

Register No.: ..... Name: .....

**SAINTGITS COLLEGE OF ENGINEERING (AUTONOMOUS)**

(AFFILIATED TO APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY, THIRUVANANTHAPURAM)

**SECOND SEMESTER M.TECH DEGREE EXAMINATION (Regular), JULY 2022****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. Explain the effect of transition zone on the mechanical properties of concrete.
2. List the different methods of curing.
3. Explain the effect of binder composition on the Bingham parameters.
4. What do you mean by thermal capacity and thermal diffusivity?
5. Discuss the manufacture; properties and applications of light weight concrete.
6. Explain briefly about fibre reinforced concrete.
7. Explain X-ray Diffraction Analysis (XRD).
8. Figure 1 shows the SEM image of cement paste. Identify the compounds 1 and 2.

**PART B***(Answer one full question from each module, each question carries 6 marks)***MODULE I**

9. a) Explain the effect of transition zone on the mechanical properties of concrete. (4)  
b) Why does the compressive strength of concrete is higher than its tensile strength by an order of magnitude. (2)

**OR**

10. What do you mean by Hydrated cement paste? Explain the voids and solids in Hydrated cement paste mentioning their functions and size with neat sketches. (6)

**MODULE II**

11. Explain Creep and shrinkage of concrete. (6)

**OR**

12. Prepare a Design Mix for M80 grade concrete using IS 10262. Method of concrete placing: Pumping. (6)

**MODULE III**

13. Explain the terms and definitions used for Self-Compacting Concrete. (6)

**OR**

14. Describe the engineering properties of Self-Compacting Concrete. (6)

**MODULE IV**

15. Explain the procedure of any two durability test on concrete. (6)

**OR**

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

**MODULE V**

17. Discuss the emerging trends in replacement of fine aggregates. (6)

**OR**

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

**MODULE VI**

19. Distinguish the sample preparation in SEM and XRD technique. (6)

**OR**

20. Describe the significance of interpretation of TGA curves related to concrete. (6)

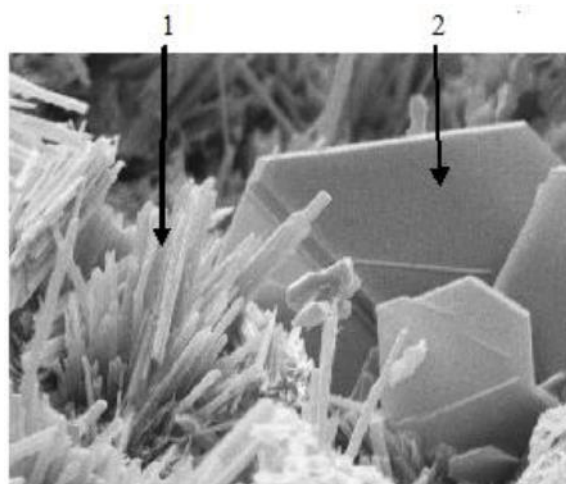


Figure 1

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