國立臺灣海洋大學100學年度博士班招生考試試題

考試科目： 大地工程綜論

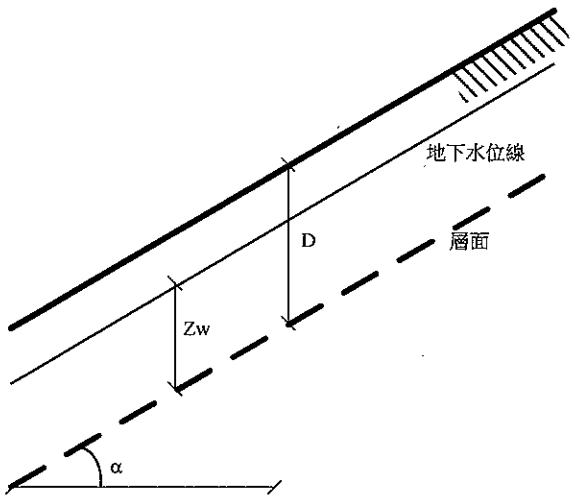
系所名稱： 河海工程學系博士班

大地工程組
※可使用計算器

1.答案以橫式由左至右書寫。2.請依題號順序作答。

1. a) 請列出與砂土有關之重要參數或基本物理性質.
   b) 請列出與黏土有關之重要參數或基本物理性質. (25%)
2. a) 與基礎設計有關之土壤參數或工程性質是什麼?
   b) 如何求得上述之參數? (25%)

3. 請推導無限邊坡之安全係數公式。(10%)



4. 請說明 2010 年國道北二高大埔段發生大規模山崩之可能破壞原因、破壞機制、與合適之邊坡穩定分析方法並推導適用之計算公式。(15%)
5. In 2011, a magnitude 9.0 (M_w) undersea megathrust earthquake was occurred in Japan. The earthquake triggered extremely destructive tsunami waves of up to 38.9 metres that struck Japan. In addition to the loss of life and destruction of infrastructure, the tsunami also caused a number of nuclear accidents. To further understand the geo-mechanics of the earthquake, please find the extreme horizontal stresses that will cause (1) normal and (2) thrust faulting at 1500 ft below the surface based on the following description. (25%)

   (a) A rock formation has a $\phi = 45^0$. It is found in the laboratory that the specimen fails under uniaxial compressive stress of 850 psi. The unit weight $\gamma = 170$ pcf.

   (b) Find the extreme horizontal stresses that will cause (1) normal and (2) thrust faulting at 1500 ft below the surface.

   (c) Assuming that one of the horizontal principal stresses is 22000 psi, determine the value of σ (the other) required to cause strike-slip faulting.