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**Eighth Semester B.E. Degree Examination, June/July 2017**  
**Advanced Concrete Technology**

Time: 3 hrs.

Max. Marks:100

**Note: 1. Answer any FIVE full questions, selecting  
atleast TWO questions from each part.**  
**2. Use of IS10262-2009 is permitted and ACI code permitted.**

**PART – A**

- 1 a. Explain the structure of hydrated cement paste, with a neat sketch. (10 Marks)  
b. Discuss the factors that effect the strength and elasticity of concrete. (10 Marks)
- 2 a. Emphasize the function of “plasticizer” as a water reducing agent with neat sketch. (08 Marks)  
b. How does super plasticizer influence the behaviour of concrete in fresh and hardened state? (12 Marks)
- 3 a. List the methods available for proportioning concrete mix. (04 Marks)  
b. Design a concrete mix for a reinforced concrete structure with the following data, as per IS recommendations.
- Characteristic strength of 28 days – 25 MPa.
  - Max. nominal size of agg. angular – 20 mm
  - Degree of workability – Medium
  - Fine aggregate – Natural river sand confirming to zone-III
  - Cement – Ordinary Portland grade 43
  - Sp. gravity – 3.15
  - Bulk density – 1450 kg/m<sup>3</sup>
  - Aggregate properties -
- |                                   |      |      |            |
|-----------------------------------|------|------|------------|
|                                   | FA   | CA   |            |
| - Sp. gravity                     | 2.60 | 2.65 |            |
| - Bulk density, kg/m <sup>3</sup> | 1700 | 1800 |            |
| - Free surface moisture, %        | 2.0  | 1.0  |            |
| - Fineness modulus                | 2.2  | 6.0  | (16 Marks) |
- 4 a. State the factors influencing the permeability of concrete. Explain how size of agg. affect permeability. (08 Marks)  
b. How does Alkali-Aggregate reaction play a role in durability of concrete? (08 Marks)  
c. Mention the method for controlling sulphate attack. (04 Marks)

**PART – B**

- 5 a. Describe the three principle categories of manufacturing ready mixed concrete. (08 Marks)  
b. State the various tests conducted to know the property of self compacting concrete. Explain any two tests with neat sketch. (12 Marks)
- 6 a. Explain the behavior of fiber reinforced concrete in tension. (10 Marks)  
b. Calculate the increase in cracking stress of the composite uniaxial tension for a steel fiber reinforcement cement having volume fraction of fiber = 0.025. Given  $E_f = 180 \times 10^3 \text{ N/mm}^2$ ,  $E_m = 20 \times 10^3 \text{ N/mm}^2$ . Also calculate modulus of the composite. (10 Marks)

- 7 a. What are the different aggregates that would be used in light weight concrete? Mention the demerits of light weight concrete. (08 Marks)
- b. Design a light weight concrete mix to suit the following requirements:
- (i) Specified 28 day comp. strength =  $12 \text{ N/mm}^2$
  - (ii) Control factor = 0.8
  - (iii) Type of agg = leftag & leca
  - (iv) Required workability – High
  - (v) Relative density [air] = 1.3
- Fine and coarse aggregates have 4% and 5% moisture content respectively. Use relevant codes/charts. (12 Marks)
- 8 a. List the tests conducted on Hardened concrete. Explain the tension test on concrete specimen. (10 Marks)
- b. Mention the properties of hardened concrete that could be evaluated through N.D.T. Describe 'Rebound-Hammer' test. (10 Marks)

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