

**GUJARAT TECHNOLOGICAL UNIVERSITY****BE- SEMESTER-VII (NEW) EXAMINATION – WINTER 2024****Subject Code:3170616****Date:30-11-2024****Subject Name: Retrofitting of structures****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.

- Q.1** (a) Define the following terms: (i) Durability of concrete (ii) Defect (iii) Degrading factors **03**  
 (b) Enlist the various causes of failure in structures **04**  
 (c) Explain each error with suitable examples: Construction errors, Design errors and Man-made errors. **07**
- Q.2** (a) Enlist field and laboratory tests used to determine the strength of concrete. **03**  
 (b) Mention any two major differences between the Preliminary investigation and Detailed investigation. **04**  
 (c) Describe with neat sketches the different types of cracking observed in RCC beams and columns. **07**
- OR**
- (c) Enlist and explain the different clauses in accordance with IS 456 to ensure the durability of the construction. **07**
- Q.3** (a) Mention the working principle of (i) Rebound hammer test (ii) Ultra sonic pulse velocity test. **03**  
 (b) State the important characteristics required for a repair material to be durable. **04**  
 (c) Define Condition Assessment. Mention the various objectives of the condition assessment of structures. **07**
- OR**
- Q.3** (a) Explain Alkali aggregate reaction in concrete. **03**  
 (b) Write a short note on procedure of Stitching of cracks. **04**  
 (c) Enlist various strengthening methods for beams and slabs. Explain one strengthening method in detail for both beam and slab. **07**
- Q.4** (a) Explain (a) Diffusion (b) Capillary porosity. **03**  
 (b) How is the Quality control ensured in Concrete construction. **04**  
 (c) Enlist with proper steps and figures to correct the deflected RCC slab. **07**
- OR**
- Q.4** (a) Mention various signs of distress seen in deteriorated concrete structure. **03**  
 (b) Explain the importance of quality of concrete cover in RCC elements. **04**  
 (c) Explain the Mechanism of Corrosion in concrete structures. **07**
- Q.5** (a) Answer in short: (Any Seven) **14**
- (i) Periodic maintenance
  - (ii) Design philosophy for Retrofitting
  - (iii) Surface preparation before repairs
  - (iv) Under-water repairs
  - (v) Pre-placed aggregate concrete
  - (vi) Application of resin by pressure injection
  - (vii) Local & Global deficiencies in structures
  - (viii) Causes of dampness in buildings
  - (ix) Classification of cracks

\*\*\*\*\*