FPST 2483 Lab #11 Name:_____

Objective: After completing this laboratory exercise the student will:
Analyze a water supply with given information.
Graphically represent a water supply.

Procedure:

Respond as directed to the following exercises:

1. Why conduct hydrant flow tests?

2. What equipment or materials are necessary for hydrant flow tests?

3. What three pieces of information must be obtained for any valid flow test?

4. The formula for converting pitot pressures to GPM is

5. Static pressure is always plotted above_____GPM.

6. Residual pressure is always plotted above_____.

7. At what location are the test results valid?

8. Pressure is affected by elevation as indicated in the following equation:

9. The fire protection industry calculates friction loss from the Hazen-Williams formula which is as follows:

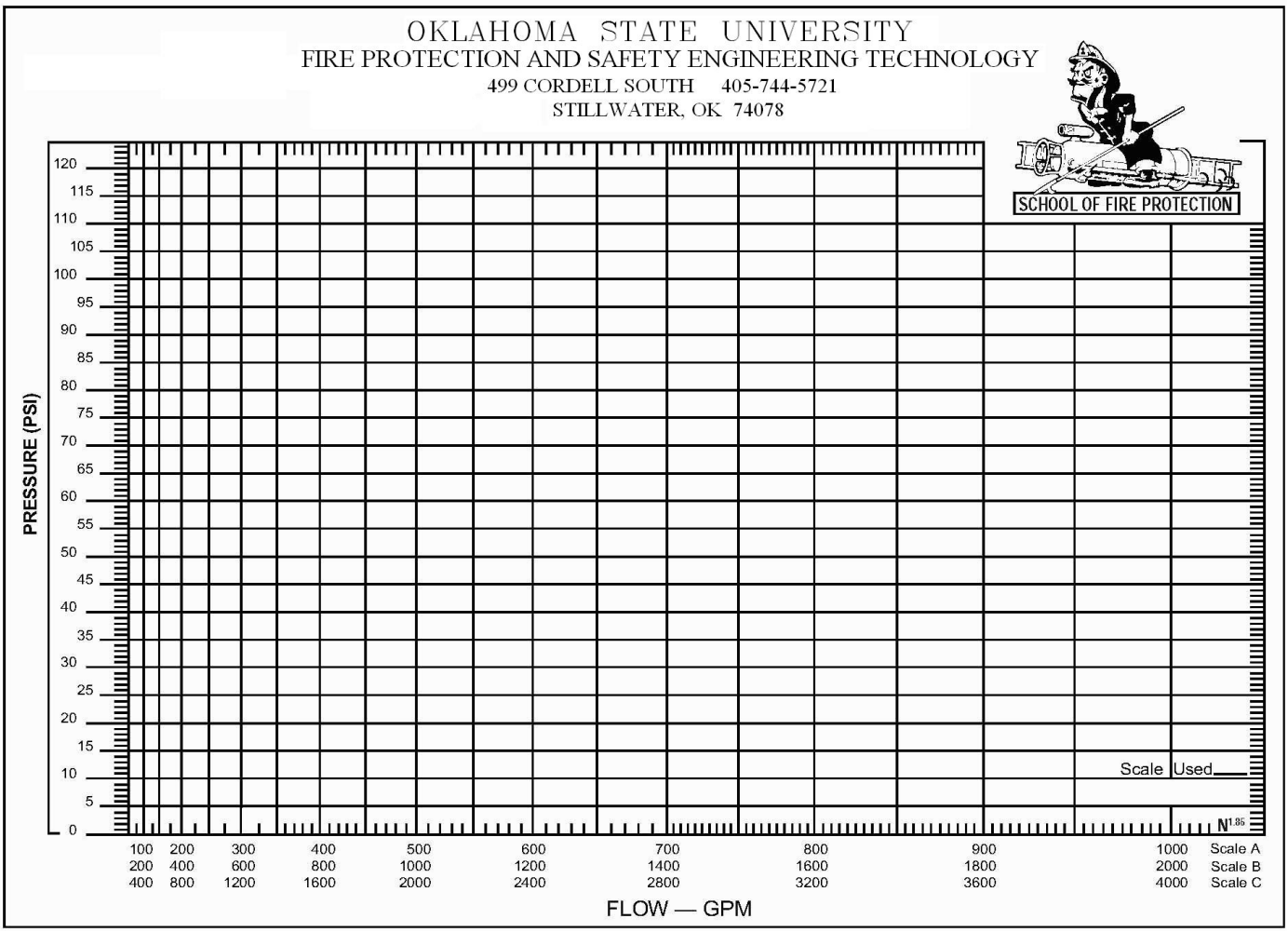
10. The most critical of the variables in the Hazen-Williams formula is what?

