Name : .....

Roll No. : .....

Invigilator's Signature : .....

CS/M.TECH (CE)/SEM-1/CE-614/2012-13

2012

ADVANCED REINFORCED CONCRETE DESIGN

Time Allotted : 3 Hours Full Marks : 70

The figures in the margin indicate full marks.

Candidates are required to give their answers in their own words as far as practicable.

GROUP – A

Answer any *four* questions. 4 × 5 = 20

1. What reasons do you ascribe to concrete gaining the status of the most widely used construction material ?

2. The occurrence of flexural tension in reinforced concrete is well known. Cite practical examples where tension occurs in other forms in reinforced concrete ?

3. Distinguish between structural design and structural analysis. List of the steps involved in the process of structural design.

4. Consider a typical reinforced concrete building in your institution. Identify the various structure.

5. Discuss the merits and demerits of the tradional methods of design (working stress method, ultimate load method).

GROUP – B

Answer any *five* questions. 5 × 10 = 50

6. Define characteristic strength. Determine the mean target strength required for the mix design of M25 concrete. Assuming moderate quality control. Enumerate the steps involved in the Indian Standard Method of mix design.

7. Can concrete be assumed to be linear elastic material ? Discuss. Distinguish between static modulus and dynamic modulus of elasticity of concrete. Is the modulous rupture of concrete equal to its direct tensile strength ? Discuss.

8. How would you defined durable concrete ? Discuss the ways of ensuring durability. Cite two examples each for the fine categories of 'environmental exposure' described in the code ? Describe the main factors that affect the permeability of concrete ?

9. Consider the temperature gradient across the shell thickness of a reinforced concrete chimney (with tubular cross section). Where would you provide a reinforcing steel to resist tensile stresses due to the effect of temperature alone (caused by the emission of hot gases), close to the outer circumference or closed to the inner circumference ? Justify your answer ?

10. a) How does creep of concrete affect the modular ratio ?

    b) What is the difference between deterministic design and probabilistic design ?

    c) Why is it difficult to undertake a fully probabilistic design of a structure in practice ?

11. What do you mean by limit state ? Discuss the different limit states to be considered in reinforced concrete design. What is meant by calibration of codes ?

12. What is fundamental assumption in flexual theory ? It is valid for at the ultimate state. Explain the concept of 'transformed section', as applied to the analysis of reinforced concrete beams under service loads.