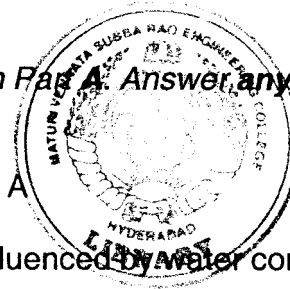


**FACULTY OF ENGINEERING**  
**B.E. 3/4 (Civil) I Semester (Main) Examination, December 2011**  
**REINFORCED CEMENT CONCRETE**

Time: 3 Hours]

[Max. Marks: 75

**Note :** Answer *all* questions from Part A. Answer *any five* questions from Part B.



## PART – A

(25 Marks)

1. What is workability ? How the workability is influenced by water content ? 3
2. What minimum cement content is maintained in the concrete ? 2
3. Calculate working design constants for M15 concrete and Fe 415 steel. 2
4. What do you understand by partial safety factors in limit state design of concrete ? 3
5. What under reinforced sections are preferred in beam design ? Explain. 3
6. What are the types of reinforcements used to resist shear in beams ? 2
7. Define development length and what is its significance. 3
8. Briefly discuss about the limit state of serviceability in beams. 3
9. Locate critical sections for bending moment and shear force in a cantilever beam. 2
10. What is the importance of lateral ties in columns ? 2

## PART – B

(50 Marks)

11. a) Compare 'working stress method' and 'limit state method'. 5  
 b) What are the Bogue's compounds in cement ? How do they influence its setting and strength properties ? 5
12. Design an intermediate T beam in a hall of 27m×6m effective dimensions with the beams of 230 mm width are spaced at 3m centre to centre and are simply supported at ends. The beams are cast monolithically with the slab of 125 mm thickness, which has to support a superimposed working load of 3 kN/m in addition to its self weight. Adopt M20 concrete and Fe 415 steel. 10

13. A 12m R.C. rectangular beam of 300mm × 725mm over all dimensions has simply supported at ends. At mid section of the beam, the bottom reinforcement is provided with 8 nos of 25 mm dia bars and top reinforcement is provided with 3 nos of 20 mm dia bars. Check the deflection requirements for the beam according to IS 456 : 2000. M20 concrete and Fe 415 steel are used. 10
14. Design a R.C. slab for a room size of 5.5m × 5.0m. the slab is to be cast monolithically over the beams with corners held down. The width of the supporting beam is 230 mm and the slab carries superimposed load of 3.5 kN/m<sup>2</sup>. Use M20 concrete and Fe 415 steel. 10
15. Design a circular column to carry an axial working load of 1000 kN. Use helical reinforcement as lateral reinforcement. Adopt M20 concrete and Fe 415 steel. 10
16. Design an isolated footing for a column of size 400mm × 400mm, reinforced with 6 bars of 20 mm diameter and carrying an axial load of 900 kN. The bearing capacity of the soil is 275 kN/m<sup>2</sup>. Use M20 concrete and Fe 415 steel. 10
17. Explain the following : (2.5×4=10)
- a) Factors influencing development length
  - b) Long term deflections in beams
  - c) Torsional reinforcement in slabs
  - d) Mineral admixtures.