11. Plot the following flow test results (all may be plotted on a single chart, but each should be clearly labeled). **Which test illustrates the best water supply?**

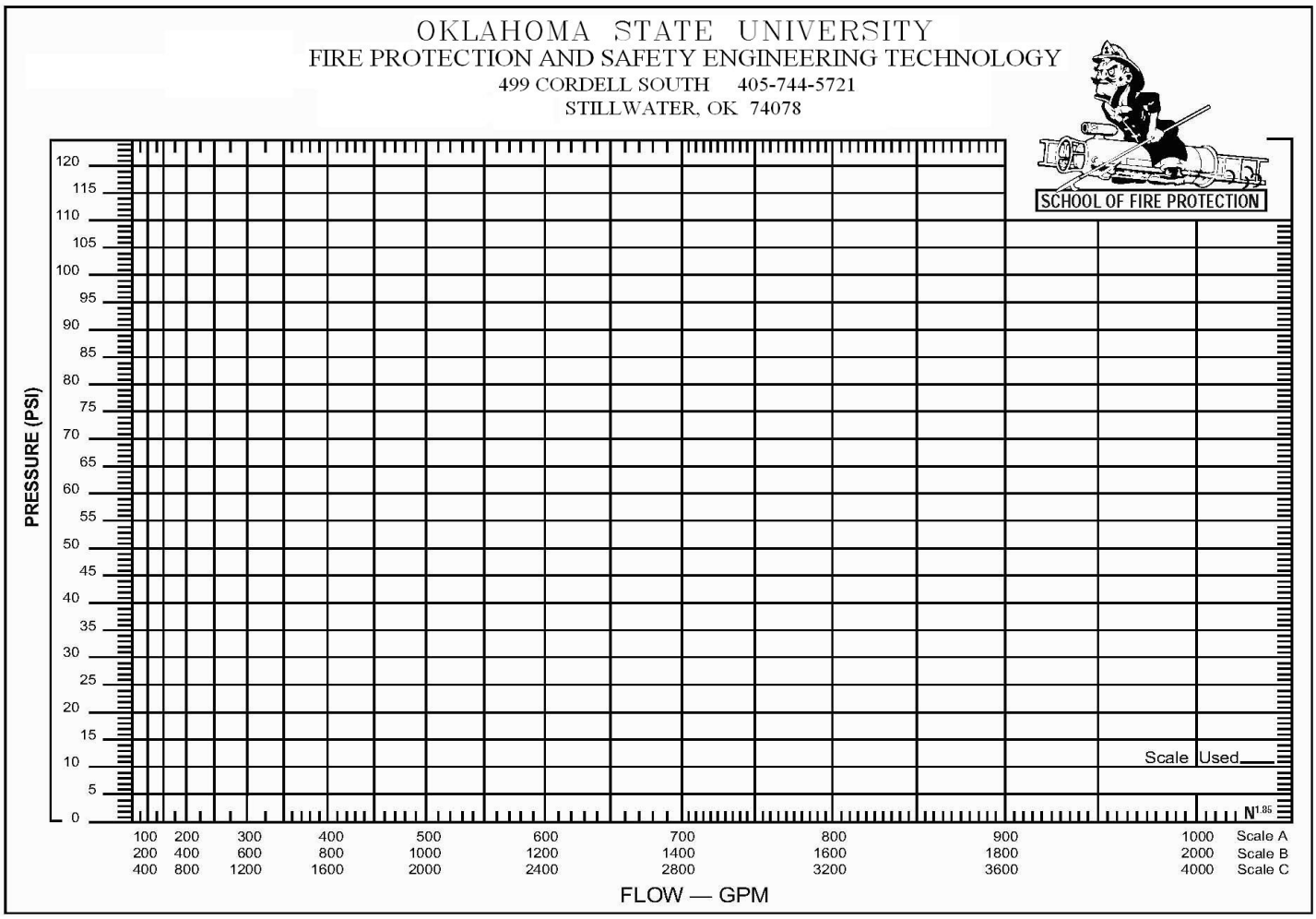
a. Static 65 psi; Residual 20 psi at 1500 gpm

