

**Instructions:**

1. Question No.1 is **compulsory**.
2. Answer any **three** from the remaining.
3. **Each** full question carries **20 marks**.

**Q. 1) Answer any four** **20 Marks**

- a) Write a note on importance of maintenance of structures.
- b) Write a note on the use of ferrocement for the repair works.
- c) Enlist various crack measurement techniques. Explain any one.
- d) Write a note on repair & rehabilitation of heritage structures.
- e) What are the various physical causes of deterioration of concrete?

**Q. 2)**

- a) Write a note on the damages caused to the structures due to earthquake. How restoration & retrofitting of such structures is carried out? **10 marks**
- b) Explain gravity filling method and drilling & plugging method of crack repair techniques with the help of detailed sketches. **10 Marks**

**Q. 3)**

- a) With the help of neat sketches, explain pull-out test & probe test on concrete. **10 marks**
- b) Explain Ultrasonic Pulse Velocity method of NDT, in detail, with neat sketches. **10 Marks**

**Q. 4)**

- a) Enlist the types of corrosion of structural steel. Discuss any one in detail. **10 Marks**
- b) How shoring technique is used for the rehabilitation of foundations of the structures? Discuss in detail, with the neat sketches. **10 Marks**

**Q. 5)**

- a) Discuss about plate bonding technique & fibre wrap technique used for repairing the RCC elements. **10 marks**
- b) Write a detailed note on cathodic protection method used for corrosion repair. **10 marks**

**Q. 6)**

- a) Discuss about epoxy injection method of crack repair technique. **05 Marks**
- b) Write a note on plastic shrinkage cracks & thermal cracks in concrete structures. **05 Marks**
- c) Discuss about shotcreting technique of repair. **05 Marks**
- d) Discuss about the application of chemical rust remover for cleaning the corroded reinforcement. **05 Marks**