DEPARTMENT OF CIVIL ENGINEERING

MAJOR :CEL836 STRUCTURAL HEALTH MONITORING
(2011-12)

Time allowed: 2 hours **Date** : 29 April 2012
Venue : SAL (V 216) **Max marks** : 30

NOTE: (a) This question paper contains one page only. (b) All questions are compulsory. (c) **Assume any data which you deem is necessary but not supplied. (d)** Draw neat and clear sketches wherever required.

Question 1.
Describe the basic principle working of accelerometer and vibrating wire strain gauge

(2.5+ 2.5 = **5 marks**)

Question 2.
Differentiate between stiffness and flexibility approaches related to global vibration techniques for structural health monitoring?

(**5 marks**)

Question 3.
How is the electro-mechanical impedance technique similar to global vibrations techniques. Further, in what respects do you think it is similar to local NDE techniques

(2.5+ 2.5 = **5 marks**)

Question 4.
A structure consists of a series combination of a damper of damping constant **c**, as spring of stiffness **k** and a mass of value **m**. Derive an expression for the mechanical impedance of the system.

(**7 marks**)

Question 5.
What are the main disadvantages of statistical damage quantifiers for EMI technique? What is the advantage of employing the identified equivalent stiffness for damage quantification?

(2.5+ 2.5 = **5 marks**)

Question 6.
What advantage is served by the integration of global vibration techniques with the EMI technique?

(**3 marks**)