



## P.E.S. College of Engineering, Mandya - 571 401

(An Autonomous Institution affiliated to VTU, Belagavi)

**Third Semester, M. Tech - Civil Engineering (MCAD)**

**Semester End Examination; Dec.- 2019**

**Advances in Concrete and Geosynthetics**

*Time: 3 hrs*

*Max. Marks: 100*

*Note: Answer FIVE full questions, selecting ONE full question from each unit.*

### UNIT - I

- 1 a. Explain with neat sketch, the transition zone in concrete. How will it influence the strength of concrete? 10
- b. Define alkali-aggregate reaction. State the factors influencing the reaction. Explain how to reduce the expansion of concrete due to this reaction? 10
- 2 a. Explain the different nano materials used in concrete and how they influence the properties of concrete? 10
- b. Write a note on 'Corrosion' and 'Carbonation' in concrete. 10

### UNIT - II

- 3 a. Explain the principle used to find the compressive strength of concrete by surface hardness test. List the limitation of this test. Also list the factors influencing the surface hardness. 10
- b. What is fiber reinforced concrete? Explain the effect of 'fiber content' and 'aspect ratio' on 'Workability' and 'Compressive strength' in steel fiber reinforced concrete. 10
- 4 a. Explain the principle used to find the compressive strength of concrete by ultrasonic pulse velocity test. Discuss the factors influencing the pulse velocity through concrete. 10
- b. What is ferro cement? Discuss briefly the constituent's materials of ferro cement. List the practical applications of ferro cement. 10

### UNIT - III

- 5 a. Define ready mix concrete. What precautions should be taken during manufacturing, transporting and placing of ready mix concrete? 10
- b. What is high density concrete? List the constituent materials used in the production. Explain how this concrete acts as a shielding material against radiation? 10
- 6 a. Write a note on 'Sprayed' and 'Pumped' concrete. 10
- b. Define light weight concrete. Explain the typical material used in preparing this concrete. Write a note on 'Workability' and 'Strength' of light weight concrete. 10

### UNIT - IV

- 7 a. Define high strength concrete. Explain the importance of using mineral admixtures in high strength concrete. List the different minerals admixtures used in high strength concrete. 10
- b. Write a note on "roller compacted concrete" and "bacterial concrete". 10

- 8 a. What is self consolidating concrete? Discuss the different methods to determine the workability of SCC. 10
- b. Explain the process involved in producing polymer impregnated concrete. Discuss the 'mechanical properties' and 'durability' of polymer impregnated concrete. 10

**UNIT - V**

- 9 a. What is a geosynthetic? Explain the necessity of using geosynthetics in civil engineering field. State some typical applications of geosynthetics. 10
- b. Discuss the geometrical aspects, hydraulic properties, and durability of geosynthetics. 10
- 10 a. What are geogrids? Explain with sketches the different types of geogrids. State some important applications of geogrids. 10
- b. Explain how geosynthetics can be used for separation, filtration and reinforcement in civil engineering field? 10

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