**University of California, Davis**

**Econ 101- Intermediate Macroeconomic Theory**

**Summer Session 2, 2013**

**Prof. Ariel Weinberger**

**Midterm**

**August 21st, 2013**

**Please put your name and ID on your scantron**

Please complete the following information:

**Name:**

**Student ID Number:**

You will have 110 minutes to complete this exam. This exam consists of two parts. The first part consists of 20 multiple choice questions worth 50 points. The second part consists of 4 short answer questions worth a total of 75 points.

**PART 1: Multiple Choice (50 points- 2.5 points each)- Please choose the best answer**

1) Hedonic pricing is

A) the tendency for the inflation rate to rise by greater and greater amounts.

B) the process of pricing individual characteristics of a good or service.

C) the tendency for nominal GDP to rise when the price level rises.

D) the process of translating nominal GDP into real GDP.

E) the way that luxury goods are priced in a market economy.

2) A firm's value added equals

A) its revenue minus all of its costs.

B) its revenue minus its wages and profit.

C) its revenue minus its cost of intermediate goods.

D) its revenue minus its wages.

E) none of the above

3) Which of the following tends to occur when the unemployment rate increases?

A) a reduction in the number of discouraged workers

B) a reduction in the labor force participation rate

C) an increase in the number of employed workers

D) all of the above

E) none of the above

Use the information provided below to answer question 4.

Suppose a country using the United States' system of calculating official unemployment statistics has 100 million people, of whom 50 million are working age. Of these 50 million, 20 million have jobs. Of the remainder: 10 million are actively searching for jobs; 10 million would like jobs but are *not* searching; and 10 million do *not* want jobs at all.

4) Refer to the information above. The official unemployment rate is

A) .4.

B) .33.

C) .1.

D) .2.

E) .66.

5) Changes in GDP in the short run are caused primarily by

A) capital accumulation.

B) demand factors.

C) supply factors.

D) technology.

E) all of the above

6) Based on the notation presented in Chapter 2, which of the following expressions represents nominal GDP?

A) PtYt

B) $Yt/Pt

C) Yt

D) Yt/Pt

7) During the mid-1980s, we observed a significant reduction in oil prices. In the United States, we would expect that this reduction in oil prices would cause

A) an equal reduction in the CPI and GDP deflator.

B) no change in the CPI and a reduction in the GDP deflator.

C) a larger reduction in the GDP deflator compared to the CPI.

D) a larger reduction in the CPI compared to the GDP deflator.

8) In the OECD countries, there is a negative relationship between output per capita in 1950 and

A) population.

B) output per capita in the 1990s.

C) distance from the equator.

D) growth since 1950.

E) none of the above

9) Suppose individuals wish to obtain the most accurate comparison of living standards between the Canada and Saudi Arabia. To do so, one would convert Saudi Arabian output into dollars using

A) an average of the last five years' exchange rates.

B) the prior year's real exchange rate.

C) purchasing power parity methods.

D) the current nominal exchange rate.

E) the current real exchange rate.

10) Which of the following will cause a reduction in output per worker in the long run?

A) capital accumulation

B) an increase in the number of workers

C) capital accumulation or technological progress

D) expansionary monetary policy

E) none of the above

11) For this question, assume that a country experiences a permanent increase in its saving rate. Which of the following will occur as a result of this increase in the saving rate?

A) a permanently faster growth rate of output

B) a permanently higher level of output per capita

C) a permanently higher level of capital per worker

D) all of the above

E) both B and C.

12) When using a logarithmic scale to plot output per capita over time, an upward-sloping curve that becomes increasingly steep indicates

A) output per capita is not changing.

B) output per capita is not defined.

C) output per capita is growing by a constant percentage each year.

D) output per capita is growing by an increasing percentage each year.

E) output per capita is growing by a constant amount each year.

13) In the model *without* technological progress, suppose the following situation exists for an economy: Kt+1/N < Kt/N. Given this information, we know that

A) the saving rate fell in period t.

B) saving per worker equals depreciation per worker in period t.

C) saving per worker is less than depreciation per worker in period t.

D) saving per worker is greater than depreciation per worker in period t.

E) none of the above

14) Suppose the saving rate is initially less than the golden rule saving rate. We know with certainty that a reduction in the saving rate will cause

A) a reduction in consumption per worker.

B) a reduction in the capital labor ratio.

C) a reduction in output per worker.

D) all of the above

E) none of the above

Use the following information to answer question 15 below:

 (1) the rate of depreciation is 10% per year,

 (2) the population growth rate is 2% per year, and

 (3) the growth rate of technology is 3% per year.

15) Refer to the information above. Which of the following represents the level of investment needed to maintain constant capital per effective worker (K/NA) in this economy?

A) .03K

B) .15K

C) .10K

D) .02K

E) .05K

16) Assume that an economy experiences both positive population growth and technological progress. In this economy, which of the following is constant when balanced growth is achieved?

A) K

B) NA

C) Y/NA

D) K/N

E) none of the above

17) Suppose the consumption equation is represented by the following: C = 250 + .75YD.

Now assume government spending increases by 100.

