ECON 010 - Principles of Macroeconomics
Drake University, Spring 2022
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Signature: ____________________

Printed name: ____________________

EXAMINATION 3 VERSION B
"Long-Run Economic Growth and Inflation"
April 12, 2022

INSTRUCTIONS: This exam is closed-book, closed-notes. Simple calculators are permitted, but graphing calculators or calculators with alphabetical keyboards are NOT permitted. Cell phones or other wireless devices are NOT permitted. Point values for each question are noted in brackets. Points will be subtracted for illegible writing or incorrect rounding. Maximum total points are 100.

I. Multiple choice: Circle the one best answer to each question. [1 pts each, 16 pts total]

(1) According to the aggregate production function, potential GDP is determined by all of the following except
a. consumer confidence.
b. technology.
c. the size of the labor force.
d. the size of the capital stock.

(2) Thomas Malthus believed that in the long run, output per person would
a. grow at a constant rate indefinitely.
b. grow at increasing rates indefinitely.
c. fall at a constant rate.
d. fall to the level of subsistence.

(3) Potential GDP grows faster in the future, the more spending is done now on
a. government purchases.
b. net exports.
c. consumption.
d. investment.

(4) If the interest rate falls, then the opportunity cost of consumption today (in terms of foregone consumption in the future)
a. rises.
b. falls.
c. remains constant.
d. cannot be determined.

(5) If the real interest rate decreases and nothing else changes, then spending on buildings, equipment, vehicles, computers, networks, and software will
a. increase.
b. remain unchanged.
c. decrease.
d. cannot be determined from information given.

(6) An decrease in U.S. interest rates will cause
a. the dollar to appreciate against other currencies.
b. the dollar to depreciate against other currencies.
c. the exchange rate to remain unchanged.

(7) According to the spending allocation model, which spending component is *not* related to the interest rate?
a. Net exports' share.
b. Government purchases' share.
c. Consumption's share.
d. Investment's share.

(8) U.S. unemployment was highest in the
a. 1930s.
b. 1950s.
c. 1970s.
d. 1990s.
e. 2010s

(9) Unemployment that results from normal turnover of workers and businesses, is called
a. frictional unemployment
b. cyclical unemployment.
c. structural unemployment.
d. all of the above.

(10) Government-sponsored employment agencies, which try to match workers to job vacancies submitted by employers, are likely to reduce the unemployment rate according to the
a. job rationing theories of unemployment.
b. job search theories of unemployment.
c. Phillips curve theory of unemployment.
d. none of the above.

(11) "Human capital" means
a. education and training.
b. retirement savings plans.
c. people-friendly businesses.
d. ergonomically designed equipment.

(12) Ideas for new products or new manufacturing techniques could potentially be used by any company without interfering with use of the same ideas by other companies. Such ideas are therefore
a. nonstandard goods.
b. nonexcludable goods.
c. normal goods.
d. nonrival goods.

(13) Which kind of money is made from something valuable?
a. bank deposits.
b. paper currency.
c. commodity money.
d. All of the above.

