國立成功大學

114學年度碩士班招生考試試題

編　號：83

系　所：土木工程學系

科　目：土壤力學

日　期：0210

節　次：第 2 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。

(1) Short Answers [60%]

a. Define the three phases of soil, and present them in a phase diagram [10%].

b. Define the terms void ratio, porosity, and degree of saturation. Explain how are they related [10%].

c. What is the difference between total stress, effective stress, and pore water pressure [10%]?

d. What is the difference between undrained and drained shear strength [10%]?

e. What is anisotropy in soil, and how does it affect soil behavior [10%]?

f. Explain the concept of critical state in soil mechanics and its significance in geotechnical design [10%].

(2) For a given soil, the following are known: $G_s = 2.67$, moist unit weight $\gamma = 17.6$ kN/m^3, moist content ω=12%. Determine: a) Dry unit weight; b) Void ratio. c) Porosity; d) Degree of saturation [10%]

(3) A sand sample with moist unit weight of 1.90 t/m^3, water content of 20%, and G_s of 2.65. How much water should we add to the sample to make the degree of saturation up to 90% per cubic meter? (Void ratio doesn't change after experiment) [10%].

(4) A soil sample is subjected to a direct shear test under a normal stress of 150 kPa. The peak shear stress is measured as 60 kPa. Given the soil's cohesion is 10 kPa, calculate the angle of internal friction using the Mohr-Coulomb criterion [20%].