

# 22602

**12223**

**3 Hours / 70 Marks**

Seat No.

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- Instructions* – (1) All Questions are *Compulsory*.
- (2) Answer each next main Question on a new page.
- (3) Illustrate your answer with neat sketches wherever necessary.
- (4) Figures to the right indicate full marks.
- (5) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

**Marks**

- 1. Attempt any FIVE of the following: 10**
- Define the term rehabilitation.
  - Define the maintenance.
  - Enlist four causes of damages that takes place in the structure.
  - State four factors due to which non-structural cracks developed.
  - State four properties of anti-corrosion coating materials used.
  - Define the honeycomb phenomenon along with suitable sketch.
  - Define the term distress survey.
- 2. Attempt any THREE of the following: 12**
- Describe any four approaches involved for the effective management of maintenance and along with its cycle.
  - Explain in brief, the terms preventive maintenance and remedial maintenance.
  - State the primary aim of damage detection. Also, explain in brief any three steps are undertaken during detection of structural damages.

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- d) Write the step-by-step procedure for assessing the quality of concrete using ultra-sonic pulse velocity apparatus along with its schematic diagram.

**3. Attempt any THREE of the following: 12**

- a) Describe in brief, any four water resisting roof materials used during maintenance of roof.
- b) State any eight factors that influencing the material section for maintenance and repair work.
- c) State any four different types of materials used for repairs along with any two properties of each material.
- d) Write the purpose of the following materials used for maintenance and repair as :-
- i) Adhesive material
  - ii) Mortar repair material
  - iii) Grout material
  - iv) Polyester putty material.

**4. Attempt any THREE of the following: 12**

- a) Write the four benefits of using non-destructive testing method. Also, give two limitations of NDT methods.
- b) Describe in brief, the four stages of repair work to be carried out during maintenance and repair strategy.
- c) State any four importance of structural audit and also, write steps involved in it.
- d) Describe in brief the chlorinated rubber coating and vinyl coating used as surface coating materials for concrete protections.
- e) Explain in brief, any two improvement techniques used for improving the settlement of foundation.

- 5. Attempt any TWO of the following:** **12**
- a) Write the procedure adopted for the repair and strengthening of damaged RC beam using steel plates with suitable sketch of repaired beam.
  - b) State any four locations of cracks developed in RCC elements. Also, write the procedure used to repair the shear cracks using epoxy grouting material with appropriate sketch after repaired.
  - c) A damaged RC column need to be repair to restore its original state, write the step-by-step procedure to repair this damaged RC column using method of jacketing and collaring along with suitable sketch.
- 6. Attempt any TWO of the following:** **12**
- a) Describe in brief, any four causes of cracks in masonry wall along with their appropriate sketches showing cracks formation due to each case.
  - b) Write an overview on rules and regulation for structural engineer with respect to the periodic audit, qualifications, eligibility and licensing to the structured engineer 1, 2 and 3.
  - c)
    - i) Write the general steps involved in budget estimation of damaged structure.
    - ii) Prepare a format for collection of general information of the building including only any six informational data.
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