SECOND MIDTERM – VERSIONS #1&4

No calculators permitted. A total of 130 points are possible.

Last Name: _____________________________ First Name: ____________________________

Your Student ID Number: __ __ __ - __ __ - __ __ __ __

Part A: Multiple Choice Questions
(20 questions, each of which is worth 5 points)

Instructions: Answer these multiple choice questions on your Scantron. Write on the Scantron your name (last name first), student ID number, and exam version number in the “name,” “subject,” “test no.” boxes respectively. For example,

<table>
<thead>
<tr>
<th>NAME</th>
<th>McComb, Madeline</th>
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<tbody>
<tr>
<td>SUBJECT</td>
<td>530-66-6271</td>
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<tr>
<td>TEST NO.</td>
<td>1 or 2</td>
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<tr>
<td>DATE</td>
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</tbody>
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**Warning**

If you first fill in an answer and then erase it to fill in a different one, and the first answer is not fully erased, the Scantron reader may detect two answers and not accept either one. Do not fill in an answer till you are sure this is the one you want to give, or you may not receive credit for the question.
1. Suppose that in initial year income is 200 and the labor supply is 10. Suppose that in the next year income is 214 and the labor supply is 11. What (roughly) is the growth rate of income per person?
A. 7%
B. 10%
C. 3%
D. -3%
E. -6%

2. Four features characterized the European Marriage Pattern. Which of the following is not one of them.
A. Late age of marriage by women.
B. No women married before age 25.
C. Large percent of women never marry.
D. No fertility control within marriage.
E. Very few births outside marriage.

3. Women in which of the following places would NOT display the European Marriage Pattern in 1700?
A. London
B. Paris
C. Milan
D. Moscow
E. Madrid

4. Europe in the 13th century had higher temperatures than usual, so that wine grapes were grown as far north as in England. Given that Europe was still a Malthusian economy what was the expected long run effect on wages of this change?
A. Increase.
B. Stays the same
C. Decrease.
D. Increase if the birth rate goes up.
E. Decrease if the birth rate goes down.
5. For the Western European economies since the Industrial Revolution growth accounting suggests that the **PROXIMATE CAUSE** of growing output per person has been:

A. All efficiency advance  
**B. 2/3 efficiency advance, 1/3 capital accumulation**  
C. ½ efficiency advance, ½ capital accumulation  
D. 1/3 efficiency advance, 2/3 capital accumulation  
E. All capital accumulation

6. Periods of political or military uncertainty were common in early Europe. A measure of the degree this uncertainty influenced investment by private individuals would be

A. What happened to interest rates  
B. What happened to land prices  
**C. What happened to both interest rates and land prices**  
D. What happened to the death rate  
E. None of the above

7. The economy in Europe in 1600-1700 we believe was still a **Malthusian** economy. This was because:

A. A small share of the population lived in cities.  
B. Birth rates were above 30 per thousand.  
C. The technology of the society was not improving.  
**D. The technology of the society was improving only slowly.**  
E. Fertility within marriage was unrestricted.

8. In 1349 the arrival of the Black Death caused death rates in Europe to increase for the next 300 years. The effect of this in the **long run** was:

A. Wages went up, births per 1000 stayed the same, and deaths per 1000 increased.  
B. Wages went up, births and deaths per 1000 both increased.  
**C. Wages went up, births and deaths per 1000 stayed the same.**  
D. Wages, and births and deaths per 1000 all stayed the same.  
E. Wages fell, and births and deaths per 1000 all stayed the same.
9. In which century did real interest rates in England fall from about 10% to 5%.
   A. 1200-99
   B. 1300-99
   C. 1400-99
   D. 1500-99
   E. 1600-99

10. Which of the following factors would we expect to increase interest rates in an economy.
    A. Lower growth of income per person
    B. Greater income inequality
    C. Political Instability
    D. Increased Life Expectancies
    E. Higher levels of incomes

11. In a Malthusian Economy what is the long run effect of a tax on wages to fund wars?
    
    | Birth Rate | Death Rate | Population |
    |------------|------------|------------|
    | A. Same    | Same       | Falls      |
    | B. Same    | Increases  | Falls      |
    | C. Same    | Increases  | Increases  |
    | D. Falls   | Falls      | Increases  |
    | E. Falls   | Same       | Falls      |

12. The number of children born to a women married at age 20 in Northern Europe in the seventeenth century would be:
    A. 2
    B. 4
    C. 6
    D. 8
    E. 12
13. We believe that either capital investment or productivity advances is the basic source of growing income per person since the Industrial Revolution because:

A. There are no other possible sources of income growth per person.
B. Technological advances are generated by investment.
C. Interest rates have fallen from the period before the Industrial Revolution.
D. High income economies have both a lot of capital per person and high productivity levels.
E. There are external benefits from investing in capital.

