

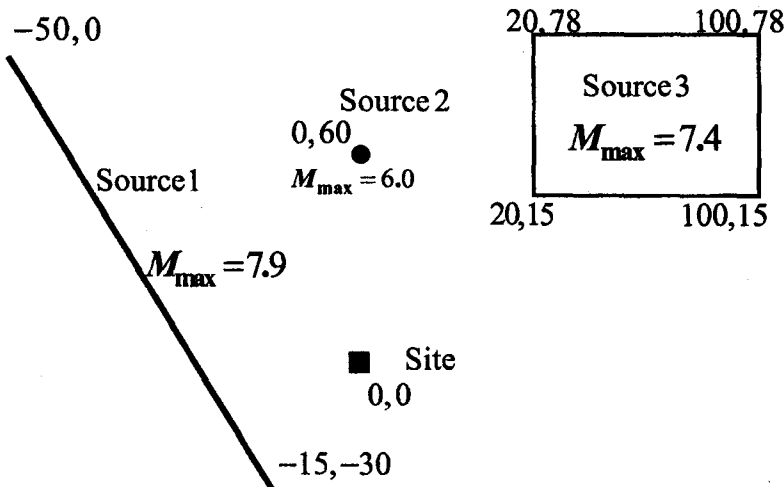
BENGAL ENGINEERING AND SCIENCE UNIVERSITY, SHIBPUR
B.E. 7TH SEMESTER (CIVIL) FINAL EXAMINATIONS, 2012
Disaster Mitigation (CE 703)

Full Marks: 70

Time: 3 hrs

Answer any FIVE questions. All questions carry equal marks.

- Q. 1. (a) Define: Hazards, Disaster, Physical Exposure, Vulnerability.
 (b) Discuss various form of Losses from disasters.
 (c) Describe various component of disaster management through a diagram. 6+4+4 = 14
- Q. 2. (a) What are the various forms of economic impact of disasters?
 (b) Describe various indicators for risk by human loss with advantages and disadvantages.
 (c) Explain the Multi-hazard disaster risk model concept with its purpose and drawbacks. 4+4+6 = 14
- Q. 3. Briefly discuss the mechanism of destruction, hazard assessment and mapping techniques, and main mitigation strategies with respect to disaster due to the following natural events: (i) Earthquake, (ii) Flood and (iii) Drought. 14
- Q. 4. (a) What do you mean by seismic hazard analysis and seismic risk analysis.
 (b) Explain the following:
 Richter Magnitude, Attenuation, Return period, Gutenberg-Richter Relation 4+10=14
- Q. 5. The location and magnitude of maximum earthquake for three sources and the site is shown in Figure Q3. Compute the peak acceleration at the site by DSHA. Assume following attenuation relation: $\ln(PHA) = 6.74 + 0.859M - 1.80 \ln(R + 25)$.
 Also explain the steps to obtain the PSHA of the same site mentioning additional data required for this. No need to show any calculation for PSHA. 14



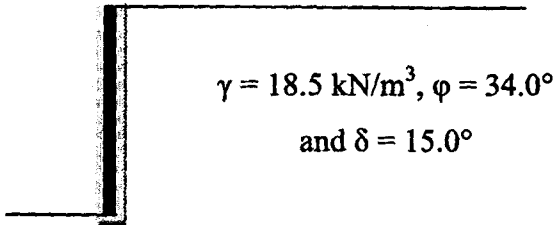
- Q. 6 (a) Explain the role of ground improvement for liquefaction hazard mitigation.
(b) Discuss any two appropriate ground improvement methods for liquefaction hazard mitigation.
(c) Explain one case study to show that mitigation can prevent liquefaction of soil due to earthquake.

3+8+3 = 14

- Q.7 (a) Determine the Factor of Safety for a given slope subjected to earthquake loading considering planer failure surface. Use pseudostatic analysis.
(b) Compute pseudostatic factor of safety for an embankment of height 6.0 m with side slope 2(H): 1(V). The properties of the soil: $\gamma = 18.5 \text{ kN/m}^3$, $\phi = 0.0^\circ$ and cohesion = 30 kPa. Assume the trial circle having center on the extended top surface of the embankment and passing through the toe. Assume $k_h = 0.1$ and $k_v = 0.0$.

5+9 = 14

- Q. 8 (a) Explain the behavior of retaining wall subjected to earthquake loading based on previous experiences.
(b) Compute the active earth pressure for the following retaining wall subjected to earthquake loading using Mononobe – Okabe Method. Assume $k_h = 0.15$ and $k_v = 0.075$



5+9 = 14

- Q. 9 (a) Enumerate the affects of liquefaction on Civil Engineering structures
(b) Explain (i) cross hole testing method and (ii) assessment of liquefaction from cross hole test results.
(c) State the liquefaction criteria for fine grained soils.

4+6+4 = 14