

Name: \_\_\_\_\_

CVEN 664 – Water Resources Planning and Management  
Fall Semester 2008  
Dr. Kelly Brumbelow, Texas A&M University

Midterm Exam #1

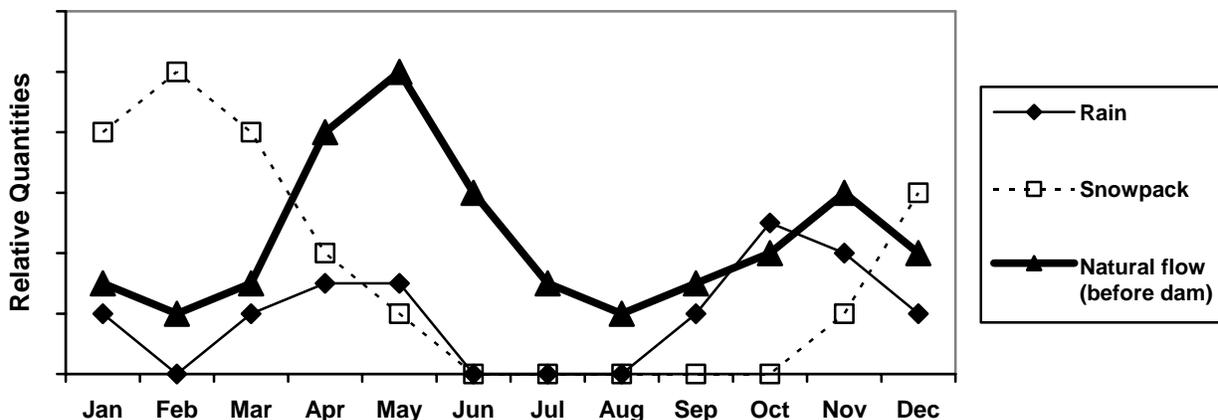
**Open-book, Open-notes (2 pages, 5 questions); Time allowed: 60 minutes**  
**Attach additional sheets as necessary with your answers.**

1. A dam and reservoir has been authorized to operate for the following water resources objectives in priority order:

1. M&I water supply
2. Irrigation water supply
3. Flood control
4. Instream flows for riverine ecology
5. Hydropower

The urban areas that receive water from the reservoir have a combined population of 3 million people. The agricultural region receiving irrigation water is semi-arid and has an average harvest value of \$300 million per year. If the reservoir's dam were to release water at its maximum possible flowrate, it is estimated that the resultant flood damages would be about \$200 million. Annual hydropower production from the dam has a value of approximately \$25 million, and most of that results from secondary energy generation.

The climate of the region is described by the graph below. Winter brings significant snow that melts in the Spring causing high natural streamflows. Summer is quite dry. Autumn does have some rainfall. The agricultural growing season starts with planting in May and ends with harvest in September.



Riverine ecology below the dam has been severely affected by changed streamflows from the dam compared to natural flows. While no endangered or threatened species are known below the dam, there is widespread public support for improving the riverine environment.

- (i) *Draw a complete set of rule curves that would be appropriate for this reservoir.*
- (ii) *Explain how you formulated the curves, and justify your formulation.*
- (iii) *Discuss typical reservoir operations and regional water management practices that would be applied when the reservoir water level is in each storage pool. (50 points)*

The following 4 questions address the Georgia HB 1281 case study. If you wish, you may answer with a single essay that includes *all* of the questions. (50 points)

2. Describe the MODELS of local drought management by water utilities before passage of HB 1281 used by two OBSERVERS: (i) Georgia's "Urban Agriculture" or "Green" Industry and (ii) typical local government officials.
3. Describe the MODELS used by these two observers after passage of HB 1281.
4. Discuss any "principle of indifference" violations present in these sets of MODELS.
5. Discuss potential SYSTEM and/or MODEL changes to resolve any principle of indifference violations.