Name _____ Student ID _____

Mark on your scantron: Test form A

Midterm 1 - Economics 101 (Fall 2024)

You will have 45 minutes to complete this exam. There are 30 points.

Multiple Choice: (8 points total, 1 points each) Choose the best answer. Write on your scantron.

MC#1 Suppose Nominal GDP rises by 3% and the GDP deflator rises by 6%. By how much does real GDP change?
- A) rise 9%
- B) rise 3%
- C) fall 3%
- D) fall 9%

MC#2 The Golden Rule level of capital accumulation is the steady state with the highest level of:
- A) capital per person.
- B) saving per person.
- C) output per person.
- D) consumption per person.

MC#3 The CPI tends to overstate inflation due to
- A) Euler's theorem.
- B) Constant returns to scale.
- C) Its fixed weights.
- D) Diminishing marginal product.

MC#4 What is the equilibrium condition in the factors market for capital?
- A) Real rental rate equals the marginal product of capital.
- B) Marginal product of capital equals depreciation rate.
- C) Marginal product of labor equals the real wage.
- D) Saving equals investment.

MC#5 In the Solow model with technological progress g and population growth rate n, which of the following grows in steady state at rate g?
- A) Effective labor.
- B) Output per worker.
- C) Output per effective worker.
- D) Total output (not per person).

MC#6 According to the Neoclassical theory, what determines the level of total real GDP in an economy in the long run?
- A) Government policy setting taxes and the government budget deficit
- B) The quantity of capital, quantity of labor, and production technology.
- C) The interest rate and the amount of national saving.
- D) The sum of demand coming from consumption, investment, and government spending.

MC#7 The GDP deflator is a measure of
- A) Output.
- B) Unemployment.
- C) Income.
- D) Prices.

MC#8 The production function $Y = K^{0.5}L^{0.5}$ has which properties?

A) Both constant returns to scale and diminishing marginal product of capital.
B) Neither constant returns to scale nor diminishing marginal product of capital.
C) Constant returns to scale but not diminishing marginal product of capital.
D) Diminishing marginal product of capital but not constant returns to scale.

Problem 1: Neoclassical Model (12 points total; each multiple choice is worth 1 point)
Suppose the macroeconomy of a country is characterized as follows:

Production:	$Y = 4K^{1/2} L^{1/2}$	
Factor supply:	$K = 1$	$L = 4$
Government:	$G = 2$	$T = 2$
Consumer behavior:	$C = 1 + 0.5(Y-T)$	
Investment behavior	$I = 4 - 10r$	

(Y is real GDP, K capital, L labor, G government purchase, T taxes, C consumption, I investment, r real interest rate)

a) (4 points) Compute the equilibrium values of real interest rate and real wage. (show your work)

b) (3 points) Suppose a new presidential administration cuts government spending, G, by 1 unit (assume no change in tax here). What effect will this have on the equilibrium values of the variables listed below? Mark on scantron.

MC#9: national saving (a) rise (b) fall (c) no change (d) insufficient information

MC#10: real interest rate (a) rise (b) fall (c) no change (d) insufficient information

MC#11: investment (a) rise by less than 1 unit
(b) rise by more than 1 unit
(c) rise by exactly 1 unit
(d) insufficient information to know the amount

c) (3 points) Suppose instead that a new presidential administration engages in mass deportation of immigrant workers that reduces the labor supply (no change in G here). According to the Neoclassical model, how will this affect the following:

MC#12: real wage
(a) rise (b) fall (c) no change (d) insufficient information

MC#13: share of GDP paid to labor
(a) rise (b) fall (c) no change (d) insufficient information

MC#14: real rental rate of capital
(a) rise (b) fall (c) no change (d) insufficient information

d) (2 points) In a couple of sentences (no equations or math), explain the underlying economic reasoning why the real wage is affected the way you state in part (c) above.

Problem 2: Solow Growth Model: (10 points total)

Equations for the Solow growth model (assuming no technological progress):
Steady state condition: $s f(k) = (\delta + n) k$
Golden rule condition: $MPK = \delta + n$

Suppose an economy with production function in per person terms $y = 0.4k^{1/2}$, a saving rate of 20%, depreciation rate of 10%, population growth rate of 10%, and no technological progress.

a) (3 points) Compute the golden rule level of capital per person. Show your work.

b) (3 points) Suppose the country raises its saving from 20% to a level that satisfies the golden rule. (Hint: 20% is below the golden rule saving level.) Using the Solow growth model, draw a graph of the investment and depreciation lines to show how the change in saving rate affects the steady state capital stock per person. Label curves, and use arrows to indicate any curve shifts. Label the initial steady state level of capital per person as k_1^*, and label as k_2^* the steady state for the new saving rate.

c) (4 points) How does the rise in saving rate make the following variables change, relative to their initial values (assuming the country started at the steady state associated with the old 20% saving rate)? Mark on scantron.

MC#15: current level of consumption per person

(a) rise (b) fall (c) no change (d) insufficient information

MC#16: current growth rate in capital stock per person

(a) rise (b) fall (c) no change (d) insufficient information

MC#17: level of consumption per person in the new steady state

(a) rise (b) fall (c) no change (d) insufficient information

MC#18: growth rate of capital stock per person in the new steady state

(a) rise (b) fall (c) no change (d) insufficient information

Space below this line may be used for scratch work. Nothing written below this line or on the next page will be graded.