

FACULTY OF ENGINEERING

B.E. 4/4 (Civil) II-Semester (Main) Examination, May 2011

Subject : **Health Monitoring and Retrofitting of Structures**
(Elective-II)

Time : 3 Hours

Max. Marks: 75

Note: Answer **all** questions of Part - A and answer any **five** questions from Part-B.**PART – A (25 Marks)**

1. What is Structural Health Monitoring (SHM)? (2)
2. What are the basic components of SHM? Explain. (3)
3. Explain the basic principles of capacitive methods. (2)
4. Describe the arrangement of capacitance probe for cover concrete. (3)
5. What are the applications of resistivity measurements? (2)
6. Give a detailed classification of NDT procedures. (3)
7. What are the various stages of conditions survey? (2)
8. What are the various possible defects in concrete structures? (3)
9. Explain the difference between rehabilitation and retrofitting of concrete structures. (2)
10. What is the importance of Re-analysis, in the context of seismic retrofitting of structures? (3)

**PART – B (5x10=50 Marks)**

11. Bring out an analogy between structural Health monitoring and Bio-mimetics. (10)
12. Discuss the application of capacitive methods for monitoring the health of a bridge with external post-tensioned cables. (10)
- 13.(a) What are the situations and contexts where NDT is needed? (5)
(b) Explain the principles and applications of Ground Penetration Radar (GPR) technique. (5)
- 14.(a) What are direct, indirect and semi-direct methods of UPV testing? (5)
(b) How do you correlate rebound hammer and UPV values? (5)
- 15.(a) What are the steps taken for quality control in concrete structures? (5)
(b) Explain any two cases where NDT is an option for NDE of concrete structures. (5)
16. Explain the execution of seismic retrofitting strategy, with reference to any one case study. (10)
17. Write short notes on the following : (4)
(a) Materials for sensor design (4)
(b) Half cell electric potential method (3)