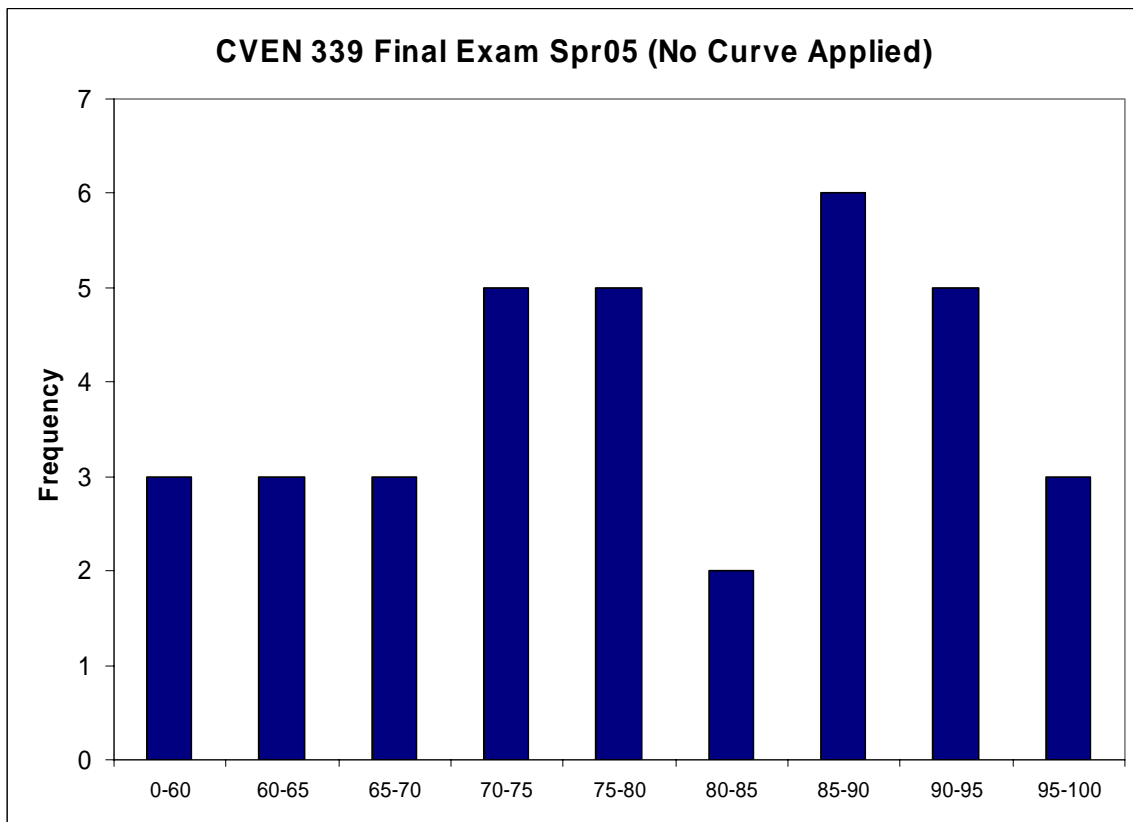


CVEN 339 – Spring 2005 – Final Exam

120 minutes allowed

No curve applied

Median	79
Mean	77.6
Std. Dev.	16.3
High	99



Name: _____

CVEN 339 – Water Resources Engineering
Spring Semester 2005
Dr. Kelly Brumbelow, Texas A&M University

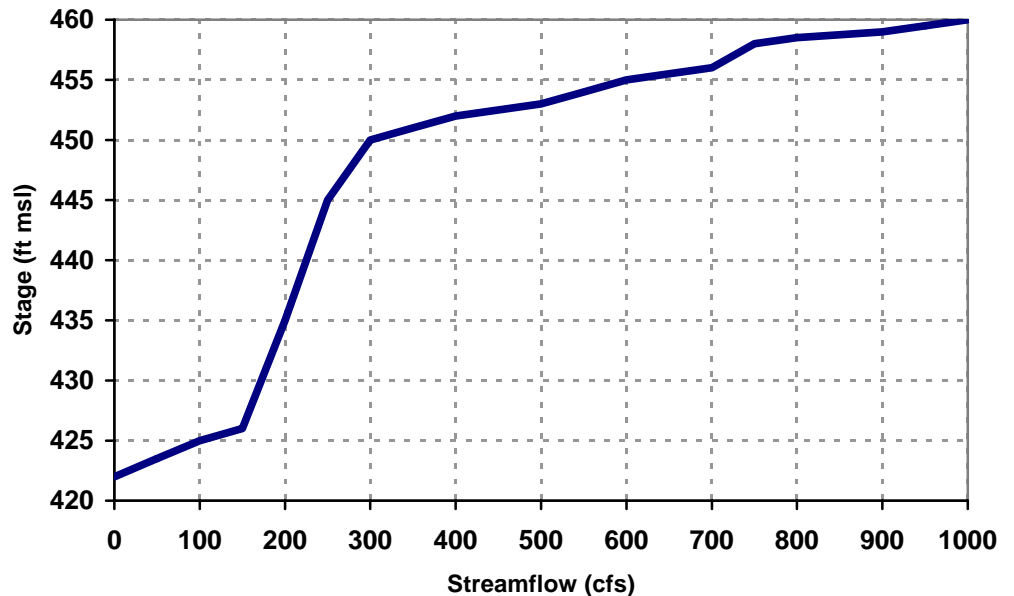
Final Exam

Open-book, Open-notes (8 pages, 5 questions)

