國立成功大學

114學年度碩士班招生考試試題

編　號：82

系　所：土木工程學系

科　目：基礎工程

日　期：0210

節　次：第 1 節

注　意：1.可使用計算機
　　　　2.請於答案卷(卡)作答，於試題上作答，不予計分。

Make reasonable assumptions if necessary.

1、 Answer the following questions briefly with texts and/or figures: (25 %)
  (1) List the conditions for the use of pile foundations. (5 %)
  (2) List the major assumptions of Terzaghi's bearing capacity theory and draw the failure surface assumed for rough, rigid strip foundation in $\phi=0$ soil. (5 %)
  (3) Describe the effective area method proposed by Meyerhof (1953). (5 %)
  (4) List factors that affect the in situ SPT-N values. (5 %)
  (5) Explain the principles and advantages of compensated foundations. (5 %)

2、 Answer the following questions associated with lateral earth pressures. (25 %)
  (1) List the general stability requirements for cantilever retaining walls. (5%)
  (2) Explain why the earth pressure distribution behind a braced cut differs from the theoretical earth pressures and describe the details of Peck's pressure envelopes. (10 %)
  (3) List the failure modes and stability requirements for braced cut design in clay soil. (10 %)

3、 Answer the following questions of sheet pile analysis: (25 %)
  (1) List the two basic methods for anchored sheet-pile walls and plot the natural variations of deflection and moment. (5 %)
  (2) Describe the analysis procedure for cantilever sheet-pile wall penetrating sandy soil and the factor of safety considerations. (10 %)
  (3) Express the theoretical penetration depth (D) and maximum moment (M_{max})for the cantilever sheet-pile wall in clay soil using the symbols in Fig. 1. (Note: P is a line load per unit length) (10 %)
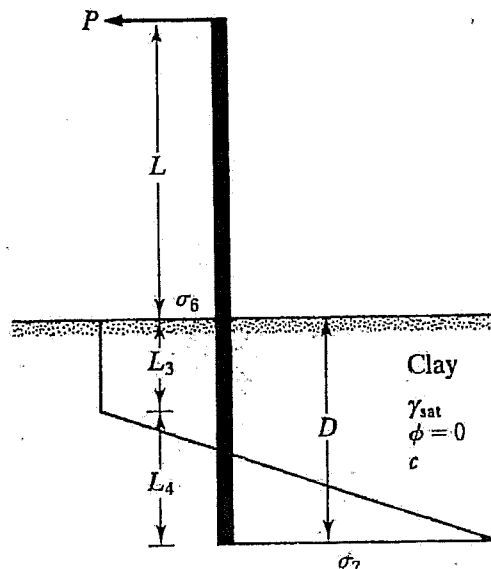

Fig. 1

4、 Answer the following questions on the bearing capacity of shallow foundations: (25 %)
  (1) List the two major satisfactory requirements of shallow foundation design. (5 %)

(2) List the relationships between the ultimate bearing capacity in plate load tests and the proposed foundations for both sandy and clay soils and explain the necessary based on Terzaghi's bearing capacity theory. (10 %)

(3) For a square footing with a width of 1.5 m and an embedded depth of 1.0 m under a clay layer with undrained shear strength of 45 kPa, estimate the net ultimate bearing capacities by Terzaghi(1943) 及 Meyerhof (1963). (Note: $F_{cs}=1+\dfrac{B \cdot N_q}{L \cdot N_c}$, $F_{cd}=1+0.4\dfrac{D_f}{B}$, $F_{ci}=(1-\dfrac{\beta^{\circ}}{90^{\circ}})^2$). (10 %)