BACHELOR OF ARCHITECTURE

Term-End Examination

June, 2012

00875

BAR-044 : THEORY OF STRUCTURES-V

Time : 3 hours   Maximum Marks : 70

Note :   Attempt any four questions. All questions carry equal
         marks.   Use of calculator and IS : 456 code is
         permitted .

1.   Determine moment of resistance of a beam of   17½
     rectangular section b × d = 350 × 500 mm
     reinforced with 4φ20. Use M20 concrete and
     Fe 415 steel. Assume nominal cover of 20mm and
     shear reinforcement of 8φ·

2.   Determine areas of tensile as well as compression   17½
     reinforcement for a doubly reinforced section of
     b × d = 375 × 500mm applied with a factored
     moment of 300 kN⁻ᵐ. Use M25 concrete and Fe
     415 steel and assume effective - cover of 50mm
     both for tensile as well as compression
     reinforcement.

3.   Design a roof slab simply supported on all its four   17½
     edges of effective span 3m × 7m. The top of the
     slab is covered with 100mm lime terrace. Imposed
     load may be taken as 1.5 kN/m². Take M20
     concrete and Fe 415 steel. Nominal cover may be
     taken as 20mm.

4. Design longitudinal reinforcement for a circular **17½**
   column of diameter 350 mm with lateral ties for a
   factored load of 1800 kN and effective length
   2.75m. Take M20 concrete and Fe 415 steel.

5. Determine the shear reinforcement in the form of **17½**
   vertical stirrups of $\phi 6$ for a rectangular cross -
   section of $b \times d = 250 \times 450$, reinforced with $4\phi 20$
   steel to resist 100 kN shear force. Use M25
   concrete, Fe 415 for main reinforcement and Fe
   250 for transverse reinforcement.

6. Determine the depth of a rectangular footing for **17½**
   a superimposed load of 1000 kN under a column
   of size 600mm × 400mm. The safe bearing
   capacity of soil is 250 kN/m^2. Use M 25 concrete
   and Fe 415 steel.

7. (a) Define bond stress and discuss the **4**
       mechanism of bond between concrete and
       reinforcement.

   (b) Define different types of bond with neat **4**
       sketches.

   (c) What are the objectives of earth quake **4**
       resistant design of reinforced concrete
       structures ?

   (d) What is shear wall ? How a shear wall is **5½**
       different from an ordinary wall with regard
       to function, loading and design ?