There are 15 questions on this exam. The questions in Part I are worth 8 points each; the questions in Part II are worth 5 points each. Use separate sheets for your answers, write on only one side of the page, and carefully label your answers. Answer clearly, be neat, and write legibly. Put your name on and number each page of your answers. When finished, turn in your answers only. The work on this exam is to be yours and yours alone.

PART I

1. Suppose that the relationship between desired consumption (C) and aggregate income (Y) is as in the table below. Furthermore, assume that gross investment (I) = $300, government spending (G) = $500, and net exports = 0, regardless of the level of income.

<table>
<thead>
<tr>
<th>Y</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>400</td>
</tr>
<tr>
<td>1000</td>
<td>1000</td>
</tr>
<tr>
<td>2000</td>
<td>1600</td>
</tr>
<tr>
<td>3000</td>
<td>2200</td>
</tr>
<tr>
<td>4000</td>
<td>2800</td>
</tr>
</tbody>
</table>

   a. If we assume that prices and inflation are constant, what is the equilibrium level of output in this economy?

      $3000.

   b. If G falls to $100, what is the new level of equilibrium income?

      $2000.

   c. Is there a “multiplier effect” in part (b)? Briefly explain.

      Yes. For each one dollar decrease in government spending, aggregate spending in equilibrium falls by $2.5, i.e. more than one dollar.

2. Suppose we observe the Fed selling treasury securities in the open market. Which of the following events might prompt this action by the Fed? Explain. (i) The Fed is trying to maintain its target federal funds rate in the face of decreasing demand for bank reserves. (ii) The Fed has observed a decrease in the rate of inflation, and is attempting to stimulate aggregate spending. (iii) The Fed has increased its target federal funds rate.
i) Yes. If the demand for reserves falls, the federal funds rate will fall if no action is taken by the Fed. By selling securities, the Fed will reduce the supply of bank reserves, and raise the rate back to its target level. ii) No. iii) Yes. To increase rates, the Fed will sell securities to reduce reserves in the banking system.

3. One of the primary components of the aggregate fluctuations model is the aggregate demand curve. Describe how each of the following affects aggregate demand, and how this is reflected in the aggregate demand curve.
   a. An increase in government purchases. Aggregate demand will increase, shifting the AD curve to the right.
   b. An increase in inflation. The quantity of aggregate demand will decrease, as the Fed raises its target nominal interest rate more than the increase in inflation. This causes no shift, but a movement along the AD.
   c. An increase (or shift upwards) in the Fed’s monetary policy rule. At a given rate of inflation, the Fed increases its nominal rate target, and thus increasing real interest rates. Aggregate demand will fall, shift to the left.

4. Assume that the current rate of inflation is 3%, real GDP is $10,000, and full-employment output is $12,000.
   a. According to the aggregate fluctuations model discussed in class, what will happen to the rate of inflation and real GDP over the next few years if the Fed follows its monetary policy rule? Why? The rate of inflation will fall since output is less than its potential. As inflation falls, the Fed, following its policy rule, will lower its nominal interest rate target enough to cause real rates to fall, leading to increased spending. Thus, real GDP will begin to increase over time.
   b. What could the Fed do if it wished to maintain the rate of inflation at 3%? The Fed could lower its nominal rate target immediately, without waiting for inflation to fall (i.e. shift its policy rule down). This would shift the AD curve to the right, increasing output quickly.

5. Assume that the economy is currently producing at its full-employment level at an inflation rate of 2%. Congress passes a law reducing taxes permanently. What effects will this policy have on real GDP, inflation, and the real interest rate in the short-run and long-run, assuming the conventional view of tax policy and the Fed maintains its monetary policy rule? Will your prediction change under the Ricardian view of taxes? If so, how?

