

**B. Tech. 4th Semester Civil Engg. E. Scheme**

**Examination, May-2014**

**DESIGN OF CONCRETE STRUCTURES-I**

**Paper-CE-206-F**

*Time allowed : 3 hours]*

*[Maximum marks : 100*

*Note : Attempt any five questions in all selecting one question from each unit. Question No. 1 is compulsory. All questions carry equal marks. Use M 20 concrete and Fe 415 grade steel.*

**1. Answer the following :**

- (i) What are the various mode by which a retaining wall can fail.
- (ii) Write a short note on splicing of reinforcement.
- (iii) What are the assumptions made in limit state of design.
- (iv) What do you understand by slenderness ratio and why it is necessary to keep it low.

**Unit-I**

- 2. (a) Write a short note on workability of concrete.**

3. (a) Describe stress ~ strain relation of steel in detail. 10
- (b) Write a short note on design philosophy of Reinforced concrete. 10

### Unit-II

4. (a) Write down various assumptions of working stress method. 5
- (b) A rectangular singly reinforced beam has a span of 5 mtr and carries a UDL of 25 k-Nm. The width of the beam is chosen as 300 mm. Find the depth and steel requirement for a balanced section. Solve by working stress method. 15
5. (a) Describe the reasons due to which a doubly reinforced is used. 5
- (b) A simply supported Rcc beam is 250 mm wide with effective depth as 500 mm. It is reinforced with 4 bars of 20 mm diameter as tensile reinforcement. If the beam is subjected to a factored shear of 95 kN at support, design the shear reinforcement consisting of vertical struss.

**Unit-III**

6. (a) Why in slab control of deflection is important and how it is ensured ? 6
- (b) Write down various steps involved in design of a two way slab by IS method. 14
7. (a) Write down in brief on reinforcement in columns. 6
- (b) What are the values of span effective depth for different types of beam and why they are different ? 7
- (c) What are the factors on which the bond strength between concrete and steel is dependent and how it can be increased ? 7

**Unit-IV**

8. (a) A square column  $400\text{ mm} \times 400\text{ mm}$  supports a total load of 1500 kNM. Design the column and a square footing for this column. The safe bearing capacity of soil is  $250\text{ kN/m}^2$ . 15

9. Design a Rcc Cantilever Retaining Wall having a 5 mtr tall stem. The wall retains soil level with its top soil density is  $18,000 \text{ kN/m}^3$  and has an angle of repose =  $30^\circ$ . The SBC of soil is  $2000 \text{ N/m}^2$ .