

Register No.: Name:

SAINTGITS COLLEGE OF ENGINEERING (AUTONOMOUS)

(AFFILIATED TO APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY, THIRUVANANTHAPURAM)

SECOND SEMESTER M.TECH DEGREE EXAMINATION (Regular), MAY 2023**STRUCTURAL ENGINEERING AND CONSTRUCTION MANAGEMENT****(2021 Scheme)****Course Code: 21SC205-A****Course Name: Microstructure and Innovations in Structural Concrete****Max. Marks: 60****Duration: 3 Hours**

Use of IS 456-2000 and IS 10262-2019 are permitted

PART A

(Answer all questions. Each question carries 3 marks)

1. How can the transition zone in concrete be improved?
2. Why is understanding the rheological behavior of fresh concrete important?
3. How is self-compacting concrete tested?
4. What are some common durability issues with concrete?
5. What are the benefits of using supplementary cementitious materials in concrete?
6. List out the challenges associated with the use of alternative materials in the replacement of fine aggregates?
7. What are some applications of SEM analysis in concrete?
8. How is XRD used to identify the major phases present in cement paste?

PART B

(Answer one full question from each module, each question carries 6 marks)

MODULE I

9. a) How can voids in hydrated cement paste be minimized or eliminated? (3)
b) What is the strength of hydrated cement paste? (3)

OR

10. How can the strength, dimensional stability, and durability of hydrated cement paste be improved? (6)

MODULE II

11. Explain the effect of binder composition on the Bingham parameters. (6)

OR

12. Prepare mix design for M80 grade concrete using IS 10262-2019. (6)

MODULE III

13. Prepare mix design for M60 grade Self compacting concrete using IS 10262-2019. (6)

OR

14. What factors can affect the filling ability of fines, flowability, and fluidity of self-compacting concrete? (6)

MODULE IV

15. How does temperature affect the strength and durability of concrete? (6)

OR

16. Write a note on spalling of concrete. Discuss causes, identification, and preventive measures of spalling of concrete. (6)

MODULE V

17. Describe the mechanism of action of plasticizers with neat sketch. Mention any three Super plasticizers. (6)

OR

18. What is fibre-reinforced concrete (FRC) and how does it differ from traditional concrete? (6)

MODULE VI

19. What are some of the key features that can be observed in SEM images of concrete, and how do these relate to the material's properties? (6)

OR

20. What are some of the key considerations in preparing samples for XRD analysis of hydrated cement paste? (6)
