

Enrollment No./Seat No.:

**GUJARAT TECHNOLOGICAL UNIVERSITY**  
**Bachelor of Engineering - SEMESTER - VII EXAMINATION - WINTER 2025**

**Subject Code: 3170622**

**Date: 01-12-2025**

**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.**

	<b>Marks</b>
<b>Q.1 (a)</b> Briefly explain Structural Ties.	<b>03</b>
<b>(b)</b> Answer the following in short:	<b>04</b>
1. Compare the structural difference between Precast and cast-in-situ buildings.	
2. Assess the performance of precast concrete elements with those constructed on-site in terms of quality control and durability.	
<b>(c)</b> Describe step by step method for precast Frame analysis.	<b>07</b>
<b>Q.2 (a)</b> Explain different types of precast beams.	<b>03</b>
<b>(b)</b> Enlist different types of precast floors. Explain any one in detail.	<b>04</b>
<b>(c)</b> Design precast RC double T slab of 12 meter effective span and 2200 mm width for service stage. Live load = $2.5 \text{ kN/m}^2$ , Floor finish load = $2.0 \text{ kN/m}^2$ . Assume appropriate data if necessary.	<b>07</b>
<b>OR</b>	
<b>(c)</b> Explain Fire resistance, UV sensitivity, quality control and weather dependency as benefits of designing with precast .	<b>07</b>
<b>Q.3 (a)</b> Explain the load path for the precast construction systems.	<b>03</b>
<b>(b)</b> Explain Precast footing and its major difference with cast in situ footing.	<b>04</b>
<b>(c)</b> Design and detail RC precast filigree type one-way floor panels for the following requirements. Provide all design checks as per relevant standards. Consider $1 \text{ kN/m}^2$ floor finish and $2 \text{ kN/m}^2$ Live load. Consider 100 mm bearings. Consider interim stage loading and grade of materials as per relevant IS Provisions. Furnish details in Plan and C/S with room area 3.2 m. x 4.9 meter and live load $2 \text{ kN/m}^2$ .	<b>07</b>

**OR**

- (a) Describe beam column connection for Pre- cast frame. 03
  - (b) What are the characteristics of the moulds used for making of PC components? 04
  - (c) Provide a detailed overview of the planning, manufacturing, and storage process for precast elements. 07
- Q.4**
- (a) State the Advantages & Disadvantages of Prefabrication. 03
  - (b) Enlist and explain the major issues associated with Prefabricated construction . 04
  - (c) Define following terms. Use illustrative sketch(s) if required or put images. 07
    - ( I) Homogeneous and Non homogeneous slab ·
    - (II) Ribbed Slab
    - (III )Voided Slab
    - (IV) Filigree slab

**OR**

- (a) What are the design requirements of precast truss? 03
  - (b) Explain in detail about connections and joints for wall panels. 04
  - (c) What are the desirable properties of concrete and steel for prefabrication unit? 07
- Q.5**
- (a) What are the erection stresses? How are they reduced or eliminated? 03
  - (b) Explain automation in manufacturing of precast elements . 04
  - (c) Explain in detail about any two precast concrete building systems. 07

**OR**

- (a) State advantages and disadvantages of precast concrete. 03
- (b) Explain the flexural and shear capacity in the design of precast floors. 04
- (c) Explain the process of precast manufacturing using Tilting tables. 07

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