \dot{P} + \dot{Y} \) (quantity equation in approximate growth rates)