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Question Paper Code: BST205



INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

M.Tech I Semester End Examinations (Regular) - January, 2018

Regulation: IARE-R16

ADVANCED CONCRETE TECHNOLOGY

(Structural Engineering)

Time: 3 Hours

Max Marks: 70

Answer ONE Question from each Unit

All Questions Carry Equal Marks

All parts of the question must be answered in one place only

UNIT – I

- (a) Describe the importance of the quality of water for concreting. Explain any one test to ensure the quality of water used for concreting. [7M]

(b) What are the various tests which are to be done on aggregates? Explain in detail any two tests for aggregates. [7M]
- (a) Discuss in brief factors promoting alkali aggregate reaction? Explain the methods for control of alkali aggregate reaction? [7M]

(b) Write a brief note on mineral admixtures? Explain the effect of flyash on fresh concrete and hardened concrete? [7M]

UNIT – II

- (a) What is workability? Explain in detail any two tests for measurement of workability of concrete? [7M]

(b) Explain the significance of setting time of fresh concrete? How to determine the setting time of fresh concrete using penetrometer test? [7M]
- (a) Explain briefly the factors effecting creep of concrete? Discuss the effects of creep on concrete structures? [7M]

(b) Define durability of concrete. Explain in detail the impact of W/C ratio on durability of concrete. [7M]

UNIT – III

- (a) What is ultra high strength concrete? Explain the techniques for producing ultra high strength concrete? [7M]

(b) Explain any four mechanisms affecting the performance of high performance concrete? [7M]
- (a) Explain in detail the fresh state properties of high-strength concrete? [7M]

(b) Write a note on high-performance concrete. Explain the role of aggregates in high-performance concrete. [7M]

UNIT – IV

7. (a) Discuss in detail about workability aspect of structural light weight concrete. [7M]
(b) What are the various tests conducted on polymer concrete? Discuss the precautions to be taken while testing polymer concrete and how do you ensure the quality of the product? [7M]
8. (a) Explain the behavior of fiber reinforced concrete in tension and compression. [7M]
(b) What is self-compacting concrete? Write a note on material and mineral admixtures for Self-compacting concrete. [7M]

UNIT – V

9. (a) Define mean strength, variance, standard deviation and coefficient of variation. Write a note on concept of mix design. [7M]
(b) Describe the procedure in adopting the ACI method of concrete mix design. [7M]
10. (a) Explain briefly the physical properties of materials required for mix design. [7M]
(b) Design the concrete mix for M30 grade of concrete with the following data: (adopt IS method) [7M]
Characteristic strength required at site: 30 N/mm^2
Maximum size of aggregate: 20 mm
Shape of CA: Angular
Exposure condition: Severe
Degree of workability: 0.85
Degree of quality control: Fair
Cement used: Grade 53
Sp. Gravity of cement: 3.15
Sp. Gr of CA: 2.67
Sp. Gr of FA: 2.6
Water absorption of CA: 0.5%
Entrapped air: 2%
Free surface moisture of CA: Nil
Free surface moisture of FA: 2%
Grading of CA conforming to Table 2 of IS 383
Grading of FA conforming to grading Zone 2.
Assume suitably any missing data.