

**BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI  
(END SEMESTER EXAMINATION)**

**CLASS: MTECH  
BRANCH: CIVIL**

**SEMESTER : I  
SESSION : MO/2022**

**SUBJECT: CE511 ADVANCED CONCRETE TECHNOLOGY**

**TIME: 3:00 Hours**

**FULL MARKS: 50**

**INSTRUCTIONS:**

1. The question paper contains 5 questions each of 10 marks and total 50 marks.
  2. Attempt all questions.
  3. The missing data, if any, may be assumed suitably.
  4. Before attempting the question paper, be sure that you have got the correct question paper.
  5. Tables/Data hand book/Graph paper etc. to be supplied to the candidates in the examination hall.
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- Q.1(a) Describe the mechanism involved in setting control admixture. [5]  
Q.1(b) State the benefits of water-reducing admixture [3]  
Q.1(c) Sketch the Schematic representation of air entrainment by surface active molecule [2]  
Q1(a) - Evaluating, CO1, CO4, Q1(b) - Generalizing, CO1, CO4, Q1 (c) - Interpreting , CO4
- Q.2(a) Explain the corrosion mechanism due to carbonation and chloride attack. [5]  
Q.2(b) Propose the factors that affect concrete durability. [5]  
Q2(a) - Evaluating, CO1, CO4, Q2(b) - Generalizing, CO1, CO4
- Q.3(a) Formulate the steps for concrete mix design as per IS 10262:2019. [6]  
Q.3(b) Explain the method adopted to determine the workability of concrete in the field. [4]  
Q3(a) - Creating, CO3, CO4, Q3(b) - Evaluating, CO2, CO3
- Q.4(a) Explain shotcreting and propose the precautions to be taken for shotcrete. [5]  
Q.4(b) Differentiate between high-strength concrete and high-performance concrete. [3]  
Q.4(c) Mention different types of special concrete. [2]  
Q4(a) - Evaluating, Generalizing , CO1, CO4, Q4(b) - Comparing, CO1, CO4,  
Q4(c) - Generalizing, CO1, CO4
- Q.5(a) The cement compound composition is given as [5]  
{C<sub>3</sub>S, C<sub>2</sub>S, C<sub>3</sub>A, C<sub>4</sub>AF, S<sub>S</sub>} = {52.3, 21.0, 9.3, 8.2, 4.9} %.  
Calculate the water requirement of the cement (for complete hydration). Take into account the amounts of CaO<sub>free</sub> (0.96 %) and MgO (1.08 %).
- Q.5(b) Evaluate the drawbacks of the workability test on concrete. Name available rheometer to measure [5]  
rheological properties.  
Q5(a) - Evaluating, CO1, CO2, CO3, CO4 , Q5(b) - Evaluating, Generalizing , CO1, CO2, CO4

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