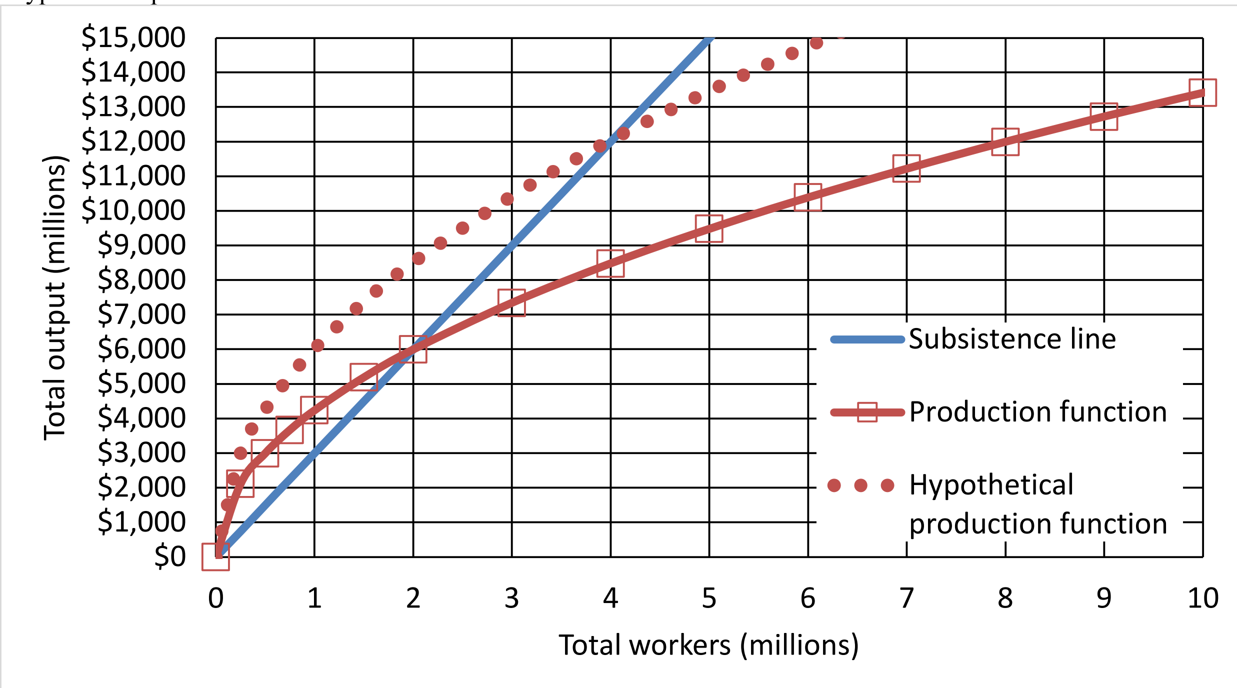
(14) The three essential functions of money include all of the following except
a. form of physical capital.
b. unit of account.
c. medium of exchange.
d. store of value.

(15) Hyperinflation is caused by excessive
a. consumption spending.
b. taxes.
c. government borrowing.
d. government spending.
e. growth of the money supply.

(16) Simple economic theory predicts that technology and capital should
a. move in opposite directions.
b. concentrate increasingly in advanced economies.
c. flow from more-developed countries to less-developed countries.
d. All of the above.

II. Problems: Insert your answer to each question in the box provided. Use graphs and margins for scratch work. Only the answers in the boxes will be graded. Work carefully: partial credit is not normally given for questions in this section.

(1) [Malthusian model: 18 pts] The graph below shows a Malthusian model of economic growth for a particular economy, where land is fixed and labor ("total workers") is the only variable input. For the moment, ignore the "hypothetical production function."



a. According to this model, how much output is required to sustain each worker? In other words, what is the subsistence level of output per worker? $

Suppose the labor force were 1 million.

b. Would there be *more than enough* food for everyone, *just enough* food, or *not enough* food?

c. Would the population tend to *increase, decrease, or remain constant*?

Suppose the labor force were 3 million.

d. Would there be *more than enough* food for everyone, *just enough* food, or *not enough* food?

e. Would the population tend to *increase, decrease, or remain constant*?

f. What is the *equilibrium* number of workers according to this model? million

g. What is the *equilibrium* level of annual wages (output per worker) according to this model? $

Suppose the production function shifts up to the hypothetical production function because new land is brought under cultivation.

h. What will be the eventual new equilibrium number of workers, according to this model? million

i. What will be the eventual new equilibrium level of annual wages (output per worker) according to this model? $

(2) [Growth of capital stock: 2 pts] The following data (in chained 2012 dollars) were reported by the U.S. Bureau of Economic Analysis.

Consumption in 2020	\$12.6 trillion
Gross private investment in 2020	\$3.3 trillion
Net exports in 2020	\$-0.9 trillion
Private capital stock at end of 2019	\$40.4 trillion
Depreciation in 2020	\$3.2 trillion
Government purchases in 2020	\$3.4 trillion

Compute the private capital stock at the end of 2020. [Hint: Some data are extraneous and not needed for this problem.]

\$	trillion

(3) [Interest rate as opportunity cost: 4 pts] Compute the opportunity cost of consuming \$500 today, in terms of forgone consumption **4** years from today. In other words, how much consumption **4** years from now is given up when \$500 is consumed today? Compute your answer to the nearest whole dollar…

a. … assuming an interest rate of **2%**.	\$
b. … assuming an interest rate of **5%**	\$