b. Static 60 psi; Residual 45 psi at 650 gpm

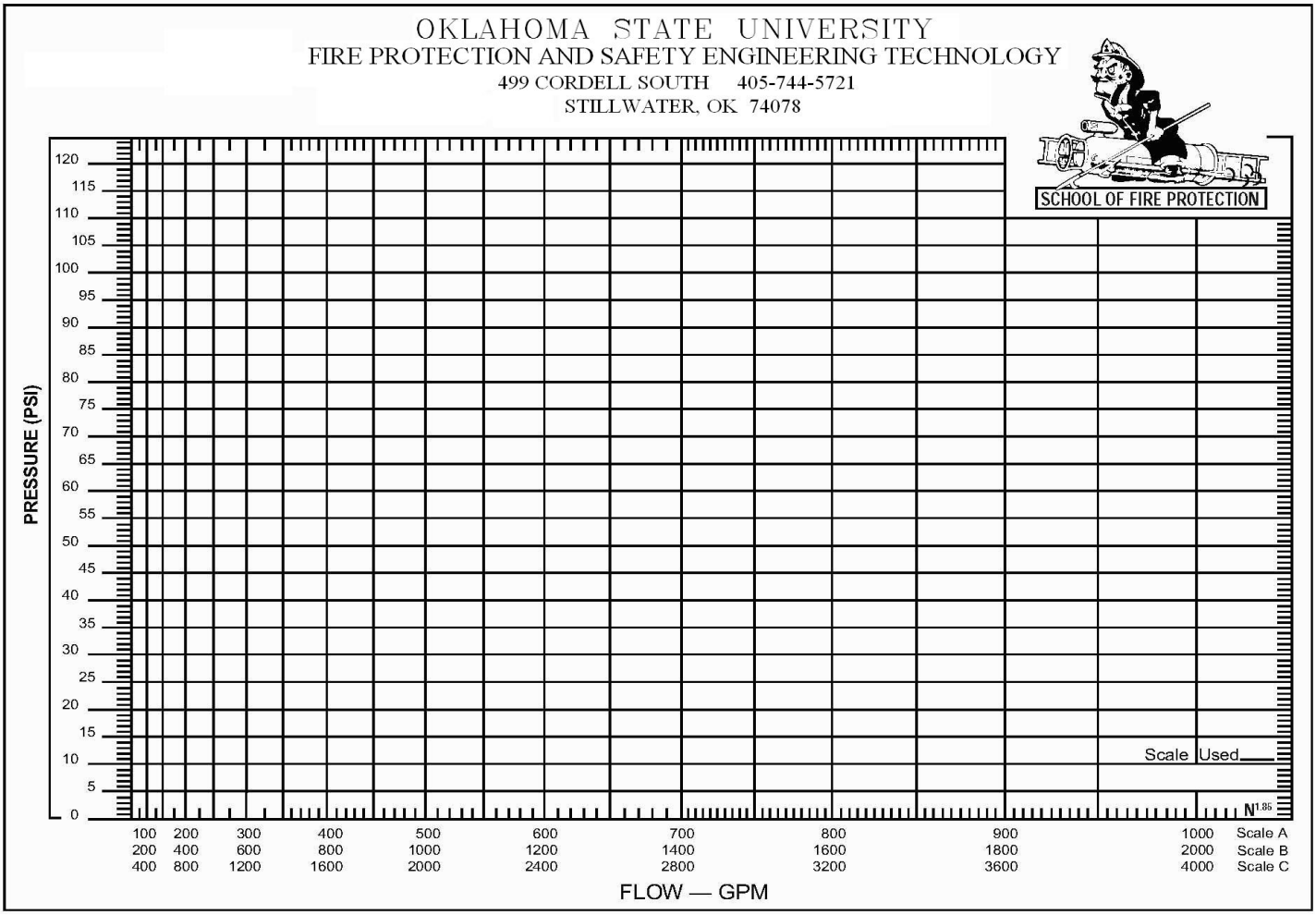
c. Static 80 psi; Residual 10 psi at 1000 gpm



