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 2006
DESIGN OF STRUCTURES II – TCW 5102

INSTRUCTIONS

Answer All Questions
Open Book Examination   **Time: 4hours**
                                                             Total Marks:100

QUESTION ONE

   Analyse the continuous beam for the three load cases shown in Figure 1.0. Draw the separate shear force and bending moment diagram for ultimate loads. Construct the maximum shear force and bending moment envelopes.
Assume characteristic dead load g_k = 20.0 kN/m;   TL – Total Load
**   characteristic imposed load q_k = 10.0 kN/m   DL – Dead Load**

Case 1.0	TL	TL	TL
Case 2.0	**DL**	**TL**	**DL**
Case 3.0	**TL**	**DL**	**TL**

8000	6000	8000

Figure 1.0

                                                             Marks 30

QUESTION TWO

 Design the end span of the continuous beam analysed in Question One. The materials are grade 30 concrete and grade 460 and 250 reinforcement. Assume cover to reinforcement as 30 mm

                                                             Marks 20

QUESTION THREE

Design a single angle tie to carry a characteristic dead load of 80kN and a characteristic imposed load of 35 kN and connected by
(a) welded connection – connected by long leg
(b) bolted connection – connected by long leg
     Material : Use Grade 43 steel

Marks25

QUESTION FOUR

    (a) Design an angle purlin for a roof with slope of 1 in 2.5. The purlins are simply supported and span 5.0m between roof trusses. The purlins are at 1.6m centers. The characteristic dead load, including self weight of purlin, is 0.35 kN/m^2 on the slope and the characteristic imposed load is 0.75 kN/m^2 on plan. Use Grade 43 steel.

Marks 15

(b)Design the purlin using the empirical method from BS 5950

Marks 10