ECO2143 Macroeconomic Theory II First mid-term examination: January 28 2013 University of Ottawa Professor: Louis Hotte Time allotted: 1h 20min

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. GOOD LUCK!

## QUESTIONNAIRE A I. MULTIPLE CHOICE QUESTIONS (4 points each)

- 1. Suppose that output per worker is given by  $y_t = k_t^{\alpha}$ , where  $k_t$  is the capital stock per worker at year t and  $\alpha = 1/2$ . Workers invest 20% of their income. The capital stock depreciates at the rate of 5% per year. The size of the capital stock per worker at year t = 0 is  $k_0 = 4$ . According to the Solow model, what is the predicted growth rate of <u>output per worker</u> between years 0 and 1. (Assume zero population growth.)
  - (a) 0%
  - (b) 1.5%
  - (c) 2.5% ✓
  - (d) 5.0%
  - (e) 6.3%
- 2. Given the data provided in question 1, what is the predicted steady-state size of the <u>capital stock</u> per worker over the very long run?
  - (a) 0
  - (b) 4
  - (c) 16 ✓
  - (d) 25
  - (e) The Solow model does not allow for a steady-state capital stock size.
- 3. Regarding consumption per worker, the Solow model predicts that an increase in the investment rate will unambiguously
  - (a) increase the steady-state level of consumption per worker.
  - (b) reduce the steady-state level of consumption per worker.
  - (c) have no impact on the steady-state level of consumption per worker.
  - (d) increase the steady-state growth of consumption per worker.
  - (e) have no impact on the steady-state growth of consumption per worker.  $\checkmark$

4. Muhamar and Margaret are the only two citizens living in country A. Nicolas and Angela are the only two citizens in country B. Their respective PPP adjusted incomes in years 1980 and 2000 are given by the following table:

Person	Country	1980	2000
Muhamar	А	3000	30000
Margaret	А	6000	60 000
Nicolas	В	1000	3000
Angela	В	2000	6000

Suppose that income inequality between <u>all</u> the citizens of the world is measured by the ratio of the average income of the richest 50% to the average income of the poorest 50%, regardless of the country where they live. The numbers in the above table indicate that between 1980 and 2000,

- (a) world inequalities have increased mainly because of an increase in inequalities between countries.  $\checkmark$
- (b) world inequalities have increased mainly because of an increase in inequalities within countries.
- (c) world inequalities have decreased mainly because of a decrease in inequalities between countries.
- (d) world inequalities have decreased mainly because of a decrease in inequalities within countries.
- (e) world inequalities have remained the same.

5. Which of the following is generally <u>false</u>?

- (a) Instead of using the market exchange rate, the use of an exchange rate adjusted for purchasing power parity to compare income levels tends to make poor countries look better off.
- (b) Instead of using the market exchange rate, the use of an exchange rate adjusted for purchasing power parity to compare income levels tends to make rich countries look even richer.  $\checkmark$
- (c) The use of an exchange rate adjusted for purchasing power parity accounts for the fact that non-tradable goods and services are cheaper in poorer countries.
- (d) The market exchange rate tends to be determined by the law of one price for tradable goods.
- 6. Between 1970 and 2005, China's GDP per capita grew at an average rate of 7.3% per year while in the US, it grew at an average 2.2% per year. In 2005, US GDP per capita was \$36 806 and Chinese GDP per capita was \$5 955. Assuming that the two countries will continue to grow at the same rates, in what year will China overtake the US in terms of GDP per capita?
  - (a) 2020
  - (b) 2031
  - (c) 2042√
  - (d) 2053
  - (e) 2064

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- 7. Over the past 130 years, the average yearly growth rate of income per capita in Canada and the USA has been approximately (give the closest value)
  - (a) -1%
  - (b) 0%
  - (c)  $2\%\checkmark$
  - (d) 5%
  - (e) 8%
- 8. According to estimates, throughout human history up to year 1500, the yearly growth of income per capita has been approximately (give the closest value)
  - (a) -1%
  - (b) 0%√
  - (c) 2%
  - (d) 5%
  - (e) 8%
- 9. Which of the following statement is generally true? (Answer according to the material seen in this course.)
  - (a) According to the evidence, the *Development Trap* argument is generally accepted as a good depiction of reality.
  - (b) According to the *Development Trap* argument, whether they start out rich or poor, all countries are bound to become equally poor.
  - (c) Development aid has been shown to be quite effective over the long run.
  - (d) Development aid is especially effective in countries that do bad in terms of their governance indicators.
  - (e) The Development Trap argument has been used by some to justify major increases in development aid.  $\checkmark$
- 10. Which of the following statement is clearly <u>false</u>?
  - (a) Life expectancy in many developing countries has gone up quite significantly over the 20th century.
  - (b) Over the past 10 years or so, many African countries have experienced high growth rates.
  - (c) The Human development Index is correlated with per capita income levels.
  - (d) Over the last 200 years or so, inequalities between citizens of the world have increased.
  - (e) Throughout human history, there has always been very large per capita income inequalities between countries of the world.  $\checkmark$

#### NAME AND ID:

## II. PROBLEM

You must answer the following questions strictly within the space provided. Your answers must be accompanied with clear explanations. Graphs and equations without explanations will not get you far.

The Solow model (60 points) Suppose that output per worker is given by  $y_t = k_t^{\alpha}$  and that investment and depreciation rates are respectively given by  $\gamma$  and  $\delta$ . (Recall that the marginal product of capital is equal to  $\alpha k_t^{\alpha-1}$ .)

a) (25 points) Suppose that you wanted to test the validity of the Solow model's predictions. To this end, your first task is to estimate the value of  $\alpha$ . Explain how you would proceed with a complete mathematical demonstration of the data required and some underlying assumptions.



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b) (25 points) With the help of a graphic, explain why the growth rate of capital per worker is larger the farther away it is from its steady state value.



# NAME:

c) (10 points) Given your result in part b) above, comment on the following assertion by a famous expert in world affairs: "Given the much larger growth rates that China has experienced over the past 30 years, it is safe to say that the standard of living of the Chinese citizens will far exceed that of the USA citizens by the end of the century."

