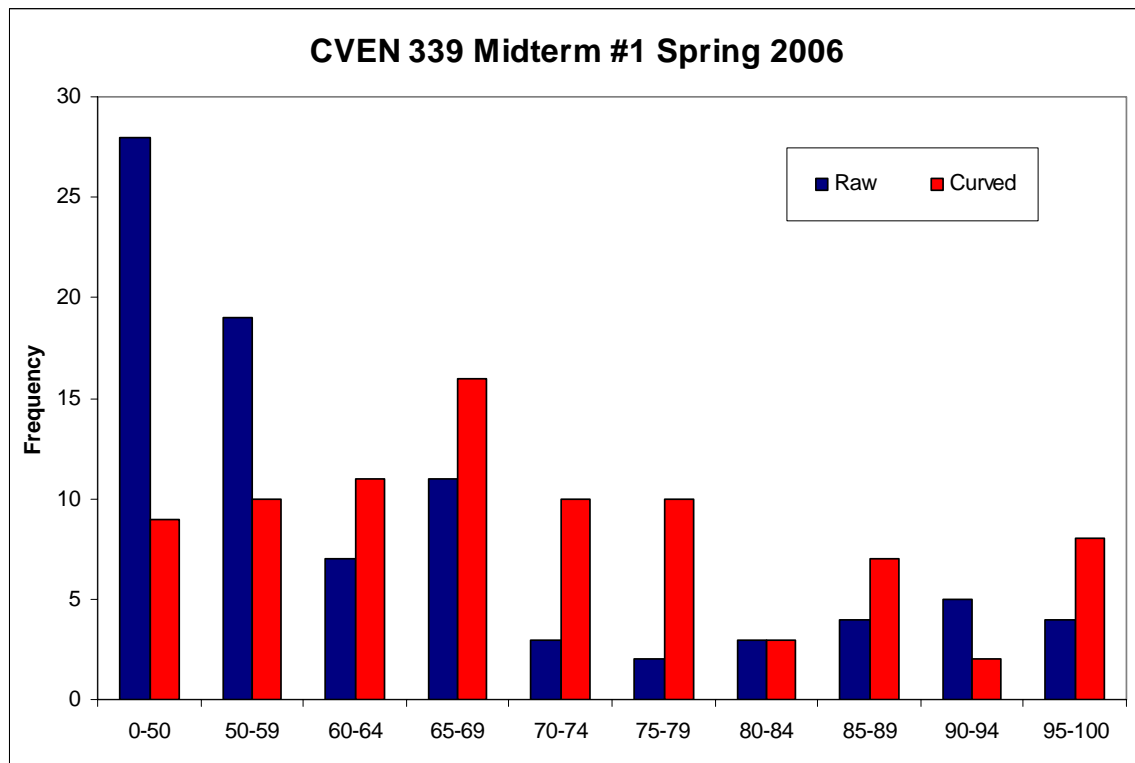


CVEN 339 – Spring 2006 – Exam #1

60 minutes allowed

	<u>Raw</u>	<u>Curved</u>
Median	58	69.8
Mean	58.3	70.0
Std. Dev.	20.7	15.0
High	98	98.8



