UNIVERSITY OF JOHANNESBURG

DEPARTMENT OF CIVIL ENGINEERING SCIENCE

MODULE   :   STRUCTURAL ENGINEERING

CODE   :   SUSA411

EXAM   :   MAY 2014

DURATION :   3 HOURS

EXAMINERS: Dr S.O Ekolu

              Dr Alvin Masarira

INSTRUCTIONS: *OPEN BOOK - LECTURE NOTES, DESIGN TABLES ETC. ARE ALLOWED*
ATTEMPT ALL QUESTIONS
NOTE THE MARK ALLOCATIONS

Total of 4 Pages

QUESTION 4. GENERAL

(a) Distinguish between the principles applied to overcome failure of structural concrete by means of:-

(i) Reinforced concrete

(ii) Prestressed concrete

In each case, illustrate the concept using flexural failure of a beam.   [15]

(b) Derive from first principles, the design formula for axially loaded short reinforced concrete columns. In your derivation, clearly explain each step and the purpose/s of the factors applied.   [10]