GE 4150/5150 Natural Hazard Mitigation
## Fall 2005 Exam 2

ANSWER EVERY QUESTION!!!! Be sure and read each question carefully.

1a (4 pts). The following USGS-style map was developed for a 50-year time interval, with a 2% chance of exceedance. What is the percentage likelihood that a shaking of 4-8%g will occur in the next 2500 years?

1b (6 pts). Structures in Nowhere City are capable of withstanding shaking levels of 8-16%g; should they be considered safe over the next 50 years? Why or why not (what factors affect interpretation of this type of map)?
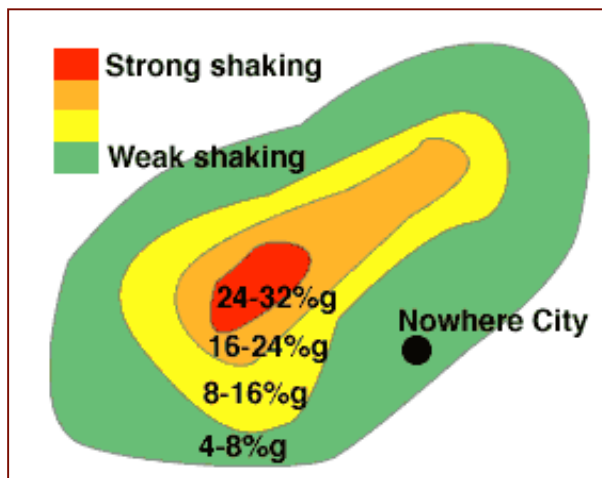
2a (2 pts). After the 1994 Northridge earthquake, how was the distribution of structural damages determined?

2b (8 pts). Name four different factors which produced the patterns of damage observed about the known epicenter.

3a (5 pts). Explain how the Mercalli Index can be used for hazard mitigation.

3b (5 pts). Explain the differences between a Mercalli Index level III and VIII.

4 (10 pts). Explain how the Parkfield earthquake study affects decisions based upon probabilistic earthquake prediction.

5 (10 pts). List (Stein's) criticisms of the seismic hazard code changes proposed for the New Madrid Seismic Zone (NMSZ).

6 (10 pts). Explain the political nature of the USACE involvement in MI river region.

7a (4 pts). Explain how a river's rating curve is constructed.

7b (3 pts). On the following graph (use the LNIII curve), show the recurrence interval of the 40 cms level flow.

7c (3 pts). On the graph, show the magnitude of the 50 year flood.
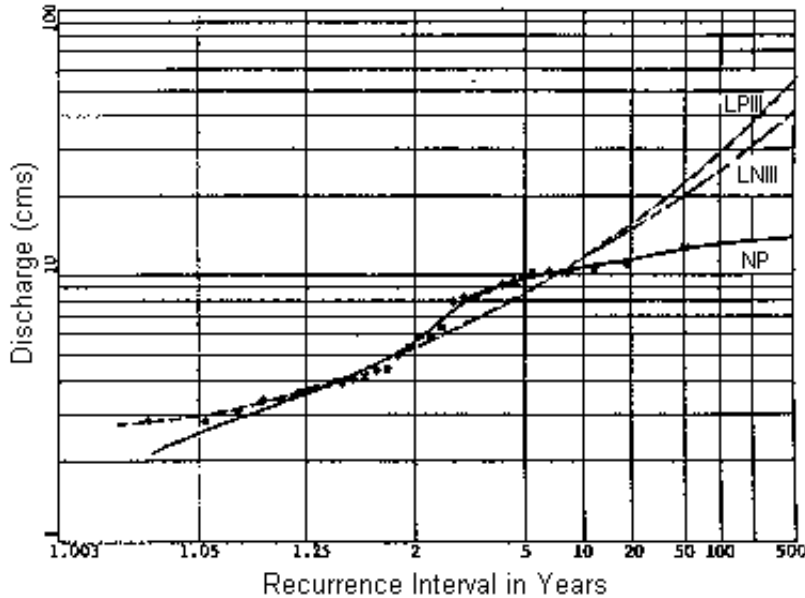
8a (5 pts). Explain the purpose and overall goals of the Coast2050 project.

8b (5 pts). What are the key vulnerabilities and proposed engineering solutions for New Orleans based upon the Fischetti (2001) analysis?

9a (5 pts). Define the 100-year flood.

9b (5 pts). For a 100 year period, calculate the probability Q, <u>in percent</u>, of the:

10-year flood _____

50-year flood _____

100-year flood _____

using $Q = 1 - (1 - 1/R)^n$

9c (5 pts). Although this is widely assumed in hazard and insurance evaluations, why is the actual probability of a 100-year flood <u>not</u> 1% every year?

9d (5 pts). Give at least three key assumptions that would be needed to use river discharge datasets to estimate a 100-year flood.