

R09

Code No: 09A50102

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY, HYDERABAD

B. Tech III Year I Semester Examinations, May/June – 2013

Design of Reinforced Concrete Structures

(Civil Engineering)

Time: 3 hours

Max. Marks: 75

Answer any five questions
All questions carry equal marks

- 1.a) Distinguish between working stress method and limit state method of design of R.C. structures.
- b) What are the basic requirements of structural design? [10+5]
2. Design a reinforced concrete beam which is supported on two walls 230 mm thick, spaced at a clear distance of 8 m. The beam carries a super imposed load of 60 kN/m. Use M20 concrete mix and HYSD bars. Sketch the reinforcement details. [15]
3. A simply supported R.C. beam, 300 mm wide and 500 mm deep, carries a factored u.d.l. of 100 kN/m including self weight over a span of 6 m. The beam is reinforced with 4 No's of 25 mm diameter bars of grade Fe 415 on tension face. Design the shear reinforcement using vertical stirrups. Take M 25 grade concrete. Effective cover is 50 mm. [15]
4. Design a R.C. slab for a room measuring 4 m × 6 m (inside). The slab carries a live load of 2 kN/m². The slab is simply supported at all the four edges with corners free to lift. The width of the supporting walls is 230 mm. Use M 20 grade concrete and Fe 415 grade steel. Sketch the reinforcement details. [15]
5. Design a rectangular isolated footing (uniform thickness) for a column of size 400 mm × 600 mm carrying an axial load of 1200 kN. The S.B.C. of the soil is 200 kN / m². Use M 25 grade concrete and Fe 415 grade steel. Sketch the reinforcement details. [15]
6. A short R.C. column has a diameter of 450 mm, and is reinforced with 8 bars of 16 mm diameter, placed with a clear cover of 40 mm. Determine the load carrying capacity of the column if the transverse reinforcement consists of
 - i) 8 mm dia. Mildsteel ties @ 200 mm c/c.
 - ii) 8 mm spirals of Fe 415 steel, arranged at a pitch of 50 mm.Use M 20 concrete and Fe 415 grade steel for longitudinal bars. [16]
- 7.a) What are the various remedial measures for control of cracking?
- b) A doubly reinforced beam of rectangular section 300 mm wide × 500 mm overall depth is reinforced with 4 bars of 20 mm diameter on the tension face and 2 bars of 16 mm diameter on the compression face. The effective cover is 50 mm. The beam spans over 8 m. Check the deflection control if Fe 415 steel is used. [5+10]
8. Design a dog legged stair for a building in which the vertical distance between floors is 3.6 m. The stair hall measures 2.5 m × 5 m. The live load may be taken as 2.5 kN/m². Use M20 concrete and HYSD bars. [15]
