|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Roll No. |  |  |  |  |  |  |  |  |  |  |  |  |



**PRESIDENCY UNIVERSITY**

**Bengaluru**

|  |
| --- |
| **End - Term Examinations – JANUARY 2025** |
| **Date:** 10 – 01- 2025 **Time:** 09:30 am – 12:30 pm |

|  |  |  |
| --- | --- | --- |
| **School:** SOE | **Program:** B. Tech (CIV/CII) | |
| **Course Code :** CIV2019 | **Course Name :** Advanced concrete technology | |
| **Semester**: V | **Max Marks**:100 | **Weightage**:50% |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **CO - Levels** | **CO1** | **CO2** | **CO3** | **CO4** | **CO5** |
| **Marks** | **16** | **14** | **31** | **39** | **-** |

**Instructions:**

1. *Read all questions carefully and answer accordingly.*
2. *Do not write anything on the question paper other than roll number.*

**Part A**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Answer ALL the Questions. Each question carries 2marks. 10Q x 2M=20M** | | | | |
| **1** | Write a note on sprayed concrete. | **2 Marks** | **L1** | **CO3** |
| **2** | Foam concrete results in a highly porous structure, making foam concrete lighter than traditional concrete. Write the advantages of foam concrete. | **2 Marks** | **L1** | **CO3** |
| **3** | Special concretes can include improved strength, durability, or resistance to specific conditions such as high temperatures, chemical exposure, or heavy loads. List the properties of Autoclaved Aerated Concrete (AAC). | **2 Marks** | **L1** | **CO4** |
| **4** | Many destructive and non-destructive tests are conducted on hardened concrete to measure their properties such as strength, permeability and durability. Name the non-destructive tests. | **2 Marks** | **L1** | **CO3** |
| **5** | What are the applications of lightweight concrete. | **2 Marks** | **L1** | **CO4** |
| **6** | Concrete is a composite material composed mainly of cement, coarse and fine aggregates and water. Name basic properties of concrete. | **2 Marks** | **L1** | **CO1** |
| **7** | Cement is the mixture of lime stone and clay which is burnt together under very controlled conditions, ground and then mixed with gypsum to prevent flash setting. What is 43 grade cement? | **2 Marks** | **L1** | **CO1** |
| **8** | Modulus of elasticity of concrete is the ratio of stress to strain of the concrete under the application of loads. It indicates a material’s resistance to being deformed when a stress is applied to it. In relation to this define poison’s ratio. | **2 Marks** | **L1** | **CO2** |
| **9** | Cement is a binder, a substance that sets and hardens and can bind other materials together. List the important properties of cement. | **2 Marks** | **L1** | **CO1** |
| **10** | Creep and shrinkage are time-dependent strains that involve the movement of water. Creep strains occur when water is forced to move by stress. Write the factors affecting creep. | **2 Marks** | **L1** | **CO2** |

**Part B**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Answer the Questions Total 80 Marks** | | | | | |
| **11.** | **a.** | Mineral Admixtures are pozzolanic materials also known as supplementary cementing materials or mineral additives. Different categories of mineral additives added to the concrete provide unique characteristics to the concrete. Construct a table of chemical composition of common mineral admixtures. | **10**  **Marks** | **L3** | **CO1** |
| **Or** | | | | | |
| **12.** | **a.** | When water is added to the cement, its ingredients react to each other with the help of water and forms some complex chemical compounds. These complex compounds are called Bogues compound. Construct the graph for the development of strength of Bogue’s compounds. | **10**  **Marks** | **L3** | **CO1** |
|  |  |  |  |  |  |
| **13.** | **a.** | Cracks in concrete have many causes. They may affect appearance only, or they may indicate significant structural distress or a lack of durability. Construct the flow chart indicating types and causes of Cracks in Fresh Concrete. | **10**  **Marks** | **L3** | **CO2** |
| **Or** | | | | | |
| **14.** | **a.** | The durability of cement concrete is defined as its ability to resist weathering action, chemical attack, abrasion, or any other process of deterioration. Construct the flow chart of recommendation of ways to have durable concrete with desirable composition. | **10**  **Marks** | **L3** | **CO2** |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **15.** | **a.** | Underwater concrete (UWC) requires special mix designs, placement techniques, and quality control due to the challenges of placing concrete. Illustrate the tremie method of underwater concreting. | **10**  **Marks** | **L2** | **CO3** |
| **Or** | | | | | |
| **16.** | **a.** | Underwater concreting is the process of placing concrete below the water line. Concreting under water will provide a couple of issues. One of these problems is that the water can disrupt the concrete mix ingredient ratio. If more water is added to the concrete mix it can cause washout of the cement. Illustrate grouted aggregate method of underwater concreting. | **10**  **Marks** | **L2** | **CO3** |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **17.** | **a.** | Workability is the ease with which concrete can be concrete can be transported, handled, placed, compacted and finished without segregation or excessive bleeding. Summarize the factors affecting workability. | **15**  **Marks** | **L2** | **CO3** |
| **Or** | | | | | |
| **18.** | **a.** | Fully compacted concrete is dense, strong and durable. Badly compacted concrete will be porous, weak and prone to rapid deterioration. Explain the various methods of mechanical compaction. | **15**  **Marks** | **L2** | **CO3** |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **19.** | **a.** | Autoclaved Aerated Concrete (AAC) is available as panels and blocks. AAC wall panels are typically used for cladding, but can also be loadbearing. AAC floor and roof panels are also available. AAC blocks can be used for loadbearing structures up to 3 storeys, and AAC panels can be used for cladding. Construct the flow chart of manufacturing of Autoclaved Aerated Concrete (AAC) blocks. | **15**  **Marks** | **L3** | **CO4** |
| **Or** | | | | | |
| **20.** | **a.** | Foam concrete, also known as Lightweight Cellular Concrete (LCC) and Low Density Cellular Concrete (LDCC), and by other names, is defined as a cement-based slurry, with a minimum of 20% (per volume) foam entrained into the plastic mortar. Construct the flow chart of manufacturing of Foamed concrete. | **15**  **Marks** | **L3** | **CO4** |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **21.** | **a.** | Geopolymer concrete is also more heat and fire-resistant, making it ideal for various construction applications. With its sustainability and performance benefits, geopolymer concrete is gaining attention as a promising material for the future of construction. Illustrate the components, geopolymerization process and environmental benefits of geopolymer concrete. | **20**  **Marks** | **L2** | **CO4** |
| **Or** | | | | | |
| **22.** | **a.** | Self-Compacting Concrete was first developed in Japan in the late 1980s to solve problems related to the labor-intensive process of vibration in congested reinforcement areas. Illustrate the composition, properties and benefits of self-compacting concrete. | **20**  **Marks** | **L2** | **CO4** |

**\*\*\*\*\* BEST WISHES \*\*\*\*\***