Multiple Choice: (30 points total, 3 points each) Write all answers in your blue book.

1) Money
   a) is a type of asset.
   b) is a medium of exchange.
   c) includes checking accounts as well as cash.
   d) All of the above are true about money.

2) Suppose that total output in an economy consists of 50 textbooks and 200 yellow highlighting pens, and suppose that the price of a textbook is an outrageous $80, and the price of a highlighting pen is $5. Suppose that the GDP deflator for 1999, as defined in class, is 1.25. Then for 1999:
   a) nominal and real GDP are $5000.
   b) nominal and real GDP are $4000.
   c) nominal GDP is $5000 and real GDP is $4000.
   d) nominal GDP is $4000 and real GDP is $5000.

3) The consumer price index is different from the GDP deflator in that it:
   a) measures the average price of all goods and services.
   b) tends to understate the level of inflation because of substitution bias.
   c) includes imported goods.
   d) has weights that change each year.

4) Which of the following would raise both investment and GDP in this year’s U.S. national income accounts?
   a) I buy stock in IBM (a U.S. company).
   b) A Korean firm buys a computer from IBM.
   c) IBM builds a computer to sell next year.
   d) A U.S. company buys a computer from IBM that IBM made last year.

5) According to the neoclassical model developed in class, when taxes are cut:
   a) private saving rises and government saving rises.
   b) private saving falls and government saving rises.
   c) private saving falls and government saving falls.
   d) private saving rises and government saving falls.

6) According to the neoclassical model, if there is a rise in investment demand at all interest rate levels (assuming consumption is not a function of the interest rate, r), then the equilibrium level of:
   a) investment rises and r rises.
   b) no change in investment, but r rises.
   c) investment rises with no change in r.
   d) none of the above.

7) Which of the following might worsen frictional unemployment in the U.S.?
   a) the creation of government-funded worker retraining programs.
   b) an increase in unionization.
   c) a rise in unemployment insurance benefits.
   d) an increase in the legal minimum wage.

8) The endogenous growth model of $y = Ak$ implies
   a) the marginal product of capital is constant.
   b) the growth rate of $y$ is constant.
   c) the growth rate of $k$ is constant.
   d) all of the above.

9) According to the Solow growth model, a high population growth rate will tend to:
   a) raise the level of income per person that a country can maintain as a steady state.
   b) lower the growth rate of capital per person for any level of capital below steady state.
   c) raise the level of capital per person that is optimal.
   d) lower the steady state growth rate in total output.

10) Which of the following is not implied by the quantity theory of money:
    a) inflation equals the rate of money growth, if output and velocity are constant.
    b) If both money supply and output double, while velocity is constant, price level will not change.
    c) $M*V = P*Y$ only if velocity is constant.
    d) transactions velocity is defined as price level multiplied by transactions divided by money.
Problem 1: Neoclassical Economy: (35 points total)
Suppose the supply side of an economy is characterized as follows:
\[ Y = 4K^{0.3}L^{0.7} \]
\[ K = 150 \quad L = 150 \]
Suppose the demand side of the economy is characterized by the following (all in units of goods):
\[ G = 100 \quad T = 100 \]
\[ C = 20 + 0.6(Y-T) \]
\[ I = 300 - 1000r \]
a) (10 pts) Compute the equilibrium level of the following: real interest rate, investment, and consumption.
b) (10 pts) Consider the effect of a cut in government purchases (with no change in taxes). State for each of the following variables whether it will rise, fall, or not change: real interest rate, investment, consumption, private saving, and government saving. Explain briefly.
c) (10 pts) Suppose now that consumption is a negative function of the interest rate. (Assume the consumption function becomes: \( C = 20 + 0.6(Y-T) - f(r) \).) How would your answers to part (b) above change? In particular, for each of the variables listed in (b), state whether it rises, falls, or doesn’t change. State also if the movement in each variable is larger, smaller, or the same as your answer in (b).

Now suppose the money market of the economy above is characterized by the following:
\[ M^s = 900 \quad M^d = 0.5 \times P \times Y \]
d) (5 pts) Compute the equilibrium price level. (Use also the information given previously.)

Problem 2: Unemployment (20 points total)
Consider an economy with the following Cobb-Douglas production function: \( Y = F(K,L) = 18K^{1/2}L^{1/2} \).
The economy has 100 units of capital and a labor force of 100 workers.
a) (7 pts) Compute the equilibrium real wage in this economy.
b) (7 pts) Suppose there is a minimum wage law dictating that workers must be paid a real wage of 10. Compute the unemployment rate if there is no frictional unemployment in this economy.
c) (6 pts) Intuitively, explain how this minimum wage law will affect the real rental rate of capital, assuming the capital rental market is allowed to clear without interference. In particular, will the real rental rate be higher, lower, or the same as a case where there was no minimum wage law?

Problem 3: Solow Growth Model (25 points total)
Suppose the U.S can be characterized by the production function: \( Y = F(K,L) = 10K^{0.5}L^{0.5} \). Suppose the depreciation rate is 10%, and the saving rate is 10%. Assume for now that there is no population growth or technological progress.
a) (10 pts) Compute the following: the steady-state level of capital per person, and the maximum level of consumption per person that is possible as a steady state.
b) (10 pts) How would your answers above change if there were a constant population growth rate? In particular, for each item computed in (a) state if the new level would be higher, lower, the same, or it is impossible to tell.
c) (5 pts) How would your answers in (a) above change if there were a constant rate of labor-augmenting technological progress? Explain briefly.

Problem 4: Solow and Neoclassical Models (10 points)
Suppose we know that workers tend to receive 70% of all the income earned in Germany, that the German depreciation rate is 10%, and that there is no population growth or technological progress. Suppose we CANNOT assume the production function in Germany takes the convenient Cobb-Douglas form (Do not assume \( Y = AK^\alpha L^{1-\alpha} \)). But we can assume that whatever the production function is, it has constant returns to scale, that the only two factors of production are capital and labor, that markets are competitive, and that firms maximize profits. Using just this information, compute what saving rate Germany should try to have, if it wants to enjoy the maximum amount of consumption per person in steady state (that is, to achieve the golden rule). Show your work.

(10/26/99)