Name: _____

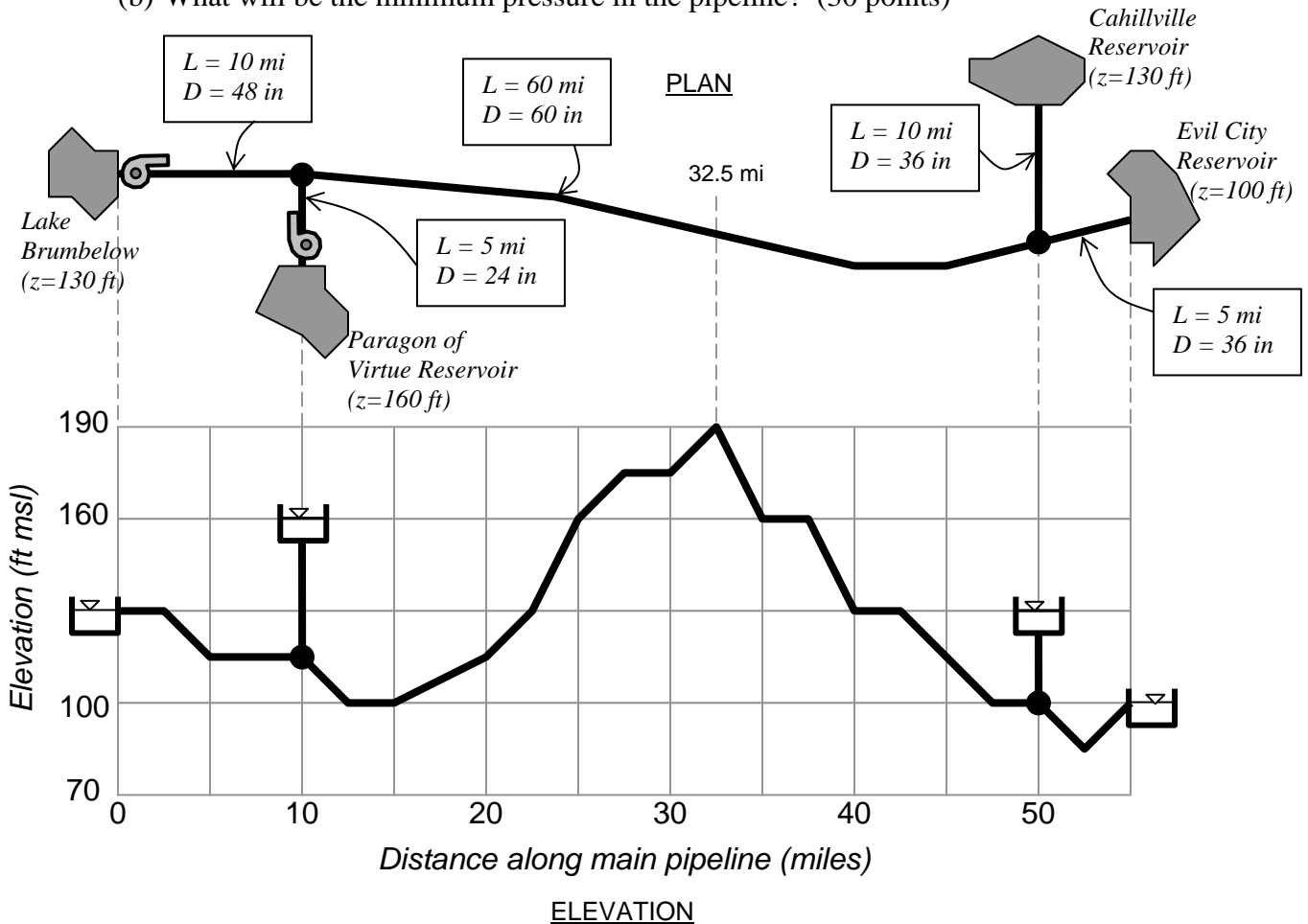
CVEN 339 – Water Resources Engineering
 Spring Semester 2006
 Dr. Kelly Brumbelow, Texas A&M University

Exam #1

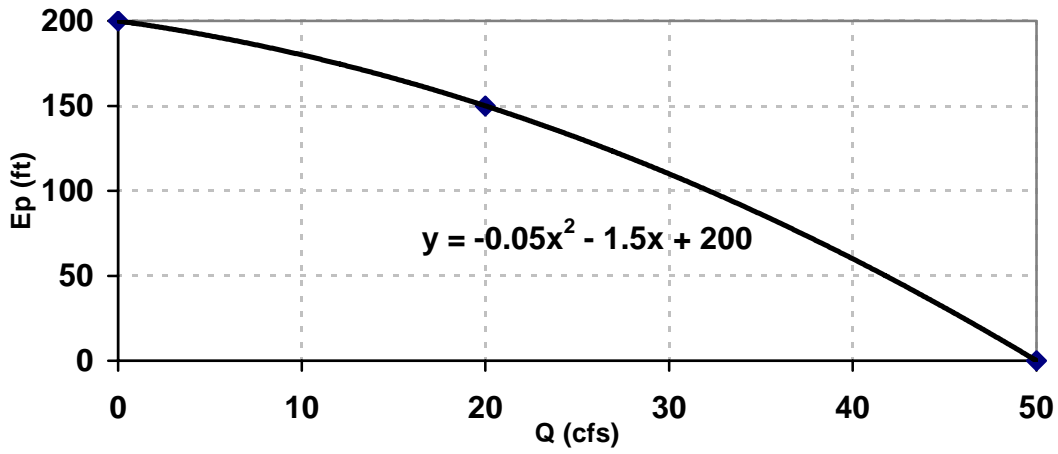
Open-book, Open-notes (4 pages, 2 questions); Time allowed: 60 minutes

