**Q. Code:439303**

**Reg. No.** | | | | | | | | | | | | | |

## B.E / B.TECH. DEGREE EXAMINATION, MAY 2023

Seventh Semester

## CE18021 – REPAIR AND REHABILITATION OF STRUCTURES

*(Civil Engineering)*

**(Regulation 2018)**

**TIME: 3 HOURS** **MAX. MARKS: 100**

**CO 1** Illustrate the assessment of damages in the structures and its causes.

**CO 2** Describe the effects of climate, temperature and cover thickness on the strength and durability properties of concrete.

**CO 3** Identify the suitable types of special concretes for repair

**CO 4** Identify the techniques for repair and protection methods

**CO 5** Differentiate the repair, rehabilitation and retrofitting of structures and demolition techniques.

**PART- A (10 x 2 = 20 Marks)**

(Answer all Questions)

| | | CO | RBT LEVEL |
|---|---|---|---|
| **1.** | Differentiate between maintenance and rehabilitation. | **1** | **2** |
| **2.** | List any four causes of deterioration of structures. | **1** | **1** |
| **3.** | Distinguish between structural cracks and non-structural cracks with an example. | **2** | **2** |
| **4.** | State the importance of cover thickness in concrete. | **2** | **1** |
| **5.** | State the merits and applications of sulphur infiltrated concrete in construction practice. | **3** | **1** |
| **6.** | List two industrial wastes used as an alternative ingredient in concrete. | **3** | **1** |
| **7.** | Distinguish between anodic and cathodic inhibitors. | **4** | **2** |
| **8.** | Under what situations the use of underpinning is warranted? | **4** | **2** |
| **9.** | What is meant by jacketing? | **5** | **1** |
| **10.** | What are the safety measures to be taken during the demolition? | **5** | **1** |

**PART- B (5 x 14 = 70 Marks)**

| | | Marks | CO | RBT LEVEL |
|---|---|---|---|---|
| **11. (a)** | Demonstrate the systematic approach to diagnose the defects in RC buildings with the help of flow chart. | **(14)** | **1** | **3** |
| | **(OR)** | | | |
| **(b)** | Illustrate the inspection that has to be carried out during and after the construction of RC structure. | **(14)** | **1** | **3** |

| | | | | | |
|---|---|---|---|---|---|
| **12. (a)** | Discuss about the effect of sustained elevated temperature on concrete and steel. | **(14)** | **2** | **3** |
| | **(OR)** | | | |
| **(b)** | **(i)** Explain the different types of cracks which affects the durability of concrete. | **(7)** | **2** | **3** |
| | **(ii)** Explain the importance of concrete cover in RCC structures. Give recommendations of IS 456 – 2000 for various exposure conditions with nominal cover. | **(7)** | **2** | **3** |
| **13. (a)** | **(i)** Write short notes on self compacting concrete. List out the methods of testing self compacting concrete and explain any one method in detail. | **(8)** | **3** | **3** |
| | **(ii)** Write short notes on geopolymer concrete. | **(6)** | **3** | **3** |
| | **(OR)** | | | |
| **(b)** | Suppose you are designing an explosive resistant structure in Chennai. As a civil engineer, recommend a suitable special concrete to withstand high energy absorbing characteristics. Also explain in detail about its properties, types and its applications. | **(14)** | **3** | **3** |
| **14. (a)** | Explain the method in which the longitudinal pulse velocity (km/s) is used to predict the quality of concrete. | **(14)** | **4** | **3** |
| | **(OR)** | | | |
| **(b)** | Summarize the process of epoxy injection. Also explain routing and sealing with sketches. | **(14)** | **4** | **3** |
| **15. (a)** | Enumerate in detail about the different techniques involved in demolition of a building. | **(14)** | **5** | **3** |
| | **(OR)** | | | |
| **(b)** | State and explain the various methods for strengthening a concrete with low member strength. | **(14)** | **5** | **3** |

## PART- C (1 x 10 = 10 Marks)

(Q.No.16 is compulsory)

| | | Marks | CO | RBT LEVEL |
|---|---|---|---|---|
| **16.** | Explain cathodic protection mechanism with the help of neat sketch. | **(10)** | **4** | **3** |