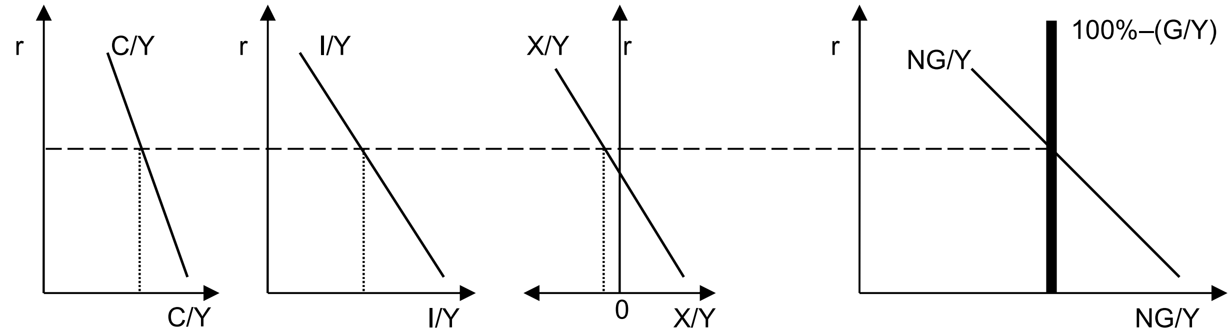
(4) [Interest rate and GDP shares: 10 pts] Suppose the following three equations relate the shares of consumption (C), investment (I), and net exports (X) in total GDP (Y) to the real interest rate (r) in the long run. In these equations, the GDP shares and the interest rate are expressed as percents.

$$(C/Y) = 70\% - 1\ r \qquad (I/Y) = 28\% - 3\ r \qquad (X/Y) = 5\% - 2\ r$$

Suppose further that the share of government purchases in GDP (G/Y) is fixed at **21 %**. Compute the following. [Hint: Check your answer to be sure that the four GDP *spending* shares sum to 100%.]

a. Interest rate (r)	%	d. Net exports' share of GDP (X/Y):	%
b. Consumption's share of GDP (C/Y):	%	e. Savings as a share of GDP (S/Y):	%
c. Investment's share of GDP (I/Y):	%		

(5) [Interest rate and GDP shares—graph: 18 pts] Consider the following scenario. Suppose business owners become more pessimistic about future business conditions. Use the graphs below of the GDP spending shares model to answer the following questions.



a. According to this scenario, which curve shifts: consumption's share (C/Y), investment's share (I/Y), or net exports' share (X/Y) ?

b. Does it shift *left* or *right* ?

c. As a consequence, does the downward-sloping (NG/Y) curve shift *left*, shift *right*, or remain *unchanged* ?

d. Does the long-run real interest rate (r) *increase, decrease*, or remain *constant*?

e. Does the share of consumption spending (C/Y) *increase, decrease*, or remain *constant*?

f. Does the share of investment spending (I/Y) *increase, decrease*, or remain *constant*?

g Does the share of net exports (X/Y) *increase, decrease*, or remain *constant*?

h. Which spending component—*consumption, investment, government purchases,* or *net exports*—directly affects potential GDP in the long run?

i. Given your answer to (h), in this scenario, will long-run growth *increase*, *decrease,* or *remain constant?*

(6) [Measuring the labor force: 4 pts] Indicate whether each person below would be counted by the U.S. Current Population Survey as *employed, unemployed,* or *out of the labor force.*

a. A 17-year-old who works 20 hours per week in her family's restaurant but does not receive a paycheck.

b. A student who works 10 hours per week at the public library for minimum wage.

c. A person who normally works at a Ford factory, but is currently on temporary layoff. This person expects to be called back to work in May.

d. A person who has a catering business and is thus "self-employed."

(7) [Measuring the labor force: 8 pts]] The U.S. Bureau of Labor Statistics reported the following data for February 2022. [Hint: Some of the data are extraneous and not needed for solving this problem.]

New claims for unemployment insurance	0.2 million
Employed	157.7 million
Labor force	164.0 million
Not in labor force	99.3 million
Mean duration of unemployment	26.0 weeks
Employed persons working part time for economic reasons	4.1 million
Discouraged workers	0.4 million

a. Compute the number of unemployed people to the nearest tenth of a million.	million
b. Compute the unemployment rate to the nearest tenth of a percentage point.	%
c. Compute the employment-to-population ratio to the nearest tenth of a percentage point.	%
d. Compute the labor force participation rate to the nearest tenth of a percentage point.	%

(8) [Technical change: 4 pts] In Canada over the period 1965 to 1990, the annual growth rate of output per worker was about 1.8%, and the annual growth rate of capital per worker was about 3.3%. Assume that the share of capital income plus depreciation in national income was about **(1/3),** as it is in the United States.

a. Compute the contribution of capital to productivity growth, to the nearest tenth of a percentage point.	%
b. Compute the contribution of technology to productivity growth, also called the Solow residual, to the nearest tenth of a percentage point.	%

(9) [Functions of money: 4 pts] For each sentence below, indicate whether money is functioning as a *medium of exchange,* a *store of value*, or a *unit of account*.

