14.02 PRINCIPLES OF MACROECONOMICS
Spring 2002- QUIZ ONE

STOP!! READ INSTRUCTIONS FIRST.

Read all questions carefully and completely before beginning the exam. There are **10** pages, and 4 sections of the quiz – make sure you do them all. Show your work on all questions in order to receive partial credit. If your answer includes a graph, label all curves and axes clearly; if we can't read the graph, you will lose points on your answer. The quiz is worth a total of **84** points.

No notes, calculators, or books may be used during the quiz. You will have 2 hours to complete the quiz.

No blue books; use the blanket in this sheet.

Please, check your recitation:

- ❑ Samer 09
- ❑ Samer 10
- ❑ Samer 11
- ❑ Samer 12
- ❑ Tobias Adrian 11
- ❑ Jonathan Zinman 13
- ❑ Jonathan Zinman 14
- ❑ Manuel Amador 15

Name _____ _____ _____ _____ March 14, 2002

First Name | Last Name | MIT ID# | Signature | Date

Good luck!

PART I: TRUE OR FALSE? ***(3 points per question, 30 points total)***

Answer True/False and explain briefly why true or false. (2 points for correct T or F answer plus 1 added point for reasonable, brief, one sentence explanation of why True or False, or for a directional ("greater" or "lower") correction if a magnitude is discussed)

1. The natural rate of unemployment is the rate consistent with stable inflation, including satisfying labor market equilibrium conditions such as that the actual rate of inflation is equal to the expected rate of inflation.

Answer: _____

_____

2. The Aggregate Supply curve (AS) slopes up from left to right in space (P,Y).

Answer: _____

_____

3. The Aggregate Demand curve (AD) shifts down/to the left ("South-West ") when money supply is expanded.

Answer: _____

_____

4. Standard econometric equations are usually designed to find the coefficients that minimize the simple sum of the residuals.

Answer: _____

_____

5. If a new federal budget raises government purchases by $100 per person and pays for this with a new per capita tax also equal to $100 per person so that the government deficit is unchanged, and the central bank holds interest rates unchanged, then GDP will also be unchanged.

Answer: _____

_____

6. “Exogenous” variables of a macroeconomic model would include policy variables such as government defense purchases.

Answer: _____

_____

7. According to modern inflation theory, the central bank can achieve a stable, lower inflation rate by pursuing an unemployment rate above 6%.

Answer: _____

_____

8. Productivity growth in the United States has typically averaged approximately 5%-6% per year in the past three decades.

Answer: _____

_____

9. A country that has fewer workers and fewer machines than another country cannot produce more output.

Answer: _____

_____

10. A high R-squared for an econometric relationship combined with a statistically significant coefficient for the independent or explanatory variable proves that this explanatory variable causes the movements in the dependent variable.

Answer: _____

_____

PART II: MULTIPLE CHOICE *(4 points per question, 24 points total)*

Clearly indicate the letter of your answer, and explain your choice in a few sentences.

1. Which of the following is NOT a method for calculating GDP?

    A. Sum of transactions in the economy
    B. Sum of value added in the economy
    C. Value of final goods and services produced
    D. Sum of incomes
    E. None of the above

Answer: _____

_____

_____

2. To measure the economic growth of living standards for a region, economists should focus on the behavior of

    A. The rate of growth of real GDP.
    B. The rate of growth of nominal GDP.
    C. The rate of growth of real GDP per capita.
    D. The rate of growth of nominal GDP per capita.

Answer: _____

_____

_____

3. The AD curve is the combination of _____ and _____ such that the _____ market and the ____ market are in equilibrium.

    A. P, Y, money, goods
    B. i, Y, money, labor
    C. P, Y, labor, goods
    D. i, M, money, goods
    E. P, W, labor, goods

Answer: _____

_____

_____

4. When nominal supplied money increases by 10%, then:

    A. GDP, investment and consumption decreases
    B. GDP, investment and consumption increase
    C. Interest rate decreases, while the change in investment and consumption is ambiguous
    D. GDP and government deficit increase
    E. None of the above

Answer: _____

_____

_____

5. Changes in which of the following causes a shift in the IS-curve:

    A. Changes in the government spending
    B. Imposing new direct taxes
    C. The Fed's monetary policy (open market transactions)
    D. A and B.
    E. A, B and C.

