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Question Paper Code: 92063

M.E. DEGREE EXAMINATION, MAY 2014.

Elective

Structural Engineering

01PSE514 - EXPERIMENTAL STRESS ANALYSIS AND TECHNIQUES

(Regulation 2013)

Duration: Three hours

Maximum: 100 Marks

Answer ALL Questions.

PART A - (10 x 2 = 20 Marks)

1. Define sensitivity.
2. List the various types of strain gauges and state their applications.
3. Mention the characteristics of structural vibration.
4. State the principle and application of Venturimeter?
5. Name any two signs of distress in structures.
6. What are the uses of a Half cell?
7. List down various NDT techniques used to detect the damages in the materials.
8. What is mean by in-situ load testing?
9. What are the laws of similitude?
10. Define Holography.

PART - B (5 x 14 = 70 Marks)

11. (a) (i) What do you understand by “strain rosette”? What are the different types of strain rosette configurations currently in use? Discuss their uses and limitations. (7)
- (ii) Describe the working of proving ring and electronic load cell in detail. (7)

Or

- (b) (i) Sketch a plain polariscope. Explain the effect of a stressed model and fringes obtained in it. (7)
- (ii) What do you understand by load calibration of testing machines? Describe. (7)
12. (a) (i) Outline the working of XY plotter in detail. (7)
- (ii) What are the applications of digital data acquisition system? Explain. (7)

Or

- (b) (i) Explain the principle, working and applications of Linear Variable Differential Transducer (LVDT). (7)
- (ii) Describe the application of wind tunnel. (7)
13. (a) Discuss in detail the formation of various types of cracks in structures. How one can measure and monitor the crack movement? (14)

Or

- (b) (i) Discuss the effects of corrosion in reinforced cement concrete buildings. (7)
- (ii) What are the various techniques of controlled blasting for demolition? (7)
14. (a) (i) What do you understand by brittle coating technique? Explain. (7)
- (ii) Explain the process of in-situ load testing in detail. (7)

Or

- (b) (i) Explain the principle and working of rebound hammer testing on structures. (7)
- (ii) Discuss the principle and applications of ultrasonic testing. (7)

15. (a) (i) Discuss the need for model analysis. What are the advantages of model analysis? (7)
- (ii) Differentiate between indirect model study and direct model study. (7)

Or

- (b) (i) What are the various types of similitude? What is scale effect in models? (7)
- (ii) What are the structural problems that may demand model studies? (7)

PART - C (1 x 10 = 10 Marks)

16. (a) Describe the various types of strengthening techniques adopted to control the structural distress. (10)

Or

- (b) Outline the procedure for measuring the following in a railway station building:
- (i) Vibration and
- (ii) Strength. How will you control vibration and improve the strength? (10)
