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B.Tech.(Textile) (2011 Onwards) (Sem.–3)
ELEMENTS OF INSTRUMENTATION AND CONTROL ENGINEERING
Subject Code : BTTE-305
M.Code : 71657

Time : 3 Hrs.   Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :
1. **SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.**
2. **SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.**
3. **SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.**

SECTION-A

1.   **Answer briefly :**

   a   Why Tachometers are required in instrumentation? Explain.

   b   Why the input impedance of voltmeter is high? Explain.

   c   Explain that sensitivity and linearity are two conflicting requirements in a resistance potential divider transducer.

   d   What do you mean by the term Instrumentation? Explain.

   e   Differentiate between analog and digital transducers.

   f   Define maximum overshoot and rise time.

   g   What do you mean by stability of a system? Explain.

   h   What do you mean by steady state error? On what factors it depends? Discuss.

   i   Write down the advantages of signal flow graph.

   j   What is the need of mathematical modelling? Explain.

SECTION-B

2. Classify the transducer into Primary and secondary

3. Explain why control system is required? Discuss in detail the (by considering examples) the open loop and closed loop systems.

4. Explain the construction and principle of operation of a wire wound strain gauges and derive the expression for the gauge factor.

5. Explain

    a Galvanometer

    b Ammeter

6. Represent the following set of equations by a signal flow graph and determine the overall gain relating x_5 and x_1.

$$x_2 = a\,x_1 + f\,x_2$$

$$x_3 = b\,x_2 + e\,x_4$$

$$x_4 = c\,x_3 + h\,x_5$$

$$x_5 = d\,x_4 + g\,x_2$$

SECTION-C

7. The transfer function of the system is given by $\dfrac{C(s)}{R(s)} = \dfrac{16}{s^2 + (0.8 + 16k)s + 16}$

   Determine the value of k such that damping ratio is 0.5. Then obtain the rise time, peak time, maximum overshoot and settling time in the unit step response.

8. Discuss in detail the mathematical modelling of mechanical and chemical systems.

9. Discuss the following :

    a Piezoelectric transducer

    b Photo voltaic transducer

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.