Answer: _____

_____

_____

6. If one plotted a curve of yearly inflation against the yearly average unemployment rate in the United States, one would find that:

    A. No obvious correlation in the years between 1960 and 1970, but a strong negative relationship after 1970
    B. A strong negative relationship both before 1970 and after 1970
    C. No relationship at anytime period
    D. A negative one before 1970 and a positive relationship after the 1970
    E. A negative relationship before the 1970 and almost no relationship after the 1970

Answer: _____

_____

_____

PART III: Model Building and Policy Determination (20 Points)

- You are the Chairman of the central bank and in this hypothetical world you can perfectly control interest rates.
- Based on your study of the inflation process in the economy, you believe the natural rate of unemployment is 5%.
- Your task is to offset fiscal policy changes that could over- or under-stimulate the economy.

Today, the President has announced a new budget and you must define the right response: i.e. pick the proper interest rate.

Here's the economy in which you operate:

- Consumers ultimately receive all GDP as gross income, face a 25% tax rate on this, and spend 80% of their after-tax income.

- Businesses typically buy $250 worth of new equipment each year, but reduce this by $50 for each percentage point by which interest rates exceed 4 percent, or increase it symmetrically if rates are lower. (Hint: the algebraic expression for investment ("I") as a function of interest rates ("r"), is easiest to use in your model if you treat "r" as a whole number like 3, 4, 5, 6, etc. rather than as .03, .04, .05, .06, etc. Thus a rise of r from 6 to 7 would cut I by 50.)
- The citizens are unwilling to buy from or sell to other countries.

- Given the current level of capital, an output level of $2000 is consistent with 5% unemployment; each 1% extra output reduces the unemployment rate by 0.5 percentage points, and symmetric responses occur for lower output.

- Government purchases are initially $500 and you have set interest rates at 3 percent, a policy blend that, in fact, achieves "full employment" of 5% at an output level of $2000.

Now, a new budget announced by the President calls for spending of $600, but no changes in tax law.

Question 1: (8 points: one for each structural equation and three for the IS curve)

Combine the facts about spending behavior to write out the equations behind the IS curve. Specifically, provide one basic, structural equation (i.e. an algebraic version of the words above) for:

- Consumption (C)=
- Investment (I)=
- Taxes (T)=
- Disposable Income (YD)=
- Identity for GDP (Y)=

Then substitute appropriately to solve for GDP, so as to write out the formula for the IS curve as a function of the exogenous variables and key coefficients. (note—do not yet substitute in values for the policy variables: create a general rule for later use) (You can check your work by verifying that the initial equilibrium is GDP=2000 given the policy values of G=500 and r=3.):

_____

_____

_____

Question 2: (6 points)

(3 points) Write out the formula for the unemployment rate as a function of GDP.

_____

_____

_____

(3 points) Substitute your GDP formula from question 3 into this formula to derive a model of the unemployment rate as a function of policy tools. (Again, check your work with the original values provided).

_____

_____

_____

Question 3: (6 points)

(3 points) What interest rate should you now target for the economy to hit your unemployment rate objective?

_____

_____

_____

(2 points) If you overshoot by raising rates by one percentage point too much, how much lower will GDP be?

_____

_____

_____

(1 point) And how much higher will unemployment be?

_____

_____

_____

PART IV: National Income Accounting Definitions (10 Points)

- Fill in the missing word or words to complete the definitions below:

1. The difference between gross (GNP) and net (NNP) national product is _____.
2. NNP minus "National income" equals _____.
3. Personal income minus _____ equals disposable income.
4. Consumers allocate their disposable income between consumer spending and _____.
5. Give one example of a type of government spending not counted as "G" in the standard GDP identity: _____.