14. Suppose that in an economy prices are falling at 2%, while the payments to capital, labor and land are all increasing at 3%. The shares of capital, labor and land in national income are not known. The productivity growth rate is

A. -1%
B. 2%
C. 3%
D. 5%
E. not possible to calculate

15. Malthus wrote his “Essay on a Principle of Population” in 1798 because

A. He wanted to demonstrate the importance of good government in explaining human welfare.
B. He wanted to explain why the Industrial Revolution was increasing real incomes.
C. He wanted to explain why human welfare was independent of the actions of government.
D. He was a supporter of the French Revolution of 1789.
E. He was arguing for increased subsidies to poor families by the government.

16. A formal patent system to reward innovation was first introduced in

A. Paris in 1674
B. Venice in 1474
C. England in 1574
D. England in 1689
E. The Netherlands in 1589
17. Which of the following is **NOT** an institutional explanation for slow technological advance before 1760

A. The rulers of these societies sought to maximize their own welfare, not GNP
B. The church suppressed various forms of economic activity
C. Serfdom limited incentives to work and save for much of the population
D. **People had not learned to desire more material consumption and so worked little.**
E. Political instability discouraged investment.

18. We know that the peoples of the America’s were much less technologically advanced than the invading Europeans circa 1500 because

A. Mayan pyramids were very similar to those of the Ancient Egyptians
B. The Aztecs practiced human sacrifice
C. Cortez and a small band of Spaniards were able to conquer the entire Aztec Empire in 1519
D. **There were only about 25 million people in the whole of the Americas in 1492.**
E. The Incas had no written language

19. The best measure of the level of technological advance of economies before 1800 is:

A. **The population density.**
B. The percentage of the population living in cities.
C. Life expectancy.
D. Real wages.
E. The sophistication of the legal system.

20. Suppose that the share of labor and land in national income are together 50%. Suppose also that the rate of the growth of capital per person is the same as the rate of growth of income per person. In that case a 1% increase in the efficiency of the economy will raise output per person by

A. 1%
B. 0.5%
C. **2%**
D. 1.5%
E. 2.5%
Part B: LONG ANSWER (30pts)

(a) We saw that in any competitive economy the rate of growth of output per person is given by

\[
\frac{gQ}{L} = \alpha gK/L + \gamma gT/L + g_A
\]

Show that this implies that in a Malthusian economy the rate of technological advance is thus given by

\[
g_A = \gamma g_L
\]

where \( \gamma \) is the share of land in national income and \( g_L \) is the growth rate of population (20 points)

There were two ways to approach this question:

1.) We know that in a Malthusian economy \( G_{Q/L} \) must equal zero as we can observe no real change in standards of living throughout history (at least before 1800). There is the further implication that if \( G_{Q/L} = 0 \), then \( G_{K/L} \) must also equal zero since we expect the growth of output and the growth of the capital stock to proceed hand-in-hand, so to speak. So when \( G_{Q/L} = G_{K/L} = 0 \), the equation above becomes

\[
0 = \gamma g_{T/L} + g_A = \gamma (g_T - g_L) + g_A = -\gamma g_L + g_A \text{ since the growth rate of land is almost always zero.}
\]

With a tiny bit of algebra, this becomes \( \gamma g_L = g_A \).

2.) Since it was not stated otherwise, we can assume that there are no externalities to capital/investment in the Malthusian economy, meaning

\[
g_{Q/L} = -\frac{\gamma}{1-\alpha} g_L + \frac{1}{1-\alpha} g_A = 0 \text{ since the growth rate of output per person is zero in the Malthusian world.}
\]

Multiplying through by \((1-\alpha)\), we’ll get \(0 = -\gamma g_L + g_A \) or \( g_A = \gamma g_L \).
(b) Suppose that the birth rate is 40 per thousand, while the death rate is 30 per thousand. How fast must the rate of technological advance be to allow incomes to grow if the share of land in national income is one third? (Show your calculations). (10 points)

Given the equation above, all that must be done now is to calculate the growth rate of labor (or equivalently, of population). Since B=40/1000 and D=30/1000, we need to subtract these two from one another to get the increase in population per thousand, i.e. B-D=(40/1000)-(30/1000)=(10/1000)=(1/100)=1%.

You also need to express the equation above now as an inequality. Since we want to know what the rate of technological advance must be to allow income growth, we need to use

\[ g_A > \gamma g_L \text{ because } g_{QL} > 0 \text{ only when } g_A > \gamma g_L. \]

Now, simply plug your values for \( g_L \) and gamma into the equation,

\[ g_A \text{ must be greater than } \left( \frac{1}{3} \right) \times 1\% = \frac{1}{3} \%. \]