

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 – APPLIED STRUCTURAL STATICS AND DYNAMICS

Instructions

Time: 2 Hours

Answer All Questions
Total Marks 100

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 800 kg/cm^2 what is the minimum diameter required? What will be the extension of 3.50 m length of wire?
Take $E = 2 \times 10^6 \text{ kg/cm}^2$ (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 $E = 2 \times 10^6 \text{ kg/cm}^2$ (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