Answer each of the following equally-weighted questions.

1) Using a pure exchange model with two goods and two consumers, explain how voluntary trading results in an (exchange) efficient allocation of resources. In your answer be sure to include technical conditions and explanations of the relevant tools and/or diagrams.

2) Explain and demonstrate the derivation of the production possibility frontier.

3) There are three consumers I, II and III. Consumer I is willing to pay (has a MRS of flowers for dollars of) 24-9F dollars for a unit of flowers for the public square, II is willing to pay 6-9F dollars for a unit of flowers, and III is willing to pay 27-9F for a unit of flowers, where F is the number of flowers consumed.
   a) What is the social willingness to pay, or demand, for flowers? (Your answer should be an equation or function of F.)
   b) How, and why, does the demand curve for a public good differ from that for a private good?
   c) If the cost of flowers is constant at $3 per unit what is the pareto optimal quantity of flowers to put in the square?

4) The demand schedule for widgets is P=265-25Q where P is the price and Q is the quantity. The supply (marginal cost) schedule of the firm which produces widgets is MC = 25+35Q, and each unit of widgets produced causes $60Q additional damage to the environment, that is MD=60Q.
   a) What output is produced in the absence of any attempts to reduce pollution?
   b) What is the efficient level of output?
   c) If the firm has the property rights to the environment how much would the injured parties be willing to pay the firm to bribe it not to produce the last unit sold? How much must the firm receive from the injured parties to decide against producing the last unit sold?
   d) If the government were to impose a (Pigouvian) tax on this firm what size should the tax be, and how much revenue would be raised?