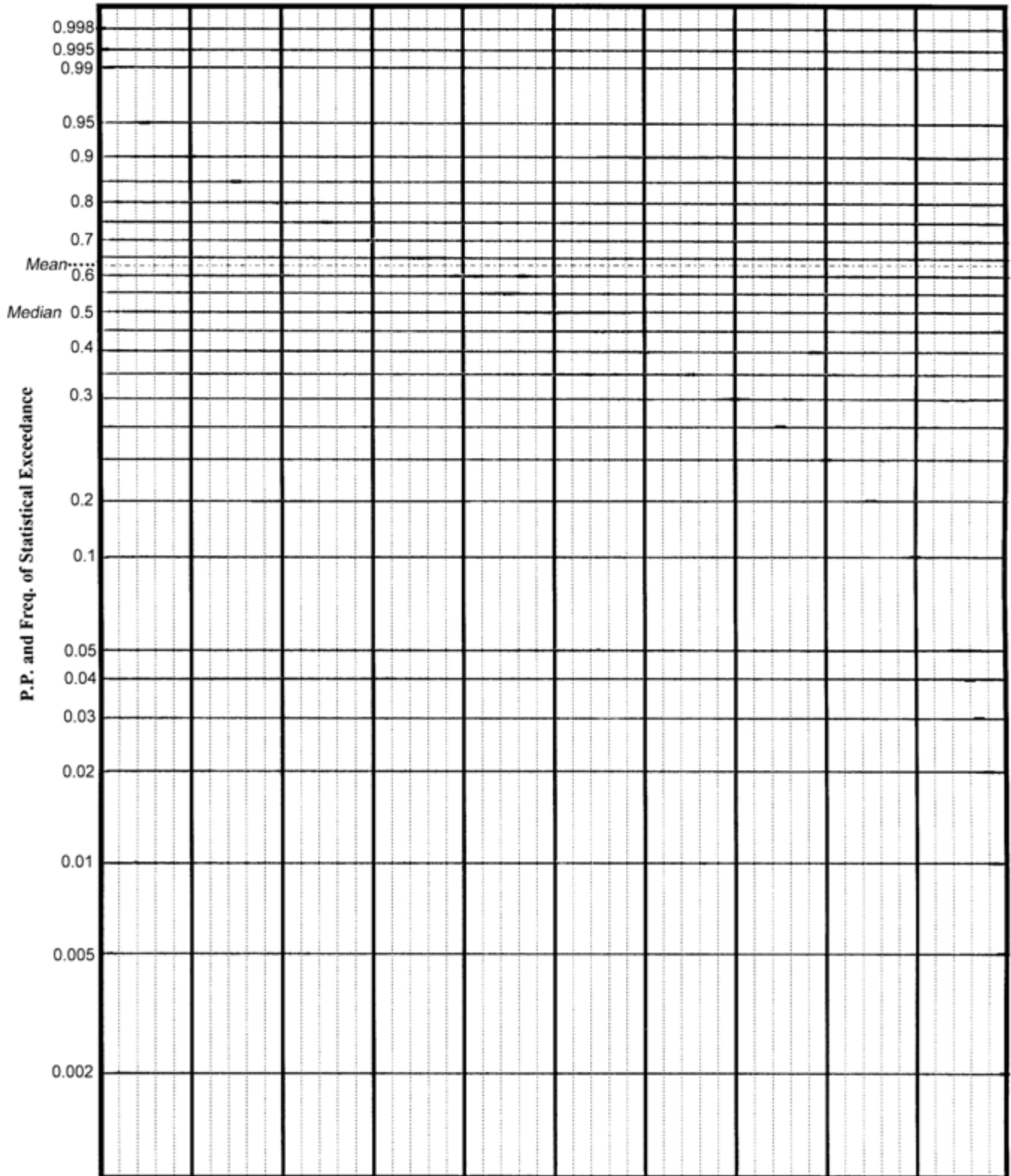
1. You are tasked with assessing the reliability of a water supply intake structure on a stream. The lower threshold of the intake is at elevation 425.50 ft msl. The pump motors for the intake have been installed at elevation 455.00 ft msl. The intake is unusable if: (1) low flows prevent water from entering the intake over the lower threshold, or (2) high flows cause submergence of the pump motors. You have obtained daily streamflow data for an adjacent streamgage, which is given in the table below (obviously this test question includes a very small dataset). The rating curve for the adjacent streamgage is also given below. A sheet of Weibull probability paper is attached, and you may assume that the data follows the Weibull distribution. *What is the probability on any given day that the water supply intake will be unusable?*

(20 points)