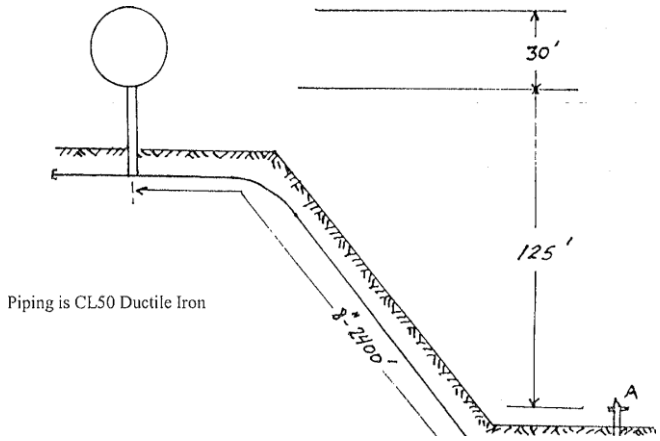
12. A flow test indicates that a static pressure of 75 psi drops to a residual pressure of 30 psi with a 1500 gpm flow. Hydraulic calculations show that 750 gpm are needed at a residual pressure of 52 psi. Plot the water supply curve and determine if the water supply is adequate to provide the sprinkler demand.



13. The hydraulically calculated sprinkler demand is 650 gpm at 45 psi residual pressure. If the static pressure is 80 psi, graphically determine what flow at 20 psi residual pressure would be representative of a water supply just adequate to meet the sprinkler demand?



14. Plot the expected water supply from the elevated tank. Make your graph valid at point A. Assume C = 140.



OKLAHOMA STATE UNIVERSITY
FIRE PROTECTION AND SAFETY ENGINEERING TECHNOLOGY
499 CORDELL SOUTH 405-744-5721
STILLWATER, OK 74078

SCHOOL OF FIRE PROTECTION

PRESSURE (PSI)

