U.S.N.										

B.M.S. College of Engineering, Bengaluru-560019

Autonomous Institute Affiliated to VTU

September / October 2024 Supplementary Examinations

Programme: B.E. **Semester: V**
Branch: Civil Engineering **Duration: 3 hrs.**
Course Code: 22CV5PEACT **Max Marks: 100**
Course: Advanced Concrete Technology

Instructions: 1. Answer any FIVE full questions, choosing one full question from each unit.
2. Missing data, if any, may be suitably assumed.
3. Use of IS-10262-2019 is permitted.

Important Note: Completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages. Revealing of identification, appeal to evaluator will be treated as malpractice.

			UNIT - I	CO	PO	Marks
1	a)		List out the different chemical admixtures used in concrete and discuss the mechanism of the action of important chemical admixtures in modifying the fresh property of concrete.	CO1	PO 1	**10**
	b)		Discuss the composition of Limestone Calcined Clay (LC2) and its benefits over ordinary Portland cement.	CO1	PO1	**6**
	c)		Explain the properties of construction demolition aggregates.	CO1	PO1	**4**
			OR			
2	a)		Discuss the interfacial transition zone (ITZ) with the sketch and strengthening of the same by adding supplementary cementitious materials (SCMs).	CO1	PO1	**10**
	b)		Enumerate the Merits and demerits of Composite Cement.	CO1	PO1	**6**
	c)		List out the different aggregates used for making lightweight concrete and High-density concrete.	CO1	PO1	**4**
			UNIT - II			
3	a)		Design M40 grade Self-compacting concrete **(SCC)** mix using IS 10262-2019 guidelines for the following data. Type of cement- OPC 53 grade Nominal size of aggregate -20 mm Exposure condition- Moderate Slump flow- SF3 (Slump flow 760 mm to 850 mm) Degree of site Control-Good Type of aggregate- Crushed angular aggregate Total Powder content-520 kg/m^3 Maximum cement content- 450 kg/m^3 Chemical admixture-PCE-based superplasticizer Mineral admixture- Fly ash The specific gravity of cement-3.10 The specific gravity of Fly ash- 2.00 The specific gravity of fine aggregates-2.60 The specific gravity of coarse aggregates- 2.65 The specific gravity of superplasticizer-1.05	CO2	PO3	**12**

		b)	Discuss how High-performance concrete is more durable than usual concrete.	*CO2*	*PO3*	**8**
			UNIT - III			
	4	a)	List different fibers used in fiber-reinforced concrete and explain the effect of fiber addition on fresh properties of concrete.	*CO2*	*PO3*	**10**
		b)	Discuss the materials used for Ultra-High-Performance Concrete **(UHPC)** in enhancing different properties with their particle packing mechanism.	*CO2*	*PO3*	**10**
			OR			
	5	a)	Explain the applications of steel fibers in the construction industry.	*CO2*	*PO3*	**10**
		b)	Discuss the durability properties of Ultra-high-performance concrete **(UHPC).**	*CO2*	*PO3*	**10**
			UNIT - IV			
	6	a)	Explain the process involved in the polymerization (reaction chemistry) of Geopolymer concrete in attaining strength.	*CO2*	*PO3*	**10**
		b)	Design geopolymer concrete mix by assuming the Density of geopolymer concrete is 2400kg/m^3. The molarity of NaOH is - 10 The ratio of NaOH: Na_2Sio_3 - 2.0 Total water content – 160 l/m^3 Fly ash - 12% GGBS - 8% Coarse Aggregate - 55% Fine aggregate - 45%	*CO2*	*PO3*	**10**
			UNIT - V			
	7	a)	Explain the factors affecting the rheology of fresh concrete.	*CO2*	*PO3*	**10**
		b)	List different Rheometers.	*CO2*	*PO3*	**4**
		c)	Discuss the advantages of 3D printable concrete.	*CO2*	*PO3*	**6**

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