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

DEPARTMENT OF ARCHITECTURE
BACHELOR OF ARCHITECTURAL STUDIES (HONOURS) DEGREE

PART I – SECOND SEMESTER EXAMINATIONS - MAY 2005
AAR 1206 – INTRODUCTION TO MATERIALS AND CONSTRUCTION

Instructions ***Time: 3 Hours***

Answer All Questions

QUESTION 1

a) Draw a typical load-extension curve for mild steel illustrating the salient points. (12 marks)

b) Define i) yield stress
ii) elastic limit
iii) plastic range
iv) elastic range (8 marks)

QUESTION 2

a) Define tensile stress, compressive stress, shear stress, strain and modulus of elasticity. (5 marks)

b) A load of 400 kg has to be raised at the end of a steel wire. If the unit stress in the wire must not exceed 800kg/cm^2 what is the minimum diameter required? What will be the extension of 3.50 m length of wire?
Take E = 2 x 10^6 kg/cm^2 (10 marks)

c) A bar consists of 3 lengths as shown in Fig.Q2. Find the stresses in the 3 parts and the total extension of the bar for an axial pull of 2000 kg.
Take E = 2 x 10^6 kg/cm^2 (5 marks)

QUESTION 3

a) A simply supported beam of 10 m length is loaded as shown in Fig. Q3. Draw the shear force and bending moment diagrams. What is the maximum bending moment and shear force? (20 marks)

QUESTION 4

a) What are the important factors in the selection of structural systems. (4 marks)

b) What are the basic types of structural forms? How can they be used in different structural situations? (16 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 the y-axis (16 marks)

Fig Q2

Fig. Q3

Fig. Q5