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P.E.S. College of Engineering, Mandya - 571 401

(An Autonomous Institution affiliated to VTU, Belgaum)

Seventh Semester, B.E. – Civil Engineering

Semester End Examination; Dec. - 2014

Advanced Concrete Technology

Time: 3 hrs

Max. Marks: 100

Note: i) Answer any **FIVE** full questions, selecting at least **TWO** full questions from each part.
ii) Assume suitable missing data if any. iii) Use of IS : 10262 – 2009 is permitted.

PART – A

1. a. Explain the various oxide and compound compositions of OPC. What is their influence? 12
Explain with the help of neat diagrams.
- b. What is transition zone in concrete? How to improve the quality of the transition zone? 8
- 2 a. Explain the action of super plasticizer with the help of neat sketch. How is it different from 10
hyperplasticizer.
- b. Explain the importance of superplasticizer as a workability agent, strength enhancer and 10
cement saver.
- 3 . Design a concrete mix of M30 grade for the following data using flyash and superplasticizer,
 - a) Maximum size of aggregate : 20 mm angular
 - b) Maximum / minimum cement : 430 kg /m³ / 320 kg / m³
 - c) Maximum W/C : 0.45
 - d) Exposure condition : Moderate
 - e) Workability : 100 mm slump for pumping
 - f) Quality control : Good
 - g) Chemical admixture : Permitted
 - h) OPC : 53 grade
 - i) Specific gravity : SP = 1.12
Cement = 3.12
Flyash = 2.20
 - j) Mineral admixture : Grade I flyash permitted
 - k) Coarse aggregate : Specific gravity : 2.65
Water absorption : 0.40
free moisture content : Nil
 - l) Fine aggregate : Zone III
Specific gravity : 2.60
Water absorption : 0.8%
Free moisture content : Nil

- 4.a. What is durability of concrete? Explain the various factors which affect the same. 10
- b. Explain the corrosion action with the help of a neat sketch. Explain the various methods employed in practice to control the corrosion of steel in concrete. 10

PART – B

- 5. a. Explain the various advantages of RMC. What are the various precautions to be taken while using RMC? 8
- b. Explain any two properties of high volume flyash concrete. 6
- c. Mention the various tests conducted on fresh SCC. Give the typical range for test results. 6
- 6 a. Define the following as applied to SFRC:
 - i) Aspect ratio 6
 - ii) Volume fraction
 - iii) Critical length of fiber.
- b. Explain the effect of AR and VF on strength and workability of SFRC with the help of sketches. 8
- c. What is ferro-cement? What are their advantages? 6
- 7 a. What is structural light weight concrete? Explain the typical mix details for LWC. 6
- b. What are the advantages of using high performance concrete? 6
- c. Mention the types of aggregates used in high density concrete. What are their properties? 8
- 8 a. Explain the significance of H/D ratio and rate of loading on compressive strength of concrete. 8
- b. Explain how ultrasonic pulse velocity test is conducted. Explain the typical range of UPV for defining the quality of concrete. 8
- c. Mention the various factors which affect the rebound hammer readings. 4

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