1. Suppose, the production function of a Solovian economy is; $Y(t) = K(t)^{\alpha}(A(t)N(t))^{1-\alpha}$; $\alpha = 0.5$. Here, $K(t)$ is capital stock at time t; $A(t)$ is the technology level at time, t; and $N(t)$ is the population of the economy at time t. $Y(t)$ is the output of the economy at time, t. Household saves 60% of her income. Rate of growth of population and technology of the economy is 1% and 2% respectively. The depreciation rate of capital stock of the economy is, 2%. (20)

   a) Write down the fundamental equation of the economy in terms of effective capital stock, when the effective capital stock is defined as, $\hat{k}(t) = \frac{K(t)}{A(t)N(t)} = \frac{k(t)}{A(t)}$. (5)

   b) Calculate, the long-run/steady state effective capital stock, and effective output. (2+2=4)

   c) Calculate the long-run/steady state growth rate of percapita output $\left(y(t) = \frac{Y(t)}{N(t)}\right)$, and output $(Y(t))$. (1.5+1.5=3)

   d) Suppose, savings rate of the economy rises from 60% to 80%. Calculate, the new long-run/ steady state effective capital stock, and effective output. (2+2=4)

   e) Calculate the new long-run/steady state rate of rate of percapita output $(y(t))$, and output $(Y(t))$. (1+1=2)

   f) Is there any change in the long-run/steady state growth rate of percapita output, and output found in part c) and part e) above? Intuitively explain. (2)

2. Suppose, the production function of a Solovian economy is, $Y(t) = K(t)^{\alpha}N(t)^{1-\alpha}$; $\alpha = 0.5$. Here, $K(t)$ is capital stock at time t; and $N(t)$ is the population of the economy at time t. $Y(t)$ is the output of the economy at time, t. Government taxes, $\tau = 20\%$ of both percapita labour income and capital income, and throws the tax revenue to the ocean. Household saves 75% of her disposable income. Rate of growth of population of the economy is, 2%, and the depreciation rate of capital stock is, 3%. (10)