NATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY
DEPARTMENT OF CIVIL AND WATER ENGINEERING
FACULTY OF INDUSTRIAL TECHNOLOGY
BACHELOR OF ENGINEERING (HONOURS) DEGREE
SECOND SEMESTER-PART V EXAMINATIONS MAY 2008
FOUNDATION ENGINEERING DESIGN TCW 5202

INSTRUCTIONS

Answer ALL QUESTIONS

OPEN BOOK EXAMINATION   **Time 4 hours.**
                                                             Total Marks   100

QUESTION ONE

**(a) Describe Geotechnical processes and their importance in foundation
        engineering.**

                                                                    Marks 5
(b) Describe any three methods of geotechnical processes.

                                                                    Marks 15

QUESTION TWO

Design a cantilever footing to support two columns supporting the following loads.
External Column (boundary) : Characteristic dead load of 400 kN
                              Characteristic live load of 200 kN
Internal Column :   Characteristic dead load of 750 kN
                              Characteristic live load of 300 kN

The columns are 450mm square and are at 4.0 meter centres
Assume safe bearing pressure of the soil to be 250kN/mm^2.
Material properties are: Concrete Grade 30 and reinforcement Grade 460.
Assume cover to reinforcement to be 40mm .

                                                                    Marks 40

QUESTION THREE

(a) Describe

                (i) End bearing piles and (ii) Friction bearing piles

                                               Marks 8

(b) What is the Standard penetration test and its purpose in foundation
    engineering.
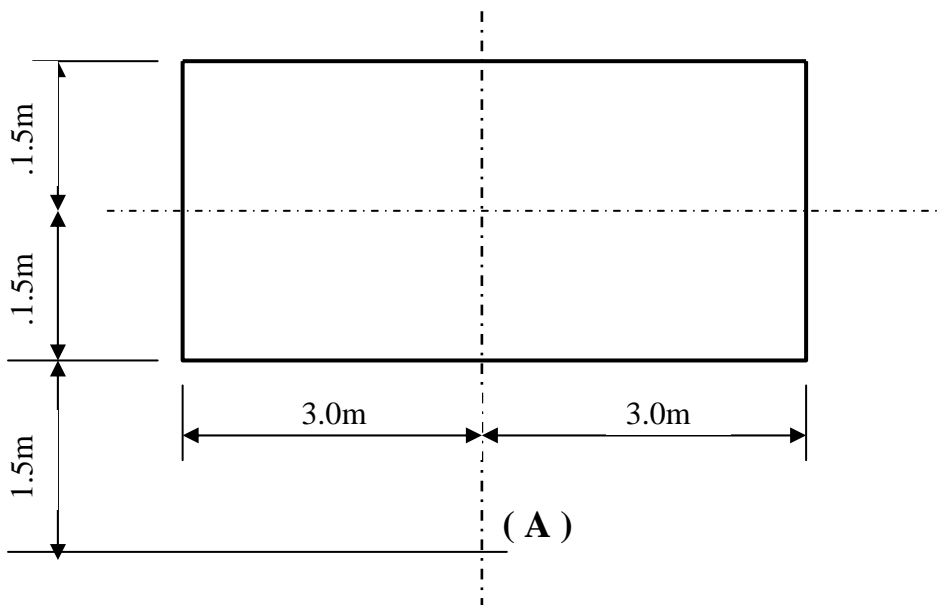
                                               Marks 7

QUESTION FOUR

A rectangular foundation 6m x 3m carries a uniform pressure of 300kN/m^2 near
the surface of a soil mass.

(a) Determine the vertical stress at a depth of 3m below the centre of the
    foundation.

                                             Marks 10

(b) Determine the vertical stress at a depth of 3m below a point (A) in the figure

(A)

                                               Marks 15