1. A water supply pipeline receives inflow from 2 reservoirs and pump stations and supplies water to 2 cities' water treatment supply reservoirs. The pipeline is shown below in plan and elevation views. The state water regulatory agency carefully monitors water obtained by the 2 cities at the ends of the pipeline and records flowrates of 10.90 and 26.36 cfs for Cahillville and Evil City, respectively. All pipes are concrete ($\epsilon = 3$ mm). Characteristic curves are given for the pump stations on the next page.

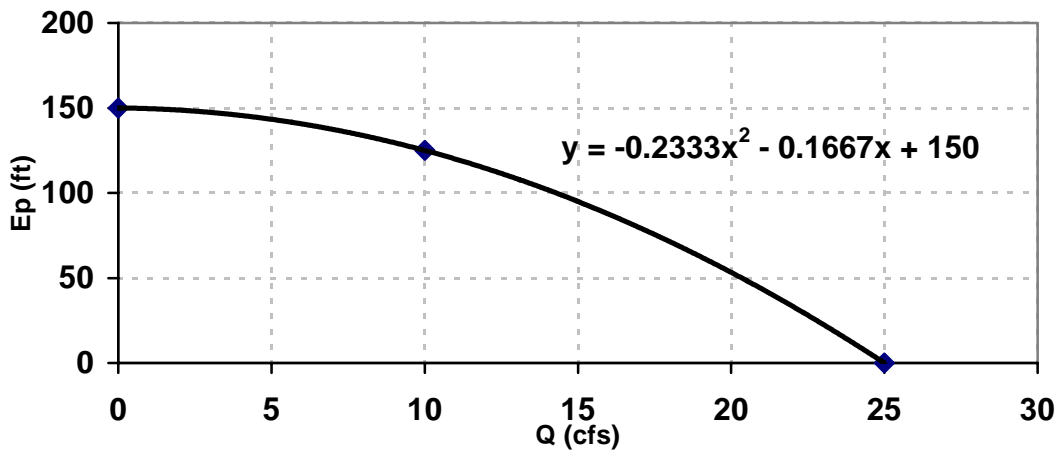
- (a) What will be the flows entering the pipeline from the pump stations at Lake Brumbelow and Paragon of Virtue Reservoir, respectively? (45 points)
- (b) What will be the minimum pressure in the pipeline? (30 points)



Lake Brumbelow Pump Station Characteristic Curve:



Paragon of Virtue Reservoir Pump Station Characteristic Curve:



You may assume that the pump stations are immediately adjacent to the respective reservoirs.

2. A pond is 1.5 m deep, 30.0 m long, and 7.1 m wide. This pond is special because in it grow magical guppies that can grant wishes; however, if the guppies ever are frozen, they lose their magical powers and become breaded fish sticks available in the frozen foods aisle of your local HEB. The temperature of the water in the pond is 2.1°C one cold, bleak February day. A large snowfall is forecast with an expected 1.5 m of snow in the next few days. Since the snowflakes form high in the atmosphere, their temperature when they land in the pond is -15.4°C .

Assuming that the bulk density of this snow will be 170 kg/m^3 , and considering that the specific heat of liquid water is $4,216\text{ J/kg}^{\circ}\text{C}$, the specific heat of ice (snow) is $2,102\text{ J/kg}^{\circ}\text{C}$, and the latent heat of melting/freezing is $334,000\text{ J/kg}$, would you expect this pond to completely freeze as a result of this snowfall? (That is, should I fire up my grill and wish for ribeyes tonight, or am I just eating fish sticks again?)

(25 points)