

MTPESEPE104BT Structural Audit SET 3 Marking Scheme

Q. 1 A. Explain concrete defects observed during structural audit such as poor texture, honeycombing, sag, and excessive deflection in RC members.

Marking Scheme (12 Marks):

- Concrete texture and surface defects – 4 marks
- Sag and deflection in beams/slabs – 4 marks
- Causes of these defects – 2 marks
- Structural implications – 2 marks

Q. 1 B. Classify cracks in buildings based on their nature and cause. Discuss their fatality and significance in structural audit.

Marking Scheme (12 Marks):

- Classification of cracks – 4 marks
- Causes of different types of cracks – 3 marks
- Structural vs non-structural cracks – 3 marks
- Fatality and assessment importance – 2 marks

Q.2 A. Explain the design principles of box culverts. Discuss the structural action of top slab, bottom slab, and side walls.

Marking Scheme (12 Marks):

- Introduction and applications of box culverts – 3 marks
- Structural behavior under loads – 4 marks
- Design principles (conceptual) – 3 marks
- Advantages over slab culverts – 2 marks

Q.2 B. Discuss the types of deterioration observed in reinforced concrete structures and explain their mechanisms and effects on structural performance.

Marking Scheme (12 Marks):

- Classification of deterioration types – 4 marks
- Carbonation & chloride attack – 4 marks
- Corrosion-induced damage – 2 marks
- Effect on strength & durability – 2 marks

Q.3 A. Explain the concept, objectives, and importance of Non-Destructive Testing (NDT) in structural audit and condition assessment of concrete structures.

Marking Scheme (12 Marks):

- Definition and concept of NDT – 3 marks
- Objectives of NDT – 4 marks
- Importance in structural health assessment – 3 marks
- Limitations and scope – 2 marks

Q.3 B. Explain the carbonation test and chloride content test for durability assessment of reinforced concrete structures.

Marking Scheme (12 Marks):

- Carbonation test: principle & procedure – 5 marks
- Chloride test: principle & significance – 5 marks
- Effect on reinforcement corrosion – 2 marks

Q.4 A. Explain how damage assessment results are used to determine the load carrying capacity and safety level of an existing structure.

Marking Scheme (12 Marks):

- Interpretation of damage assessment – 4 marks
- Reduction factors and strength degradation – 4 marks
- Capacity evaluation – 2 marks
- Decision making for repair/retrofit – 2 marks

Q.4 B. Discuss the overall methodology for strength evaluation of an existing building, starting from inspection to final recommendations.

Marking Scheme (12 Marks):

- Preliminary investigation – 3 marks
- Detailed assessment and analysis – 4 marks
- Strength evaluation and safety checks – 3 marks
- Final recommendations and reporting – 2 marks

Q.5 A. Explain the structural audit procedure for buildings damaged due to extreme events such as floods, earthquakes, fire, cyclones, landslides, tsunamis, and accidental events (blasts/wilful damages).

Marking Scheme (12 Marks):

- Types of extreme and accidental events – 3 marks
- Damage identification and assessment – 4 marks
- Safety evaluation and risk categorization – 3 marks
- Recommendations for repair, retrofit, or demolition – 2 marks

Q.5 B. Who is responsible for calling a structural audit? Explain the duties and responsibilities of owners, occupants, and authorities.

Marking Scheme (12 Marks):

- Responsibility of building owner/society – 4 marks
- Role of occupants – 3 marks
- Role of statutory authorities – 3 marks
- Importance of timely audits – 2 marks