Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 61342

M.E./M.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2023.

Elective

Structural Engineering

ST 4013 – STRUCTURAL HEALTH MONITORING

(Regulations 2021)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. What is Structural Health Monitoring?

2. Define active and passive monitoring.

3. List some of sensors used in Structural Health Monitoring System.

4. What is Data Transmission?

5. What is Flat jack Technique?

6. Why vibration testing is important in SHM?

7. Describe migration imaging.

8. Name some damage diagnostic methods based on vibration.

9. Write the concept of wavelet in SHM.

10. What is meant by Outlier analysis?

PART B — (5 × 13 = 65 marks)

11. (a) (i) What are the objectives of monitoring the health of a structure? (6)

(ii) Differentiate between Non-Destructive Evaluation (NDE) and Structural Health Monitoring. (7)

Or

(b) (i) Explain the challenges in implementation of Structural Health Monitoring System. (8)

(ii) Write down the advantages of Structural Health Monitoring System. (5)

12. (a) Explain the role of different types of sensors in health monitoring of structures.

Or

(b) Write a detail note on Data Acquisition, Data Transmission and Data Processing.

13. (a) List out the various advantages and disadvantages of types of static field tests in static testing.

Or

(b) Explain various dynamic loading allowances test.

14. (a) Discuss in detail about the modal strain energy method.

Or

(b) (i) What is the concept of focusing array? (7)

(ii) Write down the difference between bulk wave and lamb wave. (6)

15. (a) Explain in detail any structure case study on structural health monitoring.

Or

(b) Explain Hilbert Huang transform and its applications.

PART C — (1 × 15 = 15 marks)

16. (a) What are the various loading methods for static tests? Explain in detail.

Or

(b) Describe the procedure of forced vibration method.

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