

DEPARTMENT OF CIVIL ENGINEERING



MAJOR :CEL836 STRUCTURAL HEALTH MONITORING (2013-14)

Time allowed: 2 hours
Venue : SAL (V 216)

Date : 07 May 2014
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.

What is the common observation about the trend of “y vs frequency” observed in fatigue related experiments involving the EMI technique? How do we rationalize the trend in terms of the “equivalent stiffness”

(4 marks)

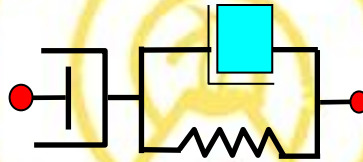
Question 2.

Explain the effect of temperature on the signatures obtained using the EMI technique. How can the influence of temperature be separated?

(3 marks)

Question 3.

Derive an expression for the mechanical impedance of the system shown in Figure below.



(6 marks)

Question 4.

Describe the principles of **acoustic emission** and **eddy current** techniques.

(3+3 = 6 marks)

Question 5.

Distinguish between the terms “structural health monitoring” and “condition assessment”

(4 marks)

Question 6.

Explain the specific advantage of the damage index approach over other conventional approaches such as the flexibility approach

(4 marks)

Question 7.

What is the main similarity between the global dynamic techniques and the EMI technique. State the main difference also.

(3 marks)