

# MASTER OF CONSTRUCTION ENGINEERING 3<sup>RD</sup> SEM. EXAM, 2017

## CONDITION ASSESSMENT & HEALTH MONITORING OF STRUCTURES - II

Time: 3 Hours

Full Marks: 100

Answer any **Four** questions. All question carry equal marks. Explain your answer with neat sketches if necessary. Assume any other relevant data not provided.

1.
  - a) What do you mean by '**System Identification**' in the context of SHM? Discuss on the advantages & limitations over condition assessment based on NDT methods. **5**
  - b) Discuss **Structural Health Monitoring** (SHM) mentioning its significance in the context of structural maintenance and reliability. **5**
  - c) Discuss SHM based on system identification from limited static responses adopting '**Static Condensation Technique**' **15**
  
2.
  - a) Discuss the **Probabilistic consideration** in acceptance criterion for quality control with respect to test result of concrete cube as per IS: 456, 2000? **5**
  - b) Discuss briefly on the principle, procedure and interpretation criteria of **load test** for **flexural members** of a structure. **15**
  - c) What is the **advantage and limitations of load test**? **5**
  
3.
  - a) What do you mean by '**Dynamic System Identification**' in the context of SHM? Compare its advantages & limitations over 'Static System Identification' technique. **7**
  - b) Discuss SHM based on dynamic system identification technique using limited measurement adopting '**Equation Error Approach**' in a finite element frame work. **18**

4. a) Discuss '**Dye Penetration Testing**' in structural steel inspection mentioning its principle, advantages and limitations in brief. 7
- b) Discuss the Non-destructive test method by '**Ultrasonic Testing**' in structural steel. Write down the applications, advantage and limitations of this method. 12
- c) What is the principle of **Radiographic testing** for steel structures? Discuss its advantages, safety issues and limitations. 6
5. a) Discuss the **advantages** and **application** of welding technique over other fastening methods in the context of **repairing of damaged steel structures**? 5
- b) What are the factors affecting the **quality of welded connections**? What are the common **defects** encountered in welding practices? Write down the **acceptance norms and remedial action** for each type of welding defect. 10
- c) What do you mean **residual stress and weld distortion**? How do you control the distortion of weld in fabricated steel structures? 10