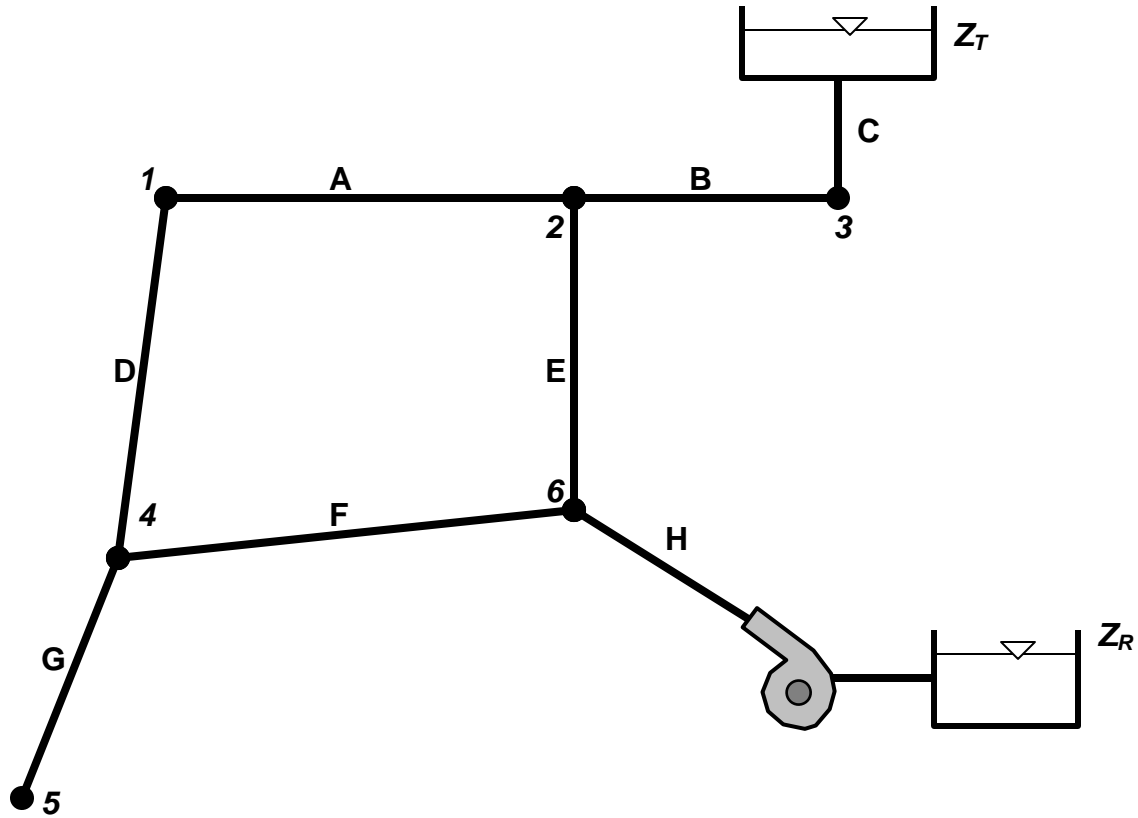
Day	Streamflow (cfs)
1	470
2	490
3	315
4	345
5	175
6	195
7	270
8	240
9	245
10	365



Weibull Probability Paper



2. Mapped below is a pipe network. Pressures have been measured at the nodes as given in the table below. Determine the flowrate in each pipe. (40 points)



Pipe	Length (ft)	Diameter (in)	Node	Demand (cfs)	Elevation (ft)	Pressure (psi)
A	1000	12	1	2.0	125.00	45.30
B	500	24	2	3.5	132.00	43.45
C	100	24	3	1.0	130.00	44.39
D	1000	12	4	2.5	117.50	48.48
E	500	12	5	1.0	124.70	45.27
F	1000	12	6	2.5	110.20	50.34
G	500	12	Z _R	--	107.50	--
H	500	24	Z _T	--	232.50	--

Pump has characteristic curve: $E_p = -0.2083Q^2 - 0.4167Q + 135$

All pipes have $f = 0.015$.

The pipe between the reservoir Z_R and the pump has negligible losses. Minor losses can be neglected.

3. Flow in a rectangular open channel goes over a broad-crested weir. The channel width is 5.5 ft; its sides are plastic; and its bedslope is 0.003. The depth of flow over the broad-crested weir is 2.76 ft. *What is the flowrate in the channel?* (10 points)

4. An open channel with a trapezoidal cross-section is expected to convey a discharge of 150.0 cfs. The bottom width is 6.0 ft; its sideslopes are 5.5:1; its bedslope is 0.016; and its sides and bottom are soil with an average particle diameter of 0.4 mm ($n = 0.019$). Using Figure 5.11 (p. 276) of the course textbook, *determine if this channel may have potential erosion problems.* (15 points)

5. Using the Muskingum method, find the peak of the outflow hydrograph resulting from routing of the inflow hydrograph below through a river reach with $K = 6.0$ hours and $X = 0.18$. (15 points)

Time (hrs)	Inflow (cfs)
0	150
1	175
2	386
3	798
4	1020
5	963
6	842
7	701
8	432
9	372
10	222
11	203
12	188
13	162
14	150