ECO2143 Macroeconomic Theory II
2nd mid-term examination: July 15 2014
University of Ottawa
Professor: Louis Hotte
Time allotted: 1h 30min

Attention: *Not all questionnaires are the same. This is questionnaire* **A***. On the answer sheet, you must indicate the letter of your questionnaire with the course's number as follows:* **ECO2143A***. You must answer according to* **the material seen in this course***. Read all answer choices before choosing your answer. Calculator permitted.* GOOD LUCK!

QUESTIONNAIRE A
I. MULTIPLE CHOICE QUESTIONS (2 points each)

1. Suppose that in a country one-third of all females born die in infancy, one-third die at age 30, and one-third live to age 60. Women bear two children before age 30 and one child after age 30. One-half of children are girls. The net rate of reproduction for this country is:
   (a) 0.83
   (b) 1.00
   (c) 1.25
   (d) 1.66
   (e) 2.57

2. Suppose that the returns to education are 13.4% for the first four years of schooling (grades 1-4), 10.1% per year for the next four years (grades 5-8), and 6.8% per year for education beyond eight years. What fraction of wages is due to human capital for a worker who has 9 years of schooling?
   (a) 0%
   (b) 28%
   (c) 33.3%
   (d) 52%
   (e) 61.5%

3. Suppose that in a country, one quarter of the population has 9 years of schooling and three quarters has 14 years. What is the share of the country's total income - i.e., its GDP - can be attributed to education? Answer this question using the data on returns to education provided in question 2. Assume that the share of physical capital in total income is 1/3.
   (a) 26.3%
   (b) 33.3%
   (c) 46.7%
   (d) 66.6%
   (e) 70.0%

4. Which of the following best describes the relationship between health and income?
    (a) Better health leads to higher income.
    (b) There is no causal relationship between health and income.
    (c) Higher income leads to better health.
    (d) Better health leads to higher income *and* higher income leads to better health.
    (e) There is no correlation between health and income.

5. When it comes to explain overall income *level* differences between countries of the world in terms of factor accumulation versus productivity, observations suggests that the differences can be explained
    (a) almost completely by differences in factor accumulation.
    (b) almost completely by differences in productivity.
    (c) about equally by differences in factor accumulation and productivity.
    (d) None of the above is anywhere close to the observations.

6. When it comes to explain overall income *growth* differences between countries of the world in terms of factor accumulation versus productivity, observations suggests that the differences can be explained
    (a) almost completely by differences in factor accumulation.
    (b) almost completely by differences in productivity.
    (c) by both factor accumulation and productivity, but productivity plays a significantly more important role.
    (d) None of the above is anywhere close to the observations.

7. When it comes to measure the importance of human capital in explaining income levels in the world today, which of the following statement is generally FALSE?
    (a) In less-developed countries, human capital plays a much less important role than physical capital.
    (b) In less-developed countries, human capital plays a more important role than physical capital.
    (c) In developed countries, human capital plays a more important role than physical capital.
    (d) Human capital plays a more important role in developed countries than in less-developed countries.

8. According to historical observations,
   (a) nutrition cannot be an important factor in explaining income differences between countries because even though there exists large differences in nutrition levels, nutrition does not have a significant impact on people's capacity to produce.
   (b) nutrition cannot be an important factor in explaining income differences between countries because nutrition levels are roughly the same across the world.
   (c) the role of nutrition in explaining economic growth in the UK since 1780 does not appear to be significant.
   (d) better nutrition plays an important role in explaining income levels because not only can workers work better, but it also allows the previously worst fed people to work when they were too weak to work before.
   (e) the impact of better nutrition is mostly due to the fact that it allows the previously worst fed people to work when they were too weak to work before, but it does not have an important impact on those who already work.

9. Which of the following statement is clearly FALSE?
   (a) One reason why governments subsidize education is because it is suspected to generate positive externalities.
   (b) Using "number of years of education" as a measure of human capital differences between countries tends to understate the true differences between poor and rich countries when one considers that quality of education differs also.
   (c) Between countries of the world today, there is a negative correlation between GDP per capita and average years of schooling.
   (d) According to one study, improved nutrition appears to be an important determinant of economic growth in the UK over the past 200 years.
   (e) Introducing human capital into the Solow model significantly improves the model's ability to predict income-level differences between countries of the world today.

10. Which of the following is TRUE?
   (a) According to the Malthusian model of population and economic growth, a technological improvement leads to higher standards of living in the long run.
   (b) The Malthusian model of population and economic growth is useful to explain increases in standards of living in the industrialized world over the last 200 years.
   (c) A drop in the mortality rate can lead to lower fertility through the effect of increased incentives to invest in a child's education.
   (d) A drop in the mortality rate is known to always lead to higher population growth in the long run.
   (e) Better access to contraceptives is the leading explanation for lower population growth in today's developed world.

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II. PROBLEM

Answer within the space provided. Your answers must be accompanied with clear explanations. Graphs and equations without explanations will not get you far.

1. Productivity versus factor accumulation (30 points) Suppose that the national output level of a country is given by the following expression $Y = AK^{\alpha}(hL)^{1-\alpha}$, where the variables are as defined in class and $\alpha = 1/3$. The following table provides the values of each variable in per worker terms for the year 2010.

Country	Year	y	k	h
X	2010	1200	25	45
Z	2010	600	50	15

a) Development accounting (15 points) With the help of the development accounting method, explain why country X is twice as rich as country Z in 2010 by comparing the relative contributions of productivities and factors of production. Explain your steps briefly but clearly.

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b) Growth accounting (15 points) We also have the following data for the same countries X and Z for the year 1960. For each country, calculate the average yearly growth rates of income per worker, physical capital and human capital stocks per worker in the 50 years between 1960 and 2010. Calculate the average yearly productivity growths for each country and use your results to compare the determinants of economic growth in the two countries.

Country	Year	y	k	h
X	1960	100	2	3
Z	1960	50	4	1

2. Health as human capital (10 points) Assume that there is a two-way causality that links health to income. Suppose further that the discovery of a new vaccine allows people to attain higher health levels for given income levels. With the help of a graphic, analyse the effect of the vaccine's discovery on equilibrium income and health levels. Explain briefly but clearly.