• You must submit your solutions using this template.

• Although you may work in groups, each student must submit individual sets of solutions. You must note the names other students that you worked with. Write their names here:
1. Essay

Read the following recent Washington Post article on the response to the pandemic in developing countries. Write a short essay [the essay has to fit in the page below] on the extra difficulties (relative to richer countries) of fighting the pandemic and alleviating the resulting economic hardship in developing countries relative to richer countries. In light of this, should developing countries follow different policies than richer countries?

Washington Post link:

https://eml.berkeley.edu/~saez/course131/coronadevo.pdf
2. True/False Statements

Determine whether each statement is true, false, or uncertain and explain why. Answers with no explanation will receive no points.

(a) Suppose that candidates X and Z run for president. Candidate X is elected president after winning 51% of the vote. Then once in office, he appoints more conservative members to the Supreme Court than candidate Z would have. This means that a majority of American voters preferred more conservative Supreme Court members. (Assume that everyone is fully informed about the candidates plans and the President does not need Senate approval to appoint Supreme Court members.)

(b) There is no reason for the government to impose social distancing to fight the epidemic because private agents can create markets to price the corresponding externality.
(c) As CO2 emissions create a classic externality, the only policy needed to solve the problem is a tax on carbon that would apply in all countries at the same rate and set equal to the marginal damage created by CO2 emissions.

(d) The returns of education accrue primarily to the person receiving the education and hence the government should not be heavily involved in the provision of education.

(e) According to the Tiebout model, local public good provision is efficient and tailored to the tastes of local residents. Hence, it is better to have a fully decentralized government.
3. Externalities

US drivers consume millions of gallons of gas every daily, and with every gallon consumed harmful emissions are released into the atmosphere. The aggregate demand function for gasoline is given by $P = 5 - 4Q^D$, where $Q$ is the quantity of gallons of gas per day in billions and $P$ reflects the price per gallon in dollars. The aggregate supply function is given by $P = 2 + 2Q^S$.

IMF economists have estimated a substantial external marginal damage of gas consumption, which we’ll round to $1.2$ per gallon.

(a) Solve for the equilibrium private market price and quantity that will be generated without any government intervention.

(b) What is the socially optimal demand function taking into account externalities?

(c) Solve for the socially optimal equilibrium price and quantity.
(d) Graph the market for US gasoline with a supply/demand graph. Be sure to label 8 things: PMC, SMC, PMB, SMB curves, the Marginal Damage, the DWL, the private market equilibrium and the socially optimal equilibrium. (Also pay attention to the slopes – they certainly don’t need to be exact, but try to consider who is the more elastic/inelastic side of the market.)

(e) Calculate the dead-weight loss from the externality.

(f) If the government uses a gas tax to address this externality, what is the optimal tax to offset the externality?
(g) Calculate the revenue that would be raised by this tax.

(h) Will there be deadweight loss associated with this tax? If yes, how much? If no, why not?

(i) What are the distributional consequences of the gas tax, is it a regressive, progressive or neutral tax?
4. Public Goods

Arlen and Michael are the two GSIs for Econ 131. After eating, sleeping, socializing and doing research both of them have 42 hours a week to devote to Econ 131 related activities. There are two course related activities: Preparing their own sections ($P_i$) and Grading ($G_i$). Arlen’s utility over the time spent preparing his own sections and the time spent grading is given by $U_A = 2 \ln P_A + \ln G$ while Michael’s utility over the time spent preparing his own sections and the time spent grading is by $U_M = 2 \ln P_M + 2 \ln G$, where $G$ is the total amount of time spent by both on grading, given by the sum of each individual’s contribution: $G = G_A + G_M$. For this problem we are assuming that both Arlen and Michael benefit from the increases in the total amount of time they both spend on grading $G$ but they don’t derive utility from the time the other spends preparing his own sections.

(a) Write down Arlen’s utility maximization problem.

(b) Find Arlen’s optimal number of hours devoted to grading ($G_A$) as a function of the time on the same task spent by Michael ($G_M$).

(c) Now, write down Michael’s utility maximization problem.
(d) Find Michael’s optimal number of hours devoted to grading \((G_M)\) as a function of the time on the same task spent by Arlen \((G_A)\).

(e) Use the response functions found in (b) and (d) to find the amount of time Michael and Arlen spend on grading and on the preparation of their own sections if they optimize their own functions.
(f) From a utilitarian perspective (maximizing aggregate utility), what is the socially optimal amount of time they should spend on each task?
(g) Is the answer for (f) different than (e)? If so, why? If not, why not?