Enrolment No./Seat No_____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE- SEMESTER–VII (NEW) EXAMINATION – WINTER 2024

Subject Code:3170622 Date:16-12-2024

Subject Name: Precast Construction

Time:10:30 AM TO 01:00 PM Total Marks:70

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**
4. **Simple and non-programmable scientific calculators are allowed.**
5. **IS: 456:2000 IS 10297:1982 and IS 15916:2020 are allowed in the exam.**

Q.1	**(a)**	What is precast concrete construction?	**03**
	(b)	Explain the principles of prefabrication.	**04**
	(c)	Discuss the advantages and disadvantages of precast construction over cast-in-situ construction.	**07**
Q.2	**(a)**	What is the importance of proper storage for precast elements before erection?	**03**
	(b)	Describe the different types of precast concrete flooring systems and their typical applications.	**04**
	(c)	Provide a detailed overview of the planning, manufacturing, and storage process for precast elements.	**07**
		OR	
	(c)	Write a note on Curing, Storage and Transportation of Precast elements.	**07**
Q.3	**(a)**	Define the concept of load path in structural systems.	**03**
	(b)	What are structural ties, and why are they important in precast concrete systems?	**04**
	(c)	Describe step by step method for precast Frame analysis.	**07**
		OR	
Q.3	**(a)**	What are the primary loads considered in precast concrete systems?	**03**
	(b)	What are the different types of loads that precast concrete columns are designed to resist?	**04**
	(c)	Explain the necessity of shear walls in the precast structure. Also discuss the various types of shear walls.	**07**
Q.4	**(a)**	What is the difference between composite and non-composite beams?	**03**
	(b)	Explain the flexural and shear capacity in the design of precast floors.	**04**
	(c)	Discuss the different types of precast concrete beams and their applications in construction.	**07**
		OR	
Q.4	**(a)**	What are the key geometric considerations when designing precast concrete columns?	**03**
	(b)	Explain the construction process of composite precast concrete beams.	**04**
	(c)	Define Progressive collapse. Enlist all the relevant design requirements to provide safety against progressive collapse.	**07**
Q.5	**(a)**	Define expansion joints in precast concrete construction.	**03**

(b) Define the following terms: **04**
Homogeneous and Non homogeneous slab,
Ribbed Slab,
Voided Slab,
Filigree slab.

(c) Design a double T type RC precast slab panel for the following requirements and data. **07**
Span : 9.0 m
Panel width : 2100 mm
Live Load : 4 kN/m2
Floor Finish : 1 kN/m2
Materials: Concrete M30, Steel Fe 500.

OR

Q.5 **(a)** What are non-structural fastenings, and why are they used in precast systems? **03**

(b) Write types of precast concrete building system and explain anyone. **04**

(c) Determine flexural Strength of Hollow core slab for 6 m span and 1.5m wide panel. Take DL= 6 kN/m2, and LL=3 kN/m2. The grade of concrete and steel are M35 and Fe415 respectively. **07**

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