

**Scheme**  
**Sample Question Paper**

**Programme Name: Civil Engineering**

**Programme Code :CE /CR/CS**

**Semester : Six**

**Course Title : Maintenance and Repairs of Structures (MRS)**

**Marks : 70**

**22602**

**Duration: 3 Hours**

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**Instructions:**

- 1) All questions are compulsory.
- 2) Illustrate your answers with neat sketches wherever necessary.
- 3) Figures to the right indicate full marks.
- 4) Assume suitable data, if necessary.
- 5) Preferably, write the answers in sequential order.
- 6) Use of non-programmable electronic pocket calculator is permissible.
- 7) Mobile phone, pager and any other electronic communication devices are not permissible in examination hall.

**Q. 1 Attempt Five of the following.**

**(10 Marks)**

- a) State any four objectives of building maintenance.
- b) Define the terms- retrofitting and restoration.
- c) State any four sources of damages in the buildings.
- d) Name the two materials available in market of each case for repairing the mortar and concrete surface protection.
- e) List any four causes of crack formation in wall
- f) Write any four techniques used to reduce the rate of damping in building
- g) State any four points due to which structural audit is necessary.

**Q. 2 Attempt Three of the following.**

**(12 Marks)**

- a) State any four advantages and four limitations of maintenance and repairs.
- b) Explain in brief any four factors influencing periodical maintenance.
- c) Describe in brief any four importance of visual observations for damage
- d) Write step by step procedure of half-cell potentiometer test with neat sketch.

**Q. 3 Attempt Three of the following.**

**(12 Marks)**

- a) Suggest one relevant test of each to be carried out for determination of strength and voids of structure. Also, explain procedural steps of any one of two.
- b) Write any two important characteristics of each of the following bonding aids.
  - i) Epoxy resins ii) Poly resins iii) Polyvinyl acetate iv) Vinyl acetate co polymer.
- c) Suggest any two materials necessary to repair the followings.
  - i) Dampness of RCC roof slab. ii) Dampness in the exterior brick wall iii) repair of 0.4 mm wide crack for total depth of a RCC slab iv) Concrete surface protection.
- d) Suggest an appropriate use of the following materials for repair
  - i) Plastic nipple ii) Zinc rich epoxy iii) Polyester putty iv) Sealant v) Low viscosity polyester resin vi) Epoxy resin mortar vii) Rebar primer viii) Oleo resinous mastics.

**Q. 4 Attempt Three of the following.**

**(12 Marks)**

- a) Describe the step by step procedure of ultrasonic pulse velocity test to be performed on the surface of RC elements.
- b) Explain in brief four stages of repair work in general.
- c) Illustrate the steps involved while performing structural audit.
- d) Explain any four factors influencing the selection of material for repairs.
- e) Enlist eight locations of occurring probable cracks in the building.

**Q. 5 Attempt Two of the following.**

**(12 Marks)**

- a) In renovation of a residential building, a RCC slab is to be casted to cover an opening surrounded by beams. Apply the step by step procedure of joining the new slab with surrounding beams.
- b) Write the step by step procedure for the following repair methods
  - i) Gunitting ii) Jacketing.
- c) Explain in short the four stages to be carried out while repairing the process of corroded RCC elements.

**Q. 6 Attempt Two of the following.**

**(12 Marks)**

- a) A brick wall has developed diagonal and other vertical crack then illustrate the suitable repair method using mild steel U- shaped dowel bars along with sketch.
- b) Prepare the format involve any eight information data of building for structural audit.
- c) Prepare the format include eight items with respect to structural audit for complain reported by user of a building.

**'I' – Scheme**  
**Sample Test Paper I**

**Programme Name: Civil Engineering**

**Programme Code : CE/CR/CS**

**Semester : Six**

**Course Title : Maintenance and Repairs of Structures (MRS)**

**Marks : 20**

**22602**

**Duration: 1Hour**

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**Instructions:**

1. All questions are compulsory.
2. Illustrate your answers with neat sketches wherever necessary.
3. Figures to the right indicate full marks.
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5. Preferably, write the answers in sequential order.
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**Q. 1 Attempt Four of the following. (08 Marks)**

- a) State any two differentiations between the maintenance and repair.
- b) State the purpose of conducting test of chloride and sulphate attack on damaged structures
- c) List any four Non-destructive test performed on the damaged structure
- d) State any four factors influencing the material selection for repair work.
- e) Write any four name of materials used for anticorrosive coating

**Q. 2 Attempt Three of the following. (12 Marks)**

- a) Prepare the check list include any eight items for the proposed building maintenance and repairs during the period of post monsoon.
- b) Write the step by step procedure of rebound hammer test to be performed on the damaged RCC elements.
- c) Explain in short four stages to be followed for the systematic approach of doing damage detections
- d) Write any two relevant names of materials used for the repair of, Joint leakage, slab leakage, Corroded steel bars and leakage between WC pan and surrounding concrete.
- e) Write any two characteristics of, Zink rich epoxy, resin mortar, resin sealant, galvanized steel wire fabrics.

**'I' – Scheme**  
**Sample Test Paper II**

**Programme Name: Civil Engineering**

**Programme Code: CE/CR/CS**

**Semester: Six**

**Course Title: Maintenance and Repairs of Structures (MRS)**

**Marks: 20**

**22602**

**Duration: 1Hour**

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**Instructions:**

1. All questions are compulsory.
  2. Illustrate your answers with neat sketches wherever necessary.
  3. Figures to the right indicate full marks.
  4. Assume suitable data if necessary.
  5. Preferably, write the answers in sequential order.
  6. Use of non-programmable electronic pocket calculator is permissible.
  7. Mobile phone, pager and any other electronic communication devices are not permissible in examination hall.
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**Q. 1 Attempt Four of the following. (08 Marks)**

- a) State any four causes of cracks in a masonry wall.
- b) Explain any one stage of repair in case of masonry wall.
- c) Enlist any four causes of failure of RCC structures.
- d) Define honeycombing. And also state any one reasons of its occurrence.
- e) State the meaning of structural audit and budget estimation.

**Q. 2 Attempt Three of the following. (12 Marks)**

- a) State the step by step procedure of repair of masonry major crack by dowel bars along with suitable sketch.
- b) State the step by step procedure of repair of crack in RCC slab by using epoxy injection method and also draw suitable sketch.
- c) State any two reasons of reinforcement corrosion and explain the repair technique of it using rebar.
- d) List any four points of each with regard to cracks in plaster on brick masonry and RCC chajja to be observed during survey of damages in a building.
- e) Write the necessity and limitation of doing structural audit. As per Government of Maharashtra. State the necessary frequencies of structural audit upto 30 years building age and for building age above 30 years.