Multiple Choice: (20 points total, 2 points each) Choose the best answer. Write on your scantron

MC#1) Which of the following policies could help explain why the natural rate of unemployment appears to be higher in Canada than the U.S.? Canada has:
   a) a larger share workers in unions
   b) fewer cases of ‘efficiency wages’
   c) less generous unemployment benefits
   d) a lower minimum wage
   e) all of the above

MC#2) In the Neoclassical model, which of the following variables adjusts to clear the goods market:
   a) price level
   b) real rental rate
   c) real interest rate
   d) nominal wage
   e) real wage

MC#3) The GDP deflator measures:
   a) the level of total production
   b) the level of total income
   c) the level of inflation in consumer goods
   d) the level of inflation as the ratio of nominal GDP over real GDP

MC#4) According to the quantity theory of money, a rise in money supply leads to a proportionate rise in:
   a) real GDP
   b) price level
   c) velocity
   d) all of the above

MC#5) If money growth rises 2% and output growth rises 3%, then according to the Quantity theory and the Fisher relation, the nominal interest rate should:
   a) rise 5%
   b) rise 1%
   c) not change
   d) fall 1%
   e) fall 5%.

MC#6) In the U.S. national accounts, which of the following would be part of GDP and consumption:
   a) you buy a used American car
   b) you buy a new American car
   c) you buy a new German car
   d) Avis company buys a new American car for its business

MC#7) Which of the following would help end a hyperinflation:
   a) reduce money growth
   b) reduce government spending
   c) reduce inflation expectations
   d) all of the above

MC#8) In the Solow model, technological progress is useful for helping explain the observation that the US has steady state growth in:
   a) income per person
   b) the real rental rate
   c) the real interest rate
   d) all of the above

MC#9) In the Solow model, if technological progress is growing at 2% and the population growth rate is 1%, then the steady state rate of growth in the real wage is:
   a) 3%
   b) 2%
   c) 1%
   d) 0%
   e) -1%

MC#10) In the theory of Conditional Convergence, for you to conclude that both China and the US will end up at the same level of income per person in the long run, which of the following should be the same in the US and China?
   a) saving rate
   b) depreciation rate
   c) population growth rate
   d) production function
   e) all of the above
Problem 1: Neoclassical Model (20 points total)

Suppose the real side of the U.S. macroeconomy is characterized as follows:

Production: \( Y = 5K + 3L \)
Factor supplies: \( K = 10 \quad L = 10 \)
Government: \( G = 15 \quad T = 20 \)
Consumer behavior \( C = 10 + 0.75(Y-T) \)
Investment behavior \( I = 30 - 100r \)

\( Y \) is real GDP, \( K \) capital, \( L \) labor, \( G \) government purchase, \( T \) taxes, \( C \) consumption, \( I \) investment, \( r \) real interest rate. Assume a closed economy.

a) (9 points) Compute the equilibrium levels of the following 7 variables:

- GDP
- real interest rate
- investment
- consumption
- private saving
- government saving
- total national saving

Show your work in your blue book. (Assume a closed economy.)

In a couple of sentences, explain the equilibrium condition you used, and the economic reasoning why the real interest rate must take the value you computed above.

b) (6 points) Suppose that the government raises spending, \( G \). What effect will this have on the variables listed below? Mark the answer on your scantron, and explain in a few sentences in your blue book the economic intuition. No computations necessary.

- MC#11) GDP (a) rise (b) fall (c) no change (d) insufficient information
- MC#12) national saving (a) rise (b) fall (c) no change (d) insufficient information
- MC#13) real interest rate (a) rise (b) fall (c) no change (d) insufficient information
- MC#14) investment (a) rise (b) fall (c) no change (d) insufficient information
- MC#15) private saving (a) rise (b) fall (c) no change (d) insufficient information

c) (5 points) Suppose now instead that there is a wave of immigration raising the supply of labor. What effect will this have on the variables listed below? Mark the answer on your scantron. No computations necessary; no explanation required.

- MC#16) GDP (a) rise (b) fall (c) no change (d) insufficient information
- MC#17) national saving (a) rise (b) fall (c) no change (d) insufficient information
- MC#18) real interest rate (a) rise (b) fall (c) no change (d) insufficient information
- MC#19) investment (a) rise (b) fall (c) no change (d) insufficient information
- MC#20) private saving (a) rise (b) fall (c) no change (d) insufficient information

Problem 2: Neoclassical Model of the Factors Market and Unemployment (12 points total)

Suppose production in the US economy could be represented by the following Cobb-Douglas production function: \( Y = 2K^{1/2}L^{1/2} \). Suppose the economy has 100 units of capital and a labor force of 100 workers.

a) (3 points) Compute the equilibrium real wage that clears the labor market (where labor supply equals labor demand).
b) (4 points) Now suppose that Congress passes a law requiring firms to pay workers a real wage of 2 units of output. Will there be structural unemployment? If so, compute the unemployment rate.

c) (5 points) Suppose the US experiences a rise in capital stock to a level above the 100 units assumed above. How would this affect the market-clearing equilibrium real wage computed in part (a) above? How would it affect the unemployment rate under the minimum wage policy of part (b)? No calculations necessary, but explain your answer in terms of economic logic in a sentence or two.

Problem 3: Solow Growth Model (20 points total)
Suppose an economy can be characterized by the production function, already put in per person terms: \( y = f(k) = 2k^{1/2} \), where \( k \) is capital per person, \( K/L \). Suppose the depreciation rate is 7%, the saving rate is 20%, the population growth rate is 3%. Assume there is no technological progress.

a) (6 points) Using the Solow growth model, compute the steady state values of the following: capital per person output per person consumption per person

b) (6 points) Compute the golden rule level of capital per person that would imply the maximum level of consumption per person that this economy can enjoy. Would it require a higher or lower saving rate to achieve this steady state?

c) (4 points) Suppose the country implements a policy that lowers the population growth rate below the 3% level assumed above. What would happen to the steady state values of the following variables:

<table>
<thead>
<tr>
<th>MC#23</th>
<th>output per person</th>
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<tbody>
<tr>
<td>(a) rise</td>
<td>(b) fall</td>
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<thead>
<tr>
<th>MC#24</th>
<th>consumption per person</th>
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<tbody>
<tr>
<td>(a) rise</td>
<td>(b) fall</td>
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<table>
<thead>
<tr>
<th>MC#25</th>
<th>golden rule capital per person</th>
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<tbody>
<tr>
<td>(a) rise</td>
<td>(b) fall</td>
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<tr>
<th>MC#26</th>
<th>growth rate in GDP per person</th>
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<tbody>
<tr>
<td>(a) rise</td>
<td>(b) fall</td>
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d) (4 points) Explain in a paragraph (around 3-5 sentences) how the low saving rate in the U.S. could be a problem for our long-run standard of living in terms of consumption per person. Discuss also how, on the other hand, an excessively high saving rate theoretically could also be harmful.