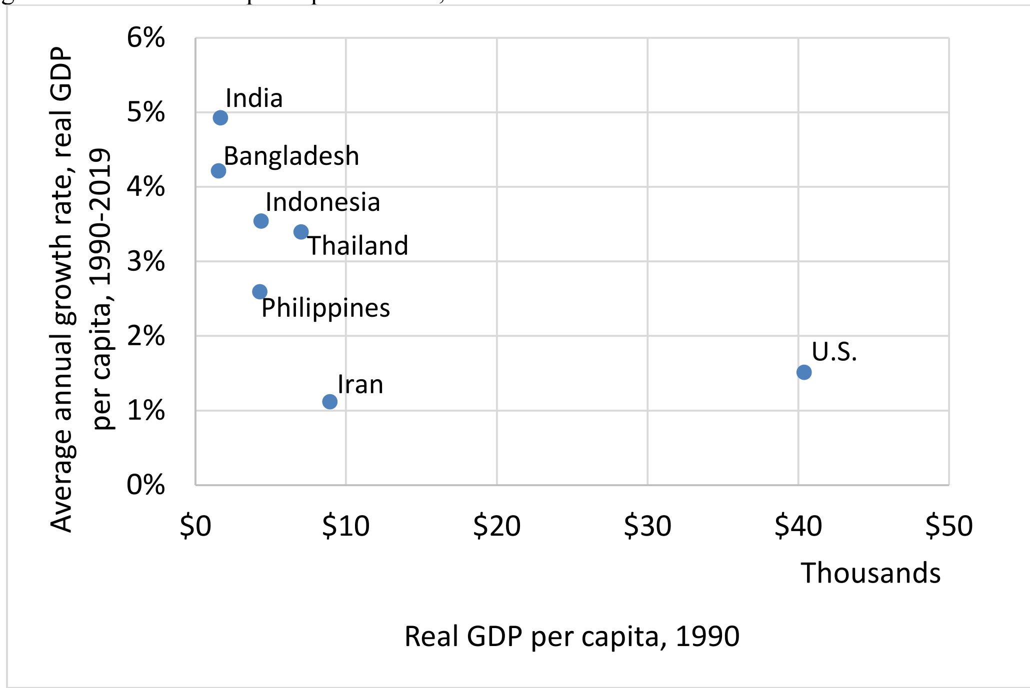
a. A college savings plan should include a variety of assets including bank accounts.	
b. Bring money to buy souvenirs!	
c. Most stores accept cash, checks, or debit cards.	
d. Her stamp collection is now worth about $20,000.	

(10) [Quantity equation: 2 pts] Average annual growth rates for various items over the period 1980 to 2020 are reported below. [Hint: Some of the data are extraneous and not needed for this problem.]

Real GDP	2.5%
Nonfarm employment	1.1%
Money supply (M2)	6.3%
Total consumer credit	6.4%
Federal budget deficit	9.8%

Assuming the velocity of money were constant, what should have been the average annual rate of inflation over this period, according to the quantity equation? Give an answer to the nearest tenth of a percentage point.	%

(11) [GDP growth around the world: 6 pts] The graph below plots the growth rate of real GDP per capita from 1990 to 2019, against initial real GDP per capita in 1990, for the U.S. and six other countries. .



Which countries' real GDP per capita *converged* toward that of the United States over this period? Answer YES or NO.

a. Bangladesh		d. Iran	
b. India		e. Philippines	
c. Indonesia		f. Thailand	

III. Critical thinking: Write a one-paragraph essay answering *one* question below (your choice). [4 pts]

(1) Consider the following statement. "Long-run economic growth requires that consumption spending increase and stay high." Do you agree or disagree? Justify your answer using the spending allocation model.

(2) Consider the following statement. "If we returned to using gold for money—instead of paper currency and bank deposits—then the quantity equation shows that we would never have inflation or deflation." Do you agree or disagree? Justify your answer.

Please circle the question you are answering and write your answer below. Full credit requires correct economic reasoning, legible writing, good grammar including complete sentences, and accurate spelling.

[end of exam]