Sample Midterm Exam[1]

I. Choose the **3 out of 4** of the following pairs of concepts. For each pair, explain the concepts briefly and discuss the connection between the two concepts.

a. factor accumulation vs. productivity gains

b. capital widening vs. capital deepening

c. Neoclassical growth model vs. endogenous growth model

d. Lorenz curve vs. Kuznets curve

II. (True, False, or Uncertain – Make sure to justify your answers by explaining your logics, giving examples, or using graphical illustrations.

1. Population growth is always harmful to economic development.
2. Economic growth will improve health outcomes of the population.

III. Growth Accounting

Suppose that the *annual percentage rates of change* in total output, total employment, and the contributions to output per worker of physical and human capital in a hypothetical country during two time periods are given in the following table.

[Note: All the numbers in the tables are in percentage terms.]

Time Periods	Total Output	Employment	Contribution to Output Per Worker of	
			Physical Capital	Human Capital
1960-1969	8.4	2.0	3.2	2.2
1970-1979	9.7	2.2	3.6	2.4

a. *(10 points*) For each time period, calculate the followings:

(i) the growth rate of output per worker,

[1] These are sample exam questions only. On the real exam, there might be more or fewer questions.

(ii) the growth rate of total factor productivity (TFP)

(iii) the growth rate of physical capital and the growth rate of human capital, given that the share of physical capital is 0.4 in both periods, and

(iv) the contribution of factor accumulation to the output growth (i.e. what percentage of output growth?).

b. *(5 points*) According to the results above, discuss the changes in the output growth during the two periods. How do the sources of growth change over time?

III. Growth Models

Consider a country in which the national output is described by the aggregate production function:

$$Y = F(K, L) = 50K^{2/3}L^{1/3}$$

where *Y* is the total income, *K* is the total capital, and *L* is the total number of workers in the economy.

Suppose that capital accumulation is characterized by:

$$\Delta K = sY - dK$$

where s is the saving rate, d is the depreciation rate of capital.

a. Suppose that the saving rate is 0.3, population growth (*n*) is 0.01, and the depreciate rate (*d*) is 0.02. Determine the steady-state level of *capital per worker* (*k*), where *k* = *K/L*. What are the growth rate of per capita income ($\Delta y/y$) and the growth rate of total income ($\Delta Y/Y$) in the economy in the long run?

b. Discuss the augmented Solow model in Mankiw, Romer, and Weil's (1992) paper. What is the main difference between the "Textbook" Solow model and the "Mankiw-Romer-Weil" Solow model? Based on the empirical evidence in this paper, is there convergence in per capita income across countries? Discuss briefly.

IV. Poverty and Inequality

a. Suppose that the proportions of population living on different levels of consumption in a country are given in the following table.

Consumption Level ($/day)	0.4	0.5	1	1.2	1.5
% of Total Population	10	40	20	10	20

If the poverty line is at $1.25 per day, calculate the headcount index and the poverty gap index. Interpret these two indices.

b. Consider the Lorenz curves of three countries (A, B, and C) in the following figure. What can be concluded about the levels of inequality in these countries?