**NATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY**
FACULTY OF ARCHITECTURE AND QUANTITY SURVEYING

**DEPARTMENT OF ARCHITECTURE**
BACHELOR OF ARCHITECTURAL STUDIES (HONOURS) DEGREE

PART I - SUPPLEMENTARY EXAMINATIONS - JULY 2005
**AAR 1206 – INTRODUCTION TO STRUCTURAL STATICS AND DYNAMICS**

*Instructions* ***Time: 2 Hours***

**Answer All Questions**

## QUESTION 1

a) There are various types of structural forms. Highlight the most important ones and how they can be used in different structural situations. (15 marks)

b) Define redundant supports, statically determinate structure and statically indeterminate structure (5 marks)

## QUESTION 2

a) Draw typical load-extension curve for mild steel highlighting elastic limit, yield point, ultimate strength point and fracture. (14 marks)

b) Explain the difference between elastic range and plastic range. (8 marks)

## QUESTION 3

A simply supported beam 10 m long carries a uniformly distributed load of 5 kN/m over the left half of the beam and a 80 kN load, 2 m from the right support and a 50kN load 3 m from the left support. Draw the shear force and bending moment diagrams. What is the position and magnitude of the maximum bending moment and shear force? (20 marks)

## QUESTION 4

a) Discuss the classes of trusses and suggest where each is appropriate to use. (8 marks)

b) A truss is loaded as shown in Fig.Q3. By the method of joints or otherwise determine the force in each member. (12 marks)

## QUESTION 5

a) For the section shown in Fig Q5, calculate:
i) the centroid of the section. (4 marks)
ii)the second moment of area about the x-axis and also the y-axis (16 marks)

Fig. Q3

Fig. Q5