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 **PRESIDENCY UNIVERSITY**

  **Bengaluru**

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| **Ph.D. Course Work End Term Examinations – JAN-FEB 2025** |
| **Date:** 31- 01- 2025 **Time:** 09:30 am – 12:30 pm |

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| **School:** SOE | **Program:** Ph.D**.** |
| **Course Code :** CIV814 | **Course Name :** Development And Application of Special Concretes |
| **Semester**:  | **Max Marks**:100 | **Weightage**: 50% |

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| **CO - Levels** | **CO1** | **CO2** | **CO3** | **CO4** | **CO5** |
| **Marks** | **20** | **10** | **40** | **30** | **-** |

**Instructions:**

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

**Part A**

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| **Answer ALL the Questions. Each question carries 10 marks. 6Q x 10M=60Marks** |
| **1** | What is Roller Compacted Concrete? Where is it commonly used? Give its advantages and disadvantages. | **10 Marks** | **L2** | **CO1** |
| **2** | What is Geopolymer Concrete? How is it eco-friendly? Compare its production cost to conventional concrete. | **10 Marks** | **L2** | **CO3** |
| **3** | Permeability is inversely proportional to durability of concrete. What are the causes of bleeding in concrete? Explain how to prevent the same. | **10 Marks** | **L2** | **CO1** |
| **4** | What is shrinkage in concrete? List types of shrinkage and briefly explain the same. | **10 Marks** | **L2** | **CO3** |
| **5** | a) What is the use of a compressometer? b) How do you avoid Fiber balling in Steel FRC mixes? | **10 Marks** | **L3** | **CO4** |
| **6** | What is Polymer Impregnated Concrete? Is it eco-friendly? | **10 Marks** | **L2** | **CO2** |

**Part B**

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| **Answer the Questions. Each question carries 20 marks 2Q x 20 = 40 Marks** |
| **7.** |  | Concreting is to be carried out at Singhik District near Kanchenjunga at Sikkim. The average daily temperature during the period of concreting is predicted to be about 3oC. What problems/challenges do you anticipate during concreting? List out the precautions to be adopted and preparations to be done to prevent the problems you anticipate. | **20 Marks** | **L3** | **CO3** |
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| **8.** |  | Carry out the mix proportion for an M70 Grade high strength fiber reinforced concrete with special requirements of high abrasion resistance using silica fume & fly ash. **Data/ Stipulations:** a) Grade designation : M 70b) Type of cement : OPC 53 grade conforming to IS 269c) Silica fume : Conforming to IS 15388d) Maximum nominal size of aggregate : 20 mme) Exposure conditions as per Table 3 & 5 of IS 456 : Moderate (for reinforced concrete)f) Workability : 110 mm (slump)g) Method of concrete placing : Pumpingh) Degree of supervision : Goodi) Type of aggregate : Crushed angular aggregatej) Chemical admixture type : Superplasticizer (Polycarboxylate ether based)k) Material Test Data:1. Cement used : OPC 53 Grade conforming to IS 269
2. Specific gravity of cement : 3.15
3. Specific gravity:
	1. Coarse aggregate (at SSD condition) : 2.70
	2. Fine aggregate (at SSD condition) : 2.60
	3. GGBS : 2.10
	4. Silica fume : 2.15
	5. Chemical admixture : 1.08
4. Moisture content
	1. Coarse aggregate : Nil
	2. Fine aggregate : Nil
5. Sieve Analysis

Consider GGBS at 30% by weight of cementitious material and silica fume at 5% by weight of cementitious material. Use 1% steel fibers based on the aspect ratio. Assume missing data suitably. | **20 Marks** | **L4** | **CO4** |

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