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APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

FIRST SEMESTER M.TECH DEGREE EXAMINATION, DECEMBER 2018

Civil Engineering

(Structural Engineering)

01 CE 6111: Experimental Methods and Instrumentation

Max. Marks : 60 Duration: 3 Hrs

Instructions: Answer ***any two full*** questions from ***each*** part

Assume suitable data wherever necessary

PART – A

1. a) Explain the static characters of a measurement system. (6)
   b) Explain the step response of a first order system. (3)

2. a) A pressure transducer has a natural frequency of 4 Hz, damping ratio 0.2 and sensitivity of 200000 V/Pa. For a harmonic input of 500000 Pa at 10 Hz find the output amplitude and phase lag. (6)
   b) Differentiate between accuracy and precision of a measurement system. (3)

3. a) Explain the different types of calibration. (4)
   b) Explain the frequency response of a second order system. (5)

PART – B

4. a) Explain the strain sensitivity of an electrical resistance strain gauge. (6)
   b) Explain the working of diaphragm type pressure gauge. (3)

5. a)Briefly describe the steps in strain gauge installation. (4)
   b) A seismic instrument of mass 200g and stiffness 1N/mm has a damping factor of 0.4. Find the maximum frequency at which the instrument can be used as an accelerometer if the error is not to exceed 5%. (5)

6. a)How is temperature compensation achieved in a quarter bridge. (5)
   b)Describe the effect of moment and torsion on a force transducer. (4)

PART – C

7. a)Derive an equation for a plane polarized light. (6)
   b) Explain the methods for detection of embedded reinforcement. (6)

8. Discuss the effect of stressed model in a plane polariscope. (12)

9. a) Discuss the working of rebound hammer. (6)

b) Explain a computerized data acquisition system. (6)