

BUILDING STRUCTURES AND GEOMECHANICS 2

Semester 2: 2006 Exam Paper

INSTRUCTIONS TO CANDIDATES:

- Answer all parts of all questions
- All questions are of equal value
- No reference material is allowed
- State any assumptions made

QUESTION 1

- A) Describe any two drilling and sampling methods. Include in your discussion advantages and disadvantages for each method.
- B) Why is it good engineering practice to not place sole reliance on the results of borehole testing? Apart from field drilling and testing, describe what actions a geotechnical engineer could follow to better define the expected soil conditions at a site.

QUESTION 2

- A) Outline typical engineering problems than can be encountered on sites with clay soils, sand soils and site containing rock.
- B) Outline the types of footings that could be used to support a single storey brick residence on an expansive soil in Adelaide. Consider both a timber floor and a concrete floored house.

QUESTION 3

- A) For a multi-story building, outline instances where pad footings would be used and instances where piled footings would be used.
- B) Precast driven piles and bored cast in place piles are two different types of concrete piles. Describe the advantages and disadvantages of each pile type. List two examples of ground or building conditions for which one pile type is preferred over the other, and give reasons for your choices.

QUESTION 4

- A) What is Compaction? What engineering properties are improved by compaction of a soil? Give one example of a suitable method of compaction for each of the following cases:
- Shallow compaction (say less than 0.3 m depth),
 - Medium compaction (say 1.0-2.0 m depth)
 - Deep compaction (say 10 m depth)
- B) The presence of water often causes problems in geotechnical engineering. Describe the various adverse effects that water can have on a clay soil. Explain how lime or cement stabilisation of the clay soil can reduce these adverse effects and improve the engineering properties of the soil.

QUESTION 5

- A) What is a collapsing soil? Include in your discussion conditions for collapse and give three examples of construction or design methods by which engineers can attempt to overcome the effects of a collapsing soil profile.
- B) Outline the effect on a retaining wall that a load surcharge on top of the backfill behind the wall has. Explain why drainage behind a retaining wall is important, and support your answer with an illustration.