NATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY
DEPARTMENT OF CIVIL AND WATER ENGINEERING
FACULTY OF INDUSTRIAL TECHNOLOGY
BACHELOR OF ENGINEERING (HONOURS) DEGREE
PART V FIRST SEMESTER EXAMINATION- DECEMBER 2005
<u>DESIGN OF STRUCTURES II – TCW 5102</u>

<u>INSTRUCTIONS</u>

Answer Question ONE and THREE and any one of Question Two or Four
Open Book Examination   Time: 4hours
                                                                    Total Marks:100

<u>QUESTION ONE</u>

Design an interior panel of flat slab of 6.5m x 5.5m with a drop panel of 3.25m x 2.75m and columns 500mm square. The total thickness of the drop panel to be overall slab thickness plus 40mm.
Characteristic Dead load including self weight of slab = 8.0kN/m^2
Characteristic Imposed load   = 6.0kN/m^2
Characteristic material strengths are f = 30 N/mm^2 and f = 460N/mm^2

Design and detail one column and its foundation.
Assume soil bearing pressure of 200 kN/m^2

                                                                    40 Marks

<u>QUESTION TWO</u>

Design a combined rectangular footing for two columns A and B .
Column A carries a load of G_k = 500 kN and Q_k = 200kN and is 400mm square.
Column B carries a load of G_k = 1000kN and Q_k = 400kN and is 600mm square.
The columns are at 5.0m centers. The property line is 270mm beyond the face of column A.
Assume safe bearing capacity of soil as 150kN/m.^{2}
Characteristic material strengths are f_{cu} = 40N/mm^2 and f_y = 460N/mm^2

                                                                    20 Marks

<u>QUESTION THREE</u>

A roof Truss is shown in Figure 1.0.
Design the following members :
(a) Top Chord member
(b) Bottom Tie member

(c) Internal members

The effect of wind loading is not to be considered and do not check deflection.

DIMENSIONS:	LOADING:
Span of Truss = 16.0m	cladding + insulation = 0.12 kN/ m^2
Rise of Truss = 3.2m	Live Load = 0.75 kN/m^2
Roof slope = 21.8deg	
Truss spacing = 4.0m	
Rafter length = 8.62m	

40Marks

QUESTION FOUR

Design the purlins for the roof truss in Question Three.
Check only the shear capacity, moment capacity and deflection.
Take Modulus of Elasticity E = 205kN/mm.^{2}

20 Marks