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

DEPARTMENT OF ARCHITECTURE
BACHELOR OF ARCHITECTURAL STUDIES (HONOURS) DEGREE

PART II SECOND SEMESTER EXAMINATIONS – MAY 2003
AAR 2205 – STRUCTURAL DESIGN II

Instructions ***Time: 3 hours***
Question 1 and 2 are compulsory
Answer any 3 from the remaining questions
All Questions carry 20 marks.

Question 1

A section of floor is to be carried by 125mm x 75 mm timber joints spanning the 3m. length. The bending stress must not exceed 4.6 N/mm^2 the total inclusive load per m^2 of floor is estimate to be 2.0KN. At what cross centres in mm must the timber beams be fixed?

Question 2

Design a suitable R.C. column of square section to support an arial load of 1000KN. Size of column 400 mm x 400 mm. Design a suitable footing for the column. Safe bearing capacity of the soil = 200 KN/m^2. Permissable compressive stress in concrete = $4N/mm^2$, Permissible compressive stress in steel = 130 N/mm^2, Concrete m15 Grade.

Question 3

Design a simply supported slab having clear dimensions of 2.5m x 10 m. The long sides of the slab are supported on 230 mm thick brick walls on one side and 300 mm beam on the other side. Live load on the roof = 1.5 KN/m· *ty* = 250 N/mm2. *teu* = 3-N/mm2. Concrete m15 Grade.

Question 4

Design a cantilever 3.50 m. long carrying a live load of 10 600N/m. *ty* = 250 N/mm^2, *teu* = 30 N/mm^2 , Concrete m15 Grade.

Question 5

Design a rectangular singly reinforced beam having a clear span of 4.5 mt. for a super imported load of 60 KN per meter run. The beam has 30 cm bearing at the ends. *ty* = 250 N/mm^2, *teu* = 30 N/mm^2, Concrete m15 Grade.

Question 6

A reinforced concrete column 30 cm x 30 cm in section is reinforced with 8 bars of 20 mm diameter. If the permissible stress in concrete is 4 N/mm^2, find the safe compressive for the column, by simple elastic theory, and as per code take modular ratio = 18. Permissible stress in steel = 130 N/mm^2 .