Given the above information, we know that equilibrium output will increase by

A) 200.

B) 1000.

C) 800.

D) 400.

E) none of the above

18) Based on our understanding of the paradox of saving, we know that a ***reduction*** in the desire to save in the short Short-run will cause

A) a reduction in GDP.

B) an increase in equilibrium GDP.

C) no change in equilibrium GDP.

D) a permanent reduction in the level of saving.

E) an increase in the desire to invest.

19) The interest rate will increase as a result of which of the following events?

A) a reduction in income

B) an increase in income

C) an open market purchase of bonds by the central bank

D) all of the above

E) none of the above

20) We would expect which of the following to occur when the central bank pursues contractionary monetary policy?

A) an increase in bond prices and an increase in the interest rate (i)

B) a reduction in bond prices and an increase in i

C) a reduction in bond prices and a reduction in i

D) an increase in bond prices and a reduction in i

E) none of the above

**PART 2: Short Answer Questions (4 questions- 75 points)**

1. Solow Growth Model with Technological Progress

Assume that the production function for the economy is given by the general Cobb-Douglas function: $Y= K^{∝}(AN)^{1-∝}$.

For this problem, use the Solow Equation given in lecture:

$$\frac{K\_{t+1}}{A\_{t+1}N\_{t+1}}-\frac{K\_{t}}{A\_{t}N\_{t}}=(\frac{1}{1+g\_{A}+g\_{N}})[\frac{I\_{t}}{A\_{t}N\_{t}}-\frac{(δ+g\_{A}+g\_{N})K\_{t}}{A\_{t}N\_{t}}]$$

1. Rewrite the production function in per effective labor terms. What

Assumption allows you to put production function into per effective labor terms?

1. Use the Solow Equation to solve for the following steady-state variables in terms of $∝$. You must show your work, starting from the Solow equation. (Note: make sure you have no endogenous variables on the right-hand-side of your answers):
2. Steady-state Capital per effective worker
3. Steady-state output per effective worker
4. Steady-state consumption per effective worker
5. Steady-state investment per effective worker
6. What is the golden rule level of the savings rate (in terms of α) that maximizes the steady state level of consumption per effective worker?

Now assume that α = $\frac{1}{4}$ and that the savings rate is 20%.

1. Does the savings rate have to increase or decrease in order to get closer to the golden rule level of capital? Suppose the government imposes policies that get this economy closer to the golden rule level of capital. Illustrate how this affects the economy using a Solow Growth diagram (this should clearly mark the original steady state and the new steady state, plus label all the curves and axis).
2. Illustrate (sketch) the **time path** of output **per effective** worker, assuming that the savings rate is changed at time **t\*** on your diagram.
3. Now, illustrate (sketch) the **time path** of output perworker, assuming that the savings rate is changed at time **t\*** on your diagram.

Finally, use the following parameter values: the depreciation rate is 5%, technology grows at 5% per year, and the population grows at 3% per year.

1. Assume that the savings rate is at the golden rule. Calculate the **value of output per effective** worker ($\frac{Y\_{t}^{\*}}{A\_{t}N\_{t}}$) and the **growth rate of the standard of living.**
2. Lastly, consider two different scenarios: either **(i)** the growth rate of technology doubles;  **or ii)** the growth rate of population doubles. Compare these two scenarios: is output per effective worker smaller, larger, or the same in scenario (i) versus scenario (ii)?

Is the standard of living growing faster, more slowly, or at the same pace in scenario (i) versus scenario (ii)?

1. Solow Growth Model with Population Growth

Graphically illustrate and explain the effects of an increase in population growth (gN) on the Solow growth model with technological progress. In your answer, you must clearly label all curves and the initial and new steady-states on the graph. Clearly state what happens to the level of output per effective worker and capital per effective worker after the increase in the rate of population growth.

In your answer, also explain what happens to the rate of growth of **output** **per worker** as the economy adjusts to this increase in population growth (immediately after the change). What is the growth rate of **output per worker** in the new steady-state?

1. The Money Demand Equation

Based on the quantity theory of money (used to derive the quantity of money equation), use the equation MV=PY to:

1. Derive the Demand equation for Real Money. You can replace the velocity variable with a “liquidity preference” variable and make it a function of the interest rate. What is the relationship between liquidity preference and the interest rate? How does the demand for money move with the interest rate? Explain the intuition behind the relationship of Real Money demand and the interest rate.
2. **Derive the inflation rate** (growth rate of prices) in terms of the growth rate of money and growth rate of real GDP (*Hint: assume that the velocity is constant and use the rule for growth rates that I showed you in class*).
3. Assume that (since there is no technology and population growth) real GDP is *constant.* Evaluate the following statement: “Inflation is always and everywhere a monetary phenomenon.”
4. The Aggregate Demand Equation

Suppose the economy is characterized by the following behavioral equations:

$$C=140+0.75Y\_{D}$$

$$I=150$$

$$G=150$$

$$T=100$$

Solve for the following variables:

1. Equilibrium GDP (Y)
2. Disposable Income ($Y\_{D})$
3. Consumption spending (C)