

FACULTY OF ENGINEERING**B.E. 3/4 (Civil) I-Semester (New) (Main) Examination, November / December 2012****Subject : Reinforced Cement Concrete****Time : 3 Hours****Max. Marks: 75****Note:** Answer **all** questions of Part - A and answer any **five** questions from Part-B.**PART – A (25 Marks)**

1. Define the nominal mix concrete and design mix concrete. (2)
2. What are the basic properties of concrete and steel materials? (3)
3. Give any two assumptions made in limit state method. (3)
4. How do you calculate the development length? (3)
5. Define equivalent shear and equivalent torque. (2)
6. Differentiate between one way slab and two way slab. (3)
7. How do you check the slabs for serviceability conditions? (2)
8. Explain the concept of virtual work method in yield line theory. (3)
9. How do you arrive minimum eccentricity in the design of columns? (2)
10. What are the IS specifications required for the design of isolated footings? (3)

PART – B (5x10=50 Marks)

- 11.(a) Explain the properties of fresh state concrete and hardened concrete. (6)
(b) Explain durability aspects of concrete. (4)
- 12.(a) Differentiate between limit state method and working stress method. (5)
(b) A singly reinforced concrete beam 250 mm wide 400mm deep to the centre of tensile reinforcement has a span of 6m, and carries a total uniformly distributed load 16 kN/m including its weight. If stresses in concrete and steel are not to exceed 7N/mm^2 and 240N/mm^2 respectively, find the steel reinforcement necessary. Take load as 12 kN/m. Use working stress method, modular ratio=14. (5)
13. Design a rectangular beam for an effective span of 6m. The super imposed load is 90 kN/m and size of the beam is limited to 40 cm x 80 cm overall. Use M20 grade concrete and Fe415 grade steel. Adopt limit state method.
14. A simply supported beam of 6m span has effective flange width of 100 cm, thickness of flange as 10 cm, breadth of the web as 25 cm and effective depth as 45 cm. There are four (4) bars of 20 mm diameter in tension and 3 bars of 18 mm in compression. Check the beam for deflection. Assume M₂₀ grade concrete and mild steel. Use limit state method.
15. Design a simply supported roof slab for a 8.5m x 4.0 m clear in size if the super imposed load is 5 kN/m². Use M20 grade concrete and Fe415 grade steel. Adopt limit state method. (10)
- 16.(a) Differentiate between uniaxial bending and biaxial bending. (4)
(b) A 3.5 m high column is effectively held in position at both the ends and restrained against rotation at one end. Its diameter is restricted to 42 cm. Calculate the reinforcement if it is required to carry a factored axial load of 1600 kN. Use M20 grade concrete and Fe415 grade steel. Use limit state method.
17. Writ the short notes on the following:
 - (a) Design procedure of slabs using yield line theory (4)
 - (b) IS codal provisions to design footings (3)
 - (c) Important design aspects of durability and detailing (3)