

DEPARTMENT OF CIVIL ENGINEERING



MINOR I :CEL836 STRUCTURAL HEALTH MONITORING (2011-12)

Time allowed: 1hour

Venue : SAL (V 216)

Date : 05 February 2012

Max marks : 15

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.

Differentiate between the terms “damage” and “failure”. State how the two terms are related to one another.

(3 marks)

Question 2.

If the resolution of the interrogation system is 10^{-6} ohms, compute the resolution with which strain can be measured if the gauge factor has been provided as 2.16 by the manufacturer.

(4 marks)

Question 3.

State the advantages of the vibrating wire strain gauge over electrical strain gauge.

(3 marks)

Question 4.

A PZT patch of size $10 \times 10 \times 0.3$ mm is supposed to be used as a sensor at the tip of a steel cantilever. What strain is required so that a potential difference of 3V is generated across the PZT sensor. The parameters of the PZT patch are as follows: Electric permittivity: 2.12×10^{-5} F/m, strain coefficient = 2.10×10^{-10} m/V, Young's modulus = 6.67×10^{10} N/m².

(5 marks)