

Exam I
(100 points)

- (15 pts) 1. When a town selects among available water policies on the basis of whether community net benefits are positive, it is said to be using a hypothetical compensation test. Explain what this means and why the term is fitting.
- (15 pts) 2. Define the overdiscounting market failure, and as you do so, define this crucial concept and its presumed effect(s). No graphs please. If you had to recommend a general corrective policy to offset this problem, what would it be?
- (18 pts) 3. The layperson's concept of "water need" conflicts with the economic concept of "water demand". Explain the economic concept and what it embodies. Contrast this to the less functional concept of "need" by identifying two differences and why or how both can be important.
- (20 pts) 4. Riverside City has been addressing its projected growth by purchasing surface water rights from irrigators. For many years this strategy has been quite satisfactory, but a recent spike in water right prices has the city examining other options. As ground water law is less restrictive than surface water law in the province, Riverside is legally allowed to drill wells within city limits even though such wells would be relatively close to the river. What is your technical assessment of this situation, and how might you advise the city?
- (32 pts) 5. In an irrigation-intensive region of a developing nation, ground water from a single aquifer is the only available water. It is estimated that 100 units of water are available for the next 20 years. All wells are completed and have no further expenses. All pumping is done using electricity, and 100% of electricity costs for pumping is subsidized by the national government, rationalized by the desire to generate agricultural exports and to support the incomes of the many small landholders.

Regional water demand for water for the first decade is $w_1 = 60 - p$ and for the second decade it is $w_2 = 64 - p$. Given the policy conditions of no energy costs, we may assume that $mc=0$ for both periods. The period-to-period (decadal) discount rate is 50%.

- a. Use an accurate graphical model to explain this situation. Develop and explain accurate numerical findings about the outcomes you expect from regional pumping behavior. Develop and explain accurate findings about the pumping behavior that you would advise.
- b. Use your model again to qualitatively indicate the impact of the electricity subsidy on actual behavior. From a water use perspective, how well is the subsidy serving society?