

NATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY
DEPARTMENT OF CIVIL AND WATER ENGINEERING
FACULTY OF INDUSTRIAL TECHNOLOGY
BACHELOR OF ENGINEERING (HONOURS) DEGREE
PART III FIRST SEMESTER EXAMINATION- APRIL 2009
DESIGN OF STRUCTURES I – TCW 3103

INSTRUCTIONS

Answer only Four Questions
Open Book Examination

Time : 4 Hours
Total Marks 100

QUESTION ONE

Describe the following:

- (a) Limit States
- (b) Characteristic Load
- (c) Partial Safety factors
- (d) Ultimate Design load

Marks 20

QUESTION TWO

A simply supported reinforced concrete slab spans 5.0m. Design a suitable slab using Grade 25 concrete and high yield reinforcement to support the following characteristic loads:

Imposed load 4.0 kN/m²
Finishes 0.5 kN/m²

Marks 25

QUESTION THREE

A reinforced concrete beam supports a total ultimate load of 240kN. The beam is 250mm wide with an effective depth of 500mm. If the concrete is Grade 30 and the area of high yield reinforcement is 1256mm². Determine the form and size of shear reinforcement required.

Marks 30

QUESTION FOUR

A square reinforced concrete column is required to support the following loads

Characteristic dead load 1000kN

Characteristic imposed load 1000kN

Design the column and reinforcement required using Grade 40 concrete and Grade 460 reinforcement.

Marks 25

QUESTION FIVE

Design an isolated footing required for the column in Question Four assuming the safe bearing pressure of the soil to be 150kN/m^2 . Assume the column is 300mm x 300mm.

Marks 25

