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

Question Paper Code: 42263

M.E. DEGREE EXAMINATION, NOVEMBER 2015

Second Semester

STRUCTURAL ENGINEERING

14PSE203 – EXPERIMENTAL TECHNIQUES AND INSTRUMENTATION

(Regulation 2014)

Duration: Three hours Maximum: 100 Marks

Answer ALL Questions

PART A - (5 x 1 = 5 Marks)

1. Gauge length for Huggenberger's extensometer is _____

   (a) 10 to 20 millimeters (b) 15 to 30 millimeters

   (c) 5 to 10 millimeters (d) 5 to 30 millimeters

2. The device which can be used for converting mechanical displacement into an electrical signal is

   (a) LVDT (b) Wheatstone bridge (c) Potentiometer (d) Hydraulic jack

3. Polycarbonate is

   (a) good time edge effect (b) excellent time edge effect

   (c) poor time edge effect (d) poor creep

4. The factor which influences the electrochemical corrosion process is

   (a) pH value (b) Sulphate content

   (c) CO_2 supply (d) None of the above

5. IS recommended Ultrasonic Pulse velocity rating for good quality grade of concrete in *Km/s* is

(a) 3.0 to 3.5 (b) 3.5 to 4.0 (c) 2.5 to 3.5 (d) 1.5 to 2.5

PART - B (5 x 3 = 15 Marks)

6. Define gauge factor for electrical resistance strain gauge.
7. Brief the terms: carrier frequency of LVDT and seismographs.
8. State the working principle of Venturimeter.
9. What are the types of residual stresses?
10. What are the various NDT techniques used to detect the damages in the materials?

PART - C (5 x 16 = 80 Marks)

11. (a) (i) The strain readings are measured by T-Delta rosette at a point in a stressed body is given by εa=150, εb=300, εc=-270 and εd=-65. Determine the Principal Strain, Stress, Directions and Maximum Shear Stress. E=2x106 kg/cm^2 and μ = 0.3. (10)

(ii) Describe the basic principle of operation and main parts of an electronic load cell. (6)

Or

(b) Explain the principle of working of an optomechanical strain gauge with its merits and limitations. (16)

12. (a) Draw the circuit diagram of a linear variable differential transformer and explain its working principle and applications. (16)

Or

(b) Explain the working procedure of cathode ray oscilloscope with a neat sketch. Also mention its applications. (16)

13. (a) What are the classifications of flow meter? Explain how the head - type flow meters are functioning. (16)

Or

(b) Explain the construction of a wind tunnel with neat sketch and how it is used in structural analysis. (16)

14. (a) (i) Describe the construction and uses of half cell. (8)

(ii) Describe the method of controlled blasting for demolition of structures. (8)

Or

(b) What are the factors which lead to corrosion of reinforcement in concrete? Also state the remedial measures to be adopted. (16)

15. (a) Write notes on rebound hammer, laser for structural testing. (16)

Or

(b) Explain the principle and working of ground penetration radar. (16)

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