ECO 305: Intermediate Macroeconomics **Name:** _____
Week 3 Homework: Socially Optimal One-Period Model

Directions: Answer the questions below using the social planner's problem (mathematically equivalent to a one-period general equilibrium model with no frictions or distorting taxes).

When you have finished, scan or take pictures of your work, combine all images to a single PDF file, and upload your work as a single PDF file to the Canvas Assignment area. There are apps available for Apple and Android mobile devices that can create PDF documents using your device's camera, including the Apple iPhone's native *Notes* app (use the *scan document* feature) and *Adobe Scan* app available for Android and Apple mobile devices. There are also free online tools such as https://online2pdf.com/ and https://www.easypdfcloud.com/.

1. Suppose an improvement in artificial intelligence technology can be productively employed by workers, leading to higher average worker productivity. Describe and illustrate the equilibrium effects in the one-period socially optimal general equilibrium model. Describe and illustrate the impact on consumption, real GDP, leisure, employment, and consumer welfare (i.e. utility).

2. Suppose deterioration of capital stock makes labor and capital less productive. Describe and illustrate the equilibrium effects in the one-period socially optimal general equilibrium model. Describe and illustrate the impact on consumption, real GDP, leisure, employment, and consumer welfare (i.e. utility).

3. Suppose the government increases its expenditure on public goods. Describe and illustrate the equilibrium effects in the one-period socially optimal general equilibrium model. Describe and illustrate the impact on consumption, real GDP, leisure, employment, and consumer welfare (i.e. utility).

4. Consider the analysis in problem #3 to the benefits of providing public goods, the costs of providing public goods, or both. Comment on whether you think a cut to public goods expenditure is good or bad policy. Use the model outcomes and shortcomings of the model to describe your answer.