

National Exams December 2014

04-Geol-B3, Site Investigation

3 hours duration

NOTES:

1. If doubt exists as to the interpretation of any question, the candidate is urged to submit with the answer paper, a clear statement of any assumptions made.
2. This is an OPEN BOOK EXAM.
3. Candidates may use any non-communicating calculator.
4. Questions have equal value. The grade for each question is given. It is suggested that the candidate proportion time based on the allocated value.
5. All questions require an answer in essay format. Clarity and organization of the written answer and any figures or sketches are important.
6. The examination has an overall value of 100 Marks: 4 questions consisting of 25 Marks each.

Marking Scheme December 2014

1. **25 marks total**
 - (a) 5 marks
 - (b) 10 marks
 - (c) 5 marks
 - (d) 5 marks
2. **25 marks total**
 - (a) 5 marks
 - (b) 5 marks
 - (c) 5 marks
 - (d) 5 marks
 - (e) 5 marks
3. **25 marks total**
 - (a) 15 marks
 - (b) 10 marks
4. **25 marks total**
 - (a) 15 marks
 - (b) 10 marks

25 Marks **Question #1**

Answer the following questions as fully as possible.

- 5 Marks a. What is the main purpose of a geotechnical site investigation?
- 10 Marks b. What are the main components of a site investigation and how are they generally organized?
- 5 Marks c. What is the final deliverable of a site investigation?
- 5 Marks d. How does the site investigation potentially affect the engineering design, budget and timelines associated with a project?

25 Marks **Question #2**

As an Engineer at an Engineering firm, your boss decides that you are the ideal candidate for a deep foundation design and construction project and he would like you to conduct the initial planning for the construction project. As a first step in this process, you are to conduct a desk study and subsequent site investigation.

- 5 Marks a. State clearly the main objectives of your site investigation.
- 5 Marks b. Once a scope of work has been determined for your project, what should the site characterization considerations entail?
- 5 Marks c. What codes, guidelines, laws etc. (i.e. design / legislative framework) will you have to cite in order to include as a consideration within your site investigation?
- 5 Marks d. What are the primary objectives of the field exploration component?
- 5 Marks e. In terms of reporting for your site investigation, what should the major headings of your report be?

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25 Marks Question #3

During a site investigation, it is important to evaluate the in-situ ground that is present. As such,

- 15 Marks a. What are the main broad categories associated with soils and rock? What are some of the engineering risks associated with each soil and rock type that you have identified?
- 10 Marks b. What are the various soil and rock sampling techniques and samplers that are used to acquire soil and rock samples (these should be the industry norm)?

25 Marks Question #4

Answer the following questions as fully as possible:

- 15 Marks a. Address the main issues associated with the thoroughness of a site investigation, the budget allocated for the site investigation and the amount of risk to the project. Show how these factors are related and how they influence each other. Focus on how to ensure the 'success' of a site investigation by trying to find the balance of these factors.
- 10 Marks b. One never has the amount of resources in order to complete a comprehensive site investigation. As such, what are the main priorities of such an investigation? Create a list of 10 priorities that must be addressed during a site investigation.