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10CV81

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^3
- Aggregate properties -

	FA	CA
- Sp. gravity	2.60	2.65
- Bulk density, kg/m^3	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 $E_f = 180\times10^3$ N/mm^2, $E_m = 20\times10^3$ 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 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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