Roll No. | | | | | | | | | | |

## ANNA UNIVERSITY (UNIVERSITY DEPARTMENTS)



## B.E. /B.Tech / (Full Time) - END SEMESTER EXAMINATIONS, NOV / DEC 2023

CIVIL ENGINEERING
5TH Semester
**CE 5031 – Concrete Technology**
(Regulation 2019)

Time:3hrs Max.Marks: 100

| | |
|---|---|
| CO1 | Have thorough knowledge of the fresh and mechanical properties of concrete |
| CO2 | Explain the effect of admixtures on the behavior of concrete |
| CO3 | Design concrete mix by IS method and be aware of the acceptance criteria as per code |
| CO4 | Explore the application of special concretes for practical purpose and special concreting methods |
| CO5 | Describe and carry out non destructive and durability test on concrete |

**BL – Bloom's Taxonomy Levels**
(L1-Remembering, L2-Understanding, L3-Applying, L4-Analysing, L5-Evaluating, L6-Creating)

### PART- A(10x2=20Marks)
(Answer all Questions)

| Q.No | Questions | Marks | CO | BL |
|---|---|---|---|---|
| 1 | What are Bogue's compounds? | 2 | 1 | 1 |
| 2 | Specify the importance of grading in concrete making. | 2 | 1 | 2 |
| 3 | Differentiate between plasticizers and super-plasticizers. | 2 | 2 | 2 |
| 4 | List any type of commercially available chemical admixtures (Two nos) | 2 | 2 | 1 |
| 5 | Specify the code provisions for the minimum frequency of sampling for the designed concrete mix. | 2 | 3 | 2 |
| 6 | Give reasons for variation in compressive strength of the samples of same mix. | 2 | 3 | 2 |
| 7 | What are the applications of light weight concrete? | 2 | 4 | 1 |
| 8 | Enumerate the parameters that affect the strengths of geo-polymer concrete. | 2 | 4 | 1 |
| 9 | What are the factors that influence the UPV test results? | 2 | 5 | 1 |
| 10 | How does exposure to chemicals impact concrete durability? | 2 | 5 | 2 |

### PART- B(5x 13=65Marks)
(Restrict to a maximum of 2 subdivisions)

| Q.No | Questions | Marks | CO | BL |
|---|---|---|---|---|
| 11 (a) (i) | Describe the measures to be taken during manufacturing to ensure the quality and consistency of concrete. | 6 | 1 | 2 |
| (ii) | Also specify the testing procedures that are employed to monitor the parameters for quality control in concrete? | 7 | 1 | 2 |
| | OR | | | |
| 11 (b) (i) | How does the curing process affect the strength development of concrete? | 5 | 1 | 2 |
| (ii) | Explain in detail **Any Two** methods to assess the concrete strength? | 8 | 1 | 2 |

| | | | | |
|---|---|---|---|---|
| 12 (a) (i) | What are the primary functions of admixtures in concrete, and how do they enhance various properties such as workability, strength, durability, or setting time (with suitable example)? | **13** | 2 | 2 |
| | **OR** | | | |
| 12 (b) (i) | Describe the different types of mineral admixtures used in concrete (Any Two). How are they classified based on their functions. | **13** | 2 | 2 |
| 13 (a) (i) | Design a concrete mix for reinforced concrete work for the following requirements using IS method<br>Characteristic strength at 28 days : 65 MPa<br>Exposure condition : Severe<br>Degree of workability : slump = 105 mm<br>Quality control : very good<br>Cement : OPC (specific gravity = 3.15,)<br>Sand : zone II (specific gravity = 2.6,)<br>Coarse aggregate : max. size 20 mm (angular, specific gravity = 2.7)<br>Water absorption of coarse aggregate = 1%<br>Free surface moisture in sand = 2%<br>Assume any data required. (Use any one supplementary mineral admixtures like flyash, GGBS etc) | **13** | 3 | 5 |
| | **OR** | | | |
| 13 (b) (i) | Design a concrete mix for reinforced concrete work for the following requirements using IS method<br>Characteristic strength at 28 days : 35 MPa<br>Exposure condition : Severe<br>Degree of workability : slump = 125 mm<br>Quality control : good<br>Cement : OPC (specific gravity = 3.15,)<br>Sand : zone III (specific gravity = 2.65,)<br>Coarse aggregate : max. size 20 mm (angular, specific gravity = 2.7)<br>Water absorption of coarse aggregate = 1.5 %<br>Free surface moisture in sand =0.5 %<br>Assume any data required. | **13** | 3 | 5 |
| 14 (a) (i) | Enumerate the tests to be conducted in self compacting concrete with their permissible limits. Explain any two methods in detail. | **13** | 4 | 1 |
| | **OR** | | | |
| 14 (b) (i) | Brief the production of geo-polymer concrete and enlist the salient parameters affecting the compressive strength of geo-polymer concrete. | **13** | 4 | 1 |
| 15 (a) (i) | How can the data obtained through NDT be effectively interpreted and analyzed to make informed decisions about concrete maintenance, repair, or replacement? | **13** | 5 | 2 |
| | **OR** | | | |
| 15 (b) (i) | Explain the mechanism of corrosion of reinforcement in concrete and discuss any one method of assessing the level of corrosion. | **13** | 5 | 2 |

## PART- C(1x 15=15Marks)

(Q.No.16 is compulsory)

| Q.No | Questions | Marks | CO | BL |
|---|---|---|---|---|
| 16. | Discuss the Hot Weather Concreting in detail. Explain the problems associated with it with a case study? How can be these problems overcome? | 16 15 | 4 | 6 |