

NATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY
DEPARTMENT OF CIVIL AND WATER ENGINEERING
FACULTY OF INDUSTRIAL TECHNOLOGY
BACHELOR OF ENGINEERING (HONOURS) DEGREE
PART V EXAMINATIONS (Supplementary) JULY 2006
FOUNDATION ENGINEERING DESIGN TCW 5202

INSTRUCTIONS

Answer ALL Questions

Time 3 Hours
Total Marks:100

QUESTION ONE

Design and detail the cantilever retaining wall shown in Figure 1.0. The top surface is horizontal behind the wall and is subjected to a surcharge of 40kN/m^2 . The soil behind the wall is a well-drained sand with the following properties:

Density $\gamma = 17\text{kN/m}^3$; angle of internal friction $\phi = 40^\circ$;
coefficient of friction μ between the base and soil is 0.57

The materials are grade 30 concrete and grade 460 reinforcement

40 Marks

QUESTION TWO

Design and detail a rectangular base to support two columns carrying the following loads:

Column 1 Dead load 310kN; imposed load 160kN

Column 2 Dead load 430kN; imposed load 220kN

The columns are 350mm square and are spaced at 2.5meters. The safe bearing pressure on the ground is 200kN/m^2 .

The materials are grade 30 concrete and grade 460 reinforcement.

40 Marks

QUESTION THREE

- (i) What is the purpose of Injection Grouting
- (ii) Describe the various materials used in grouting.
- (iii) Describe the method of Injection grouting

20 MARKS

