

Do any **6** of the following **9** questions.

1. In a one-consumer economy, what is the optimality condition for the provision of a single pure public good, when the cost of this pure public good must be financed by a tax on tobacco consumption?

2. A group of economists is contemplating whether or not to buy a software package, which they would then share. They know the cost of the package, and each economist knows his or her own benefit ( in dollars ) from having the package available. Provide a mechanism which would induce each economist to state honestly his or her benefits from the software package.

3. Suppose that a group of people must choose directly the level of provision of several public goods, using pairwise majority rule. The cost of these public goods will be paid by a head tax. People's preferences over public and private goods are well-behaved, i.e. monotonic and quasi-concave. Is pairwise majority rule likely to provide a policy which can defeat any other? Explain.

4. If the set of possible government policies is one-dimensional, explain why the median of the voters' preferred policies is likely to be implemented when voters must choose between two political parties, and the parties each care only about getting elected.

5. Derive an expression for the **change** in the deadweight loss from a system of unit commodity taxes  $t_1, t_2, \dots, t_N$  arising from an increase in the tax rate  $t_1$  on consumption of good 1.

6. Suppose that the economy consists of a single consumer, whose utility function is

$$U(L, x_1, x_2) \equiv L + f(x_1) + g(x_2)$$

where  $L$  is leisure consumption,  $x_1$  and  $x_2$  are consumption of two taxable goods, and  $f(\cdot)$  and  $g(\cdot)$  are both increasing, concave functions.

If the government must raise tax revenue from commodity taxes on goods 1 and 2, what are the optimal commodity tax rates?

7. Suppose that the economy consists of a number of people, each with the same constant-elasticity-of-substitution utility function

$$U(L, x_1, \dots, x_N) = L^\alpha + x_1^\alpha + \dots + x_N^\alpha$$

where  $L$  is hours of leisure, and  $x_i$  is consumption of taxable commodity  $i$ . People vary in the wage  $w^h$  which they can earn per hour of work.

What can be said about the optimal commodity tax system, when the government can levy ( ad valorem ) commodity taxes on goods 1 through  $N$ , and a head tax ( or subsidy )?

8. What can be said about the marginal income tax rate at the very top of the income distribution, if the income tax is set optimally? Explain briefly.

9. Explain the efficiency of using user fees to pay for the local public sector. What are the crucial assumptions necessary for this result?