Leave one empty seat between you and the person next to you. Write all answers in your blue
book. **Show all of your work.** After you finish the exam, you may keep the questions.
The exam ends at 2:20.

1. Consider the Cobb-Douglas production function where real aggregate output Y is given by
$Y = A K^\alpha (LxE)^{1-\alpha}$, in which A=5 is a parameter measuring the productivity of the available
technology, K is the amount of capital employed, L is the amount of labor employed, and
α=0.35. Here, E indicates the effectiveness of each worker, so that LxE is the amount of
effective workers employed. The annual depreciation rate in this economy is 0.06, the savings
rate is 0.30, the population grows at the annual rate of 0.02, and the measure of labor
effectiveness, E, grows at the annual rate of 0.01.

(a) (10pts) Find the steady-state amount of output per effective worker, $y=Y/(LxE)$, for this
economy.

(b) (5pts) In the steady-state for this economy, at what rate does per capita output (Y/L)
change?

(c) (10pts) Find the golden-rule steady-state amount of capital per effective worker, $k=K/(LxE)$.

(d) (5pts) In the golden rule steady-state for this economy, at what rate would real aggregate
output (Y) change?

(e) (5pts) True or false? An economy will eventually converge to its golden rule steady state.
Explain your answer.

2. (5pts) In the February 5, 2011 *Wall St Journal* (WSJ) article "Arab World Build Colleges,
But Not Jobs" David Wessel and Chip Cummins report that "many Arab countries spent heavily
on higher education. 'The objective was to boost economic growth, boost employment and
realize equity in society,' says the World Bank's Mourad Ezzine, a former Tunisian education
expert who worked on the [2010 300-page examination of higher education in Egypt] report. 'It
didn't work out well.'" In fact, this WSJ article notes that unemployment in Egypt and other
parts of North Africa and the Middle East tends to increase with schooling, whereas the opposite
is true in the United States. What reasons do the authors of the WSJ article give for why Egypt's
increased spending on higher education did not boost employment?

3. (10pts) Consider the model of the natural rate of unemployment that Greg Mankiw presents
in Macroeconomics, 7th edition. Suppose an economy has a natural rate of unemployment of
7.0%, and a monthly rate of job separation of 3.0%. This economy currently has 3.5 million
unemployed people. How many people will find a job in the next month?

4. Consider a country where labor productivity grows at an average annual rate of 2.3%, and the size of the labor force grows at an average annual rate of 1.1%. Suppose that the Quantity Theory of Money holds. Suppose also that the Solow Growth Model holds, and that this country is in its steady state.

(b) (15pts) If policy-makers have price-level stability as their goal, at what average annual rate will they let the money supply change? Explain your answer, with reference to the Solow Growth Model and the Quantity Theory of Money.

(c) (5pts) If the average annual money supply growth rate is zero, what will happen on average to prices in this economy? Be as explicit as possible.

5. Suppose Lanna makes a one-year loan to Bill at an annual nominal interest rate of 6.5%. Both people expect the annual real interest rate on the loan to be 3.2%.

(a) (5pts) From Lanna's perspective, would an inflation rate of 2.5% be better than the inflation rate she is anticipating? Explain.

(b) (5pts) From Bill's perspective, would an inflation rate of 2.5% be better than the inflation rate he is anticipating? Explain.

6. Suppose the banking industry holds one kind of deposit, a checking deposit. The money supply is defined to be currency in the hands of the public (C) plus deposits (D).   Bank A holds deposits of $400 million, and total reserves of $48 million, of which $30 million are required reserves. Suppose that all banks in this economy hold the same ratio of excess reserves to deposits. Suppose further that the public chooses a ratio of currency to deposits that is 0.28.

(a) (5pts) What is the money multiplier for this economy?
(b) (5pts) If this economy's central bank sold $10 million of Treasury bills, what would happen to the money supply?

7. Consider the January 11, 2011 speech entitled "It's a Wonderful Fed" by Minneapolis Federal Reserve Bank President Narayan Kocherlakota.

(a) (2pts) What is a solvent firm, according to Mr. Kocherlakota?
(b) (4pts) What is a financial panic, according to Mr. Kocherlakota?

In his speech, Mr. Kocherlakota said "most economists agree about how central banks should respond to financial panics. The crux of that agreed-upon response is that central banks have to be willing to lend freely to solvent firms, against a wide range of good collateral, at some kind of penalty rate. This policy is useful for two reasons."

(c) (4pts) What are Mr. Kocherlakota's two reasons for why this central bank response is useful?