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## Fourth Semester B.E. Degree Examination, Dec.2023/Jan.2024

### Concrete Technology

Time: 3 hrs.

Max. Marks: 100

**Note:** 1. Answer any FIVE full questions, choosing ONE full question from each module.  
 2. Use of IS-10262 – 2019 is permitted.  
 3. Use of IS-456 is permitted.

#### Module-1

- 1 a. Explain the manufacture process of cement by dry process using flow chart. (10 Marks)
- b. Explain the constituents of cement with their percentage and functions. (10 Marks)

OR

- 2 a. What is an Admixture? What are the effects of air entrainment and retarders on the properties of concrete? (10 Marks)
- b. What are the different types of coarse aggregate tests? Explain any two type of aggregate tests with neat sketch and appropriate formulas used. (10 Marks)

#### Module-2

- 3 a. Explain two laboratory tests for measurement of workability. (10 Marks)
- b. What is the importance of curing in concrete? Briefly discuss any two methods. (10 Marks)

OR

- 4 a. Explain the manufacturing process of concrete. (12 Marks)
- b. Explain segregation and bleeding of concrete. (08 Marks)

#### Module-3

- 5 a. Explain the types of shrinkage in concrete. (08 Marks)
- b. Discuss the factors affecting strength of concrete. (12 Marks)

OR

- 6 a. What are the internal and external factors influence the durability of concrete? (10 Marks)
- b. Explain the rebound hammer test and ultrasonic pulse velocity test. (10 Marks)

#### Module-4

- 7 a. Write the steps involved in the methods of mix design. (12 Marks)
- b. Explain the concept of mix design. (08 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.  
 2. Any revealing of identification, appeal to evaluator and /or equations written eg. 42+8 = 50, will be treated as malpractice.

OR

- 8 Design a concrete mix for  $M_{40}$
- Grade designation :  $M_{40}$
  - Type of cement : PPC
  - Max Nominal size of aggregate 20mm down size
  - Min cement content and max water-cement ratio to be adopted and/or : severe (for reinforced concrete). Exposure conditions as per table 3 and table 5 of IS456.
  - Workability : 75mm (slump)
  - Method of concrete placing : chute (non pumpable)
  - Degree of site control : Good
  - Type of aggregate : crushed angular aggregate
  - Maximum cement content not :  $450 \text{ kg/m}^3$  including fly ash
  - Chemical admixture type : super plasticizer – normal
  - Fine aggregate zone : zone 2
- Cement : Type of cement : PPC conforming to IS1489 (part 1) specific gravity : 2.88
  - Coarse aggregate : specific gravity : 2.74 water absorption : 0.5%
  - Fine aggregate : specific gravity : 2.65 water absorption : 1%
  - Chemical admixture : super plasticizer conforming IS9103 specific gravity : 1.145
- (20 Marks)**

**Module-5**

- 9 a. Explain the test conducted on self compacting concrete. **(12 Marks)**  
 b. List the advantages and disadvantages of RMC. **(08 Marks)**

OR

- 10 a. List the types of fibers used in FRC. Discuss properties of FRC and application of FRC. **(12 Marks)**  
 b. What is light weight concrete? Discuss the use and advantages of light weight concrete. **(08 Marks)**

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