Reg. No.										

MANIPAL INSTITUTE OF TECHNOLOGY
MANIPAL
(A constituent unit of MAHE, Manipal)

VI SEMESTER B.TECH (CIVIL) END SEMESTER EXAMINATIONS

April/May 2024

SUBJECT: PROGRAMME ELECTIVE I- Advanced Concrete Technology [CIE 4051]

Date of Exam: Time of Exam: Max. Marks: **50**

Instructions to Candidates:

- Answer ALL the questions & missing data may be suitably assumed
- Use of IS 456 and IS10262 is allowed

1A.	Explain the contribution of unhydrated cement grains in enhancing the mechanical properties.	**(04)**	**CO1**	**2**
1B.	Appraise the need for advanced materials to achieve sustainability.	**(02)**	**CO4**	**2**
1C	Discuss the strategies to improve interfacial transition zone to enhance the properties of concrete.	**(04)**	**CO2**	**2**
2A.	Determine the mix proportion of the ingredients to obtain a High Strength Concrete of characteristic strength 85 MPa. Use 14mm size coarse aggregates, Binder details: 53 grade OPC with Sp.gravity of 3.11, GGBS with Sp gravity of 2.4 and Silica fume of sp gravity 2.21. Filler details: Specific gravities of course and fine aggregates are 2.6 and 2.67 respectively. Chemical admixture: Use Superplasticizer with Sp gravity 1.07.	**(08)**	**CO3**	**4**
2B.	Explain the relationship between porosity and strength of concrete.	**(02)**	**CO2**	**2**
3A.	Explain the stress-strain behavior of High strength Concrete	**(05)**	**CO3**	**3**
3B.	How is slump loss especially in case of concretes like SCC, dealt on site?	**(03)**	**CO4**	**2**
3C	List the ways in which sustainability can be achieved in concreting by using alternative materials.	**(02)**	**CO1**	**3**
4A.	Explain the hydration mechanism of Ground Granulated Blast Furnace Slag when used as partial replacement to Portland cement.	**(02)**	**CO3**	**2**
4B	Examine the pore filling effect of binders in high strength concrete	**(04)**	**CO3**	**3**
4C	Compare the mechanical properties of concrete with and without fibers	**(04)**	**CO2**	**3**
5A.	Explain the mechanism of continued hydration of unreacted fly-ash in concrete beyond 28 days.	**(04)**	**CO4**	**3**
5B	Discuss creep of concrete and its effect on long-term mechanical properties.	**(03)**	**CO2**	**3**
5C.	Discuss the role of fibers in enhancing mechanical properties of concrete	**(03)**	**CO4**	**2**