Under the conventional view, the reduction in taxes will increase aggregate demand. In the short run for fixed inflation, output will rise above its potential level and inflation will start to rise above 2%. As this happens, the Fed will raise its nominal interest rate target, spending will fall, and output will fall. Inflation will continue rising and output falling until a new long-run equilibrium is reached where inflation is higher than 2%, but output is equal again to its full employment level. At this new equilibrium, real interest rates will be higher than in the original equilibrium.
The Ricardian view predicts that the change in taxes will have no effect on aggregate demand, so there will be no change in output in the short run or inflation and real interest rates in the long-run. Thus, the prediction does indeed change in this case.

6. One potential effect of a war with Iraq is that the price of oil might rise. How would this likely affect the macroeconomy in the short-run and the long-run, assuming the Fed does not alter its policy rule?

The rise in the price of oil will cause the rate of inflation to rise and the level of output to fall as the economy moves along the AD curve. If the Fed maintains its policy rule, eventually inflation will begin to fall back to its original level because output will initially fall below its potential level.

7. Some observers worry that the economy is approaching a period of “deflation.” But is “deflation” necessarily something to worry about? Briefly explain when deflation is desirable and when it is undesirable in a macroeconomic sense.

Deflation is not necessarily a bad thing. If the general price level falls because an increase in potential output (due to increases in resources or technology), deflation can potentially be a “good” thing. But if deflation is due to insufficient aggregate demand, then it can reflect a recession where output is below its potential level.

8. FDR’s “New Deal” during the Great Depression was fundamentally a series of programs aimed at increasing government spending. In terms of our model of aggregate fluctuations, what was the rationale for such a policy?

The Great Depression was characterized by a massive decrease in aggregate demand, so that output fell below potential causing prices to fall. The purpose of the government spending programs of the 1930’s was to increase aggregate demand (shift the AD curve to the right) to stimulate spending and thus output.

PART II

9. Assume that aggregate income is $25,000, consumption is $18,000, gross investment is $4,000, net exports are 0, and net taxes equal $2000. For this economy, compute the amount of (i) government spending, (ii) saving by households and (iii) national saving.

\[ G = 3000; \text{ household saving } = 5000; \text{ national saving } = 4000. \]

10. Suppose that nominal gross domestic product grew by 6% over the past five years, during which period the rate of inflation was 6%. What, if anything, can we infer about the rate of growth of real aggregate output during this period? Explain.
We can infer that the rate of growth of real output, as measured by real GDP, grew at a 0% rate over the period.

11. Two countries in long-run full employment are identical in every respect, except that marginal profit rates are higher in country A than in country B. Compare the real interest rate, the share of spending on consumption, the share of spending on investment, and the rate of household saving in each country.

*The real rate of interest, investment share and saving rate will be higher in country A than in country B. Consumption share will be lower in A than in B.*

12. Assess the validity of the following statement: “Government deficits are bad because they raise real interest rates in the long-run and crowd out private spending by households and firms.”

*Deficits do not necessarily raise real interest rates and crowd out private spending; it depends what causes the deficit. If the deficit is due to an increase in government spending, then private spending will be crowded out because of higher real interest rates. But if the deficit is due to lower taxes and the Ricardian view holds (i.e. the lower taxes are matched by higher household saving), the deficit will have no effect on national savings, the supply of loanable funds or real interest rates.*

13. Suppose that over many years growth in labor productivity in country A was 3% while growth in country B was 5%. During this period, capital per worker grew 3% in A and 6% in B. In which country did technology grow faster? Explain.

*Using the growth accounting formula, technology grew by 3% in country B and 2% in country A.*

14. In all industrialized countries, we tend to observe that there is, on average over the long-run, positive growth in employment and positive growth in real wages. What is the best and most likely explanation for this fact?

*Increases in the marginal product of labor due to advances in technology (or increases in the capital stock).*

15. Money in the long-run.

*a.* From 1981 through 1990, the annual rate of inflation in Japan was about 2%. But from 1991 to 2000, the rate of inflation in Japan was essentially 0%. According to the assumptions of the quantity theory of money, what was the growth rate of the money stock in Japan during these two periods? 2% in the first period and 0% in the second.

*b.* Compute the velocity of money if the money stock is $5000 and aggregate nominal income is $30,000. $V = 6$. 