ECO2143 Macroeconomic Theory II
Second mid-term examination: March 8, 2010
University of Ottawa
Professor: Louis Hotte
Time allotted: 1h 20min; Calculator allowed

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. Which of the following assertions is clearly NOT true.
   (a) A coppersmith's apprentice's knowledge of different styles and techniques is an example of *tacit knowledge.*
   (b) It's always best for a country to try to be the *technological leader.*
   (c) The finding of a new medical drug that eliminates the need for older, less effective drugs, is an example of *creative destruction.*
   (d) The *size of the market* is an important determinant of R&D efforts.

2. Which of the following is generally TRUE.
   (a) The duration of a patent's validity is an important determinant of R&D efforts.
   (b) If Country A has a lower level of factor accumulation than Country B but Country B has higher output, then Country B has higher TFP.
   (c) Development accounting is used to figure out changes in the growth rate of income.
   (d) The high growth experiences of Hong Kong and Singapore between the 1960 and 1990s are both explained by similarly high productivity growth.

3. The relative productivity levels of countries can be estimated
   (a) directly by observing worker productivity levels.
   (b) indirectly by comparing relative output levels to relative factor input levels.
   (c) by simply comparing relative education levels.
   (d) by simply comparing the relative health of workers.
   (e) It is impossible to compare productivity levels between countries.

4. Assume that the economy can be represented by the Solow model with the following output function $Y = K^\alpha(eL)^{1-\alpha}$, where each variable is defined as seen in class. Suppose the investment rate is $\gamma = 10\%$, the depreciation rate is $\delta = 5\%$, the growth of the labor force size is $n = 2\%$ per year and the rate of technological progress is $\hat{e} = 3\%$ per year. What will be the long-run, steady-state growth rate of *output per worker*?
   (a) 0%
   (b) 10%
   (c) 5%
   (d) 3%
   (e) 2%

5. Using the information from question (4), what will be the long-run, steady-state growth rate of *aggregate output*?
   (a) 0%
   (b) 10%
   (c) 5%
   (d) 3%
   (e) 2%

6. Sustained economic growth in Canada over the past 200 years is mostly attributed to
   (a) technological progress.
   (b) its large endowment in natural resources.
   (c) accumulation of physical capital.
   (d) education of the workforce.
   (e) global warming.

7. In order to increase LABOR productivity in Canada, it is ABSOLUTELY NECESSARY that
   (a) workers work harder and more hours.
   (b) workers use more physical capital.
   (c) workers use more human capital.
   (d) unions be banished.
   (e) None of the above.

8. Suppose that in a country one-quarter of all females born die in infancy, one-quarter die at age 30, and one-half live to age 60. Women bear one child at age 25, one child at age 28, one child at age 32, and one child at age 35. One-half of children are girls. The net rate of reproduction for this country is:
   (a) 0.75
   (b) 1
   (c) 1.25
   (d) 1.5
   (e) 2.5

9. 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 11 years of education?
   (a) 0%
   (b) 28%
   (c) 33%
   (d) 52%
   (e) 66%

10. Which of the following is clearly FALSE?
   (a) In the past 200 years or so in the UK, it has been estimated that better nutrition accounts for a significant share of overall growth in income.
   (b) In developed economies, payments to education explain a much lower share of total national income than payments to physical capital.
   (c) Between countries of the world today, GDP per capita is a poor predictor of life expectancy at birth as there is little correlation between the two.
   (d) In a country like Canada, the most important part of the costs of education takes the form of the opportunity cost of students' time.

II. PROBLEMS

1.(40 points) You are given the following observations for Canada and South Korea concerning per capita output, physical capital and human capital (all relative to the USA values). You assume that the output per capita is given by the following relation:

$$y = Ak^{\alpha}h^{1-\alpha},$$

where $\alpha = 1/3$ and A denotes total factor productivity (TFP).

	y	k	h
Canada	0.75	0.86	1.01
South Korea	0.54	0.73	0.93

a) Calculate the ratio of TFP between Canada and South Korea.
b) Calculate what is the most important cause of South Korea's lower income: factor accumulation or productivity? Discuss briefly.

2. (20 points) You are given the following data for Hong Kong and Singapore concerning per capita output, physical capital and human capital in 1960 and 1996. You assume that the output per capita is given by the following relation:

$$y = Ak^{\alpha}h^{1-\alpha},$$

where $\alpha = 1/3$ and A denotes total factor productivity (TFP).

	Year	y	k	h
Hong Kong	1960	2,000	1	1
	1996	16,000	4	4
Singapore	1960	2,000	1	1
	1996	16,000	8	8

a) For each country, calculate the average yearly growth rates of income per worker, physical capital and human capital stocks per worker in the 36 years between 1960 and 1996.
b) Using growth accounting, calculate average yearly TFP growth in each country.
c) Compare your results for each country and discuss some implications.