Multiple Choice: (30 points total, 3 points each) Choose the best answer. Write on scantron.

1) GDP measures total national:
   a) output
   b) income
   c) expenditure
   d) none of the above
   e) all of the above

2) Which of the following could prevent substitution bias in measuring inflation?
   a) Use base year prices.
   b) Use base year quantities.
   c) Use the GDP deflator
   d) Use the CPI
   e) None of the above.

3) Which of the following would contribute to U.S. GDP as investment in the national income accounts?
   a) Boeing (a U.S. company) sells an airplane to the U.S. Air Force.
   b) Boeing sells an airplane to American Airlines.
   c) American Airlines buys a plan from Airbus (a European producer).
   d) U.S. steel Inc. sells steel to Boeing to produce airplanes.
   e) All of the above.

4) Which of the following could help explain the higher level of frictional unemployment among young workers:
   a) the minimum wage.
   b) a high finding rate.
   c) government retraining programs.
   d) a high separation rate.
   e) unionization among young workers

5) Which could help explain the higher level of wait unemployment in Canada relative to the U.S.?
   a) Canada has a higher degree of unionization.
   b) Canada has government retraining programs.
   c) The U.S. has a higher minimum wage.
   d) U.S. employers believe in efficiency wages.
   e) Canada has more generous unemployment benefits.

6) In the standard Neoclassical model, which of the following will adjust to maintain equilibrium in the goods market?
   a) output
   b) price level
   c) interest rate
   d) fiscal policy
   e) consumption

7) The U.S. and China will converge to the same level of income per person in the long run, unless they are different in which of the following characteristics?
   a) population growth
   b) saving rate
   c) depreciation rate
   d) production function
   e) all of the above.

8) Which of the following could cause growth in income per person in steady state?
   a) endogenous growth theory
   b) population growth
   c) a high saving rate
   d) both a and b
   e) all of the above.

9) The endogenous growth model of $Y = AK$ (not in per person terms) implies
   a) the marginal product of capital is constant
   b) the growth rate of $K$ is constant
   c) the growth rate of $Y$ is constant
   d) the growth rate of $K/L$ is constant
   e) all of the above

10) Euler’s theorem necessarily involves all of the following except:
    a) The labor market is competitive.
    b) The goods market is competitive.
    c) The production function has a diminishing marginal product of capital.
    d) Firms want to maximize profits.
    e) Profits are zero.
Problem 1: Neoclassical Model of the Macroeconomy (40 points total, 10 points each part)

Suppose the supply side of the goods market can be characterized by the production function:
\[ Y = 12 K^{1/3} L^{2/3} \]
where K is capital stock and L is labor

The demand side can be characterized by the following:
- government purchases: \( G = 1200 \)
- taxes: \( T = 2000 \)
- consumption: \( C = 2000 + 0.6(Y-T) - 500r \)
- investment: \( I = 3000 - 500r \)

Suppose the supply side of the factors market is characterized by:
- capital stock = 1000
- labor supply = 1000

(a) Compute the equilibrium values for the following 10 variables:
- GDP
- real interest rate
- investment
- consumption
- private saving
- government saving
- total saving
- the real wage rate
- the total payments to labor
- the share of total national income that is paid to labor

(b) Suppose the government in this economy raises taxes. Discuss what effects this fiscal policy would have on the economy above. In particular, state for each of the variables you computed in part (a) whether it will rise, fall, not change, or if it is impossible to tell for sure from the given information. (No calculations required.) Discuss in a paragraph the intuition behind your conclusion regarding consumption; how was your conclusion affected by the fact the consumption function involves the interest rate.

c) Suppose the government instead raises government spending (no change in taxes). Now state for each of the variables you computed in part (a) whether it will rise, fall, not change, or if it is impossible to tell.

d) Now suppose a completely different experiment. The country has been experiencing a wave of immigration that is increasing its supply of labor beyond that specified above. Use the Neoclassical model above to analyze the effects of this on the rest of the economy. In particular, state for each of the variables you computed in part (a) whether it will rise, fall, not change, or if it is impossible to tell. (Note: there is no change in fiscal policy here.)

Problem 2: Solow Growth Model: (36 points total, 12 points each part)

Suppose the U.S. can be characterized by the production function: \( Y = F(K,L) = AK^{1-\beta} L^\beta \) (not in per person terms). Suppose \( A=10, \; \beta=0.5 \), the depreciation rate is 7%, the population growth rate is 3%, and the saving rate is 20%. Assume there is no technological progress.

(a) Compute steady state values of capital per person, output per person, and consumption per person.

(b) What is the maximum amount of consumption per person that this economy can achieve as a steady state? What saving rate would be necessary to achieve this? Explain why a saving rate higher than this would be a bad thing.

c) For the economy described in part (a) above, what would be the effect on the steady state level of consumption per person of the following scenarios? (State for each: rise, fall, no change, or ambiguous. Then explain in a sentence or two.)
   i) a rise in the saving rate by some amount
   ii) a rise in the population growth rate
   iii) a higher value for \( \beta \) in the production function