120 115 110 105 100 95 90 85 80 75 70 65 60 55 50 45 40 35 30 25 20 15 10 5 0

Scale Used____

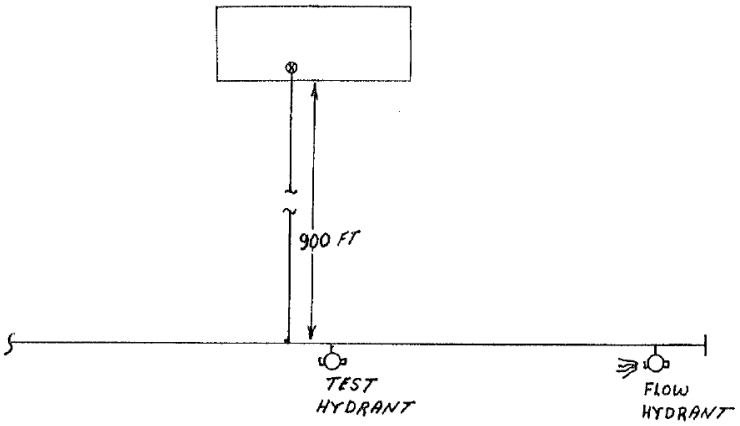
$N^{1.85}$

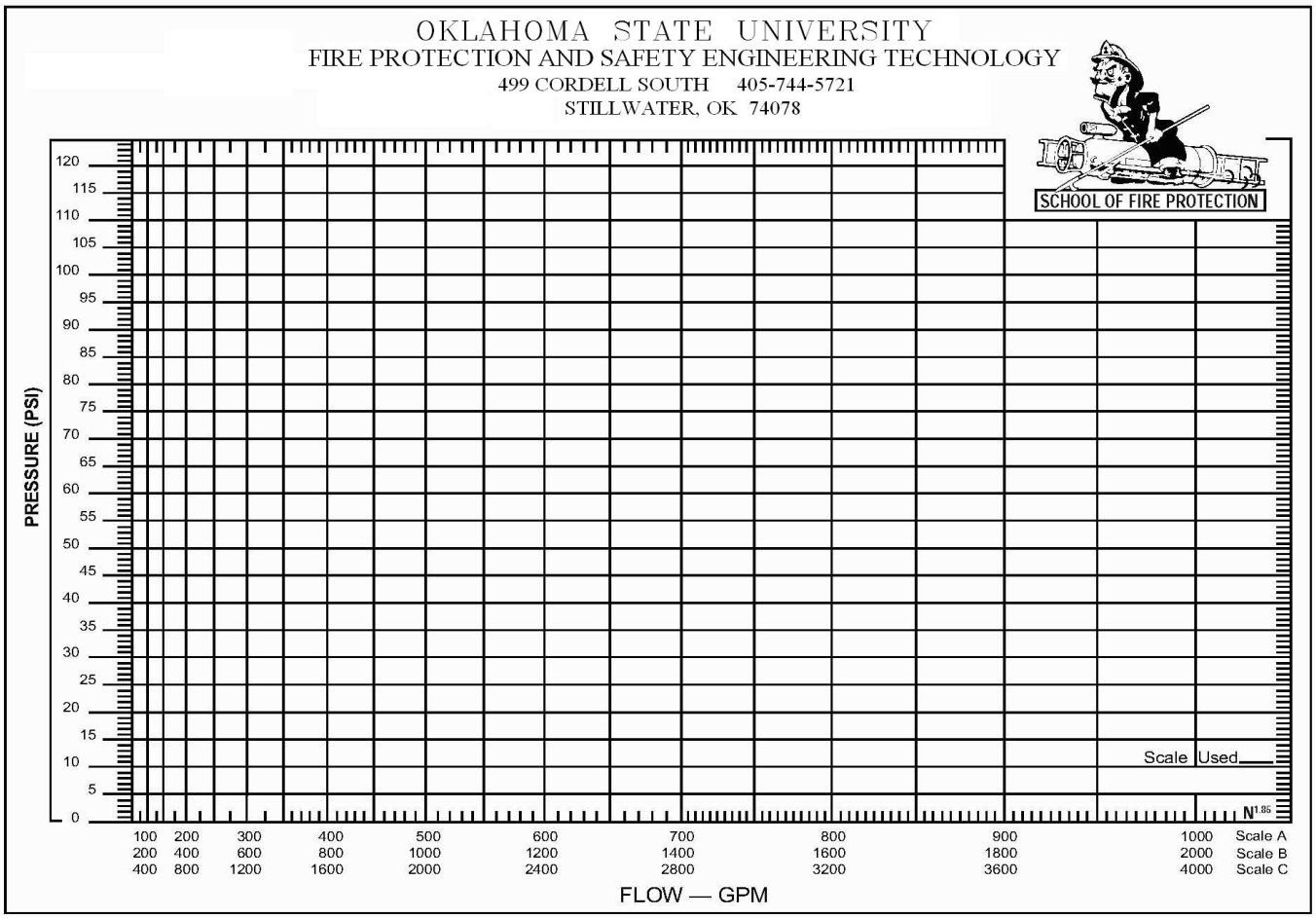
										Scale A
100	200	300	400	500	600	700	800	900	1000	Scale A
200	400	600	800	1000	1200	1400	1600	1800	2000	Scale B
400	800	1200	1600	2000	2400	2800	3200	3600	4000	Scale C

FLOW — GPM

15. A 12-inch cast-iron, dead end water main runs by the front of a Machine Shop, Static and residual pressures were measured at a hydrant in front of the factory and a flow was made at a hydrant 500 ft. beyond. The water was discharged through a 2½ -inch hydrant outlet having a discharge coefficient of 0.8. The static and residual pressures were 85 and 75 psi respectively and the pitot pressure at the flow hydrant was 58 psi. An 8-inch, unlined cast-iron pipe (C=100) connects to the 12-inch main near the first hydrant and extends 900 ft. into the plant yard where it joins the base of a sprinkler riser. The base of the riser is 20 ft. above the center of the hydrant where pressures were read.

a. Find the flow in gpm from the flow hydrant.
b. Using $N^{1.85}$ paper, plot the supply available at the test hydrant.
c. On the same sheet, plot the friction loss curve for this 8-inch pipe. (Note: This curve will start at 0,0.)
d. On the same sheet, correct the original curve for friction and elevation and plot the supply available at the base of the riser.




OKLAHOMA STATE UNIVERSITY
FIRE PROTECTION AND SAFETY ENGINEERING TECHNOLOGY
499 CORDELL SOUTH 405-744-5721
STILLWATER, OK 74078
SCHOOL OF FIRE PROTECTION
PRESSURE (PSI)
120
115
110
105
100
95
90
85
80
75
70
65
60
55
50
45
40
35
30
25
20
15
10
5
0
Scale Used
N1.85
100 200 300 400 500 600 700 800 900 1000 Scale A
200 400 600 800 1000 1200 1400 1600 1800 2000 Scale B
400 800 1200 1600 2000 2400 2800 3200 3600 4000 Scale C
FLOW — GPM