

Reg. No. :

**Question Paper Code : 52749**

B.E./B.Tech. DEGREE EXAMINATIONS, APRIL/MAY 2019.

Eighth Semester

Civil Engineering

CE 6021 — REPAIR AND REHABILITATION OF STRUCTURES

(Regulation 2013)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Compare preventive maintenance and routine maintenance with an example.
2. List the various aspects to be investigated during inspection of existing building.
3. Distinguish between structural cracks and non-structural cracks.
4. How thermal variations affect the durability of structures?
5. Differentiate filling ability and passing ability of self compacting concrete.
6. Enumerate the methods of producing high strength concrete.
7. Mention some of the situations which demand underpinning.
8. Why reinforcement is coated in RCC structures?
9. Demonstrate crack repair by routing and sealing with help of neat sketch.
10. Suggest the guidelines for construction in different seismic zones.

PART B — (5 × 13 = 65 marks)

- (b) (i) Prepare the report on assessment of damage due to severe earthquake on G + 4 reinforced concrete frame building with Ground floor as parking constructed in year 1988-1989. (7)
- (ii) Illustrate the deterioration mechanism with the help of neat sketch. (6)
12. (a) (i) What do you understand by the term durability? Compared to the other considerations, how much importance should be given to durability in the design and construction of concrete structures? (4)
- (ii) How the properties of aggregate — both fine and coarse, and cement, affect the relationship of water demand on slump, and the water-cement ratio and compressive strength? (9)

Or

- (b) (i) Ideally, from the standpoint of crack resistance, a concrete should have low shrinkage and high extensibility. Give examples to show why this may not be possible to achieve in practice. (7)
- (ii) Illustrate the significance of the carbonation of concrete, passivity of steel and state of oxidation of iron with respect to the corrosion of steel in concrete. (6)
13. (a) (i) Demonstrate the arrangement for vacuum treatment of concrete with its advantage and applications. (7)
- (ii) How polymerization is achieved in polymer concrete? Explain in detail. (6)

Or

- (b) Why it is advantage to use fibre reinforced concrete for the following construction works: (13)
- (i) Water retaining structures
- (ii) Blast resistant structures
- (iii) Precast products
- (iv) Pavement and floors
- (v) Repair and rehabilitation works.

14. (a) (i) Why the following factors affect the pulse velocity measurement? (6)
- (1) Reinforcing steel
  - (2) Temperature of concrete
  - (3) Path length.
- (ii) What are the principles behind the following test procedures : rebound hammer, pull out test, Windsor probe test? Explain which you would recommend for deciding the formwork removal time. (7)

Or

- (b) (i) List the types of shoring and discuss the use of raking shore under the following cases by neat sketch. (8)
- (1) To support a wall of multi-storeyed structure on road side leaving roadside margins.
  - (2) To support a wall of multi-storeyed structures by the side of heavy traffic road.
- (ii) Explain cathodic protection mechanism with the help of neat sketch. (5)
15. (a) (i) Discuss the following methods of crack repair. (6)
- (1) Concrete replacement
  - (2) Mortar replacement
  - (3) Resin based repairs
- (ii) Illustrate the rehabilitation procedure of fire damaged following elements : (7)
- (1) Eccentrically loaded columns
  - (2) RCC slabs and beams.

Or

- (b) (i) How cracked reinforced concrete elements are repaired by providing additional steel? Explain it with neat sketch. (6)
- (ii) Illustrate the stitching procedure to repair the flexural cracks in slab and beam with the help of neat sketch. (7)

PART C — (1 × 15 = 15 marks)

16. (a) Discuss the assessment procedure for repair and strengthening of RCC structure constructed in coastal region in the year 2009. which was damaged due to cyclone, the structures were damaged in the following forms :
- (i) Reinforcement corrosion
  - (ii) Leaking drainage pipes
  - (iii) Stagnated water on terraces
  - (iv) Spalling of concrete
  - (v) De-bonding of plaster at surfaces

Or

- (b) Illustrate the procedure for demolishing the main structural members like columns, beams and slabs of RCC structure without disturbing the nearby structures. The building was constructed in the year 1990 located in northern part of India with car parking at basement

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Civil  
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