UNIVERSITI SAINS MALAYSIA

1ˢᵗ. Semester Examination
2005/2006 Academic Session

November 2005

EAG 345/3 – Geotechnical Analysis

Duration: 3 hours

Instructions to Candidates:

1. Ensure that this paper contains **EIGHT (8)** printed pages including appendices before you start your examination.

2. This paper contains **SIX (6)** questions. Answer **FIVE (5)** questions only. Marks will be given to the **FIRST FIVE (5)** questions put in order on the answer script and **NOT** the **BEST FIVE (5).**

3. All questions carry equal marks.

4. All questions **MUST BE** answered in English

5. Each question **MUST BE** answered on a new sheet.

6. Write the answered question numbers on the cover sheet of the answer script.

1. (a) Determine the maximum allowable column load for a 2 m x 1.5 m rectangular footing founded in a clayey sand at a depth of 1.25 m below ground level. The cohesion and friction angle of the clayey sand in terms of effective stresses are 15 kpa and 32 degree respectively. The unit weight and moisture content of the clayey sand are 1.75 Mg/m^3 and 14.5% respectively.

(10 marks)

(b) A strip footing is designed to carry a load of 750 kN/m at a depth of 1.2 m below ground level. The cohesion of the soil is found to be 40 kN/m^2 and the angle of internal friction is 28 degree. Determine the width of the footing if a factor of safety 2.5 used. The water table is at 7 m below ground level. Assumed the bulk density and saturated density of the soil are 1.60 mg/m^3 and 2.05 Mg/m^3 respectively.

(10 marks)

2. (a) Describe **THREE (3)** classification of piles which are normally used in geotechnical engineering. Use sketches to support your answer.

(4 marks)

(b) A concrete pile of 600 mm diameter was driven inside a layer of non homogenous soil to a depth of 18 m.

0 m			
Clay 6 m			$Cu = 40$ kN/m^2 $\gamma = 1600$ kg/m^3
Sand 12 m			$\phi = 35^0$ $\gamma = 1600$ kg/m^3
Clay 18m			$Cu = 80$ kN/m^2 $\gamma = 1800$ kg/m^3
22m			

Determine:-
i)   Skin Friction of the pile.   (4 marks)
ii) End bearing of the pile.   (4 marks)
iii) The ultimate capacity of the pile.   (4 marks)
iv) The ultimate of a group of 2 x 2 piles as above with a distance 1 m c/c.
(4 marks)

(state your assumption clearly)