

**NATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY
FACULTY OF ARCHITECTURE AND QUANTITY SURVEYING
BACHELOR OF ARCHITECTURE (HONOURS) DEGREE
BACHELOR OF QUANTITY SURVEYING (HONOURS) DEGREE
PART I SECOND SEMESTER SUPPLEMENTARY EXAMINATIONS – MAY 2005
INTRODUCTION TO STRUCTURAL STATICS AND DYNAMICS – AAR 1206**

Instructions:

Answer all questions. All questions carry equal marks

Total marks: 100

Time: 2 Hours

QUESTION 1

- 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 2

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 3

- 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 4

- 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 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