

**Structures 2 : 10286 and Construction Design 4 : 10331**

**Building Structures 6 : 02602**

**Semester2 2000 Substructure Examination**

Monday 9<sup>th</sup> October, 2000

**Time : 1.5 hours**

**ANSWER ALL FIVE (5) QUESTIONS. ALL QUESTIONS ARE OF EQUAL VALUE.  
NO REFERENCE MATERIAL PERMITTED.**

**Question 1**

- (a) Explain the features of natural soils that make each soil problem unique.
- (b) Describe what actions a geotechnical engineer could follow to define the soil conditions at a site.

**Question 2**

- (a) Describe two types of field testing methods and their advantages and disadvantages.
- (b) Describe the various types of footings that could be used for a residential structure, for concrete and timber floors, for expansive soils of variable severity, for collapsing soils, and for various house types.

**Question 3**

- (a) For a bridge, outline when a shallow spread footing would be used, and where a piled footing would be used.
- (b) Explain the differences between the various types of piles that could be used to support a multi-storey building.

**Question 4**

- (a) Describe the various modes of failure of common retaining structure systems.
- (b) Outline the meaning of the terms "active pressure", "passive pressure", "earth pressure at rest", and "compaction pressures" in relation to retaining walls.

**Question 5**

- (a) Describe the various factors that influence slope stability, and methods that could be used to minimise the probability of slope instability.
- (b) Explain how lime is successful in stabilising certain types of soil.

End of Questions