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B.E./B.Tech. DEGREE EXAMINATION, APRIL/MAY 2008.

Fifth Semester

Mechatronics Engineering

EE 1311 — INSTRUMENTATION AND CONTROL SYSTEM

(Regulation 2004)-

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. What is a desired input for an Instrumentation system? Give an example.
2. Define limiting error.
3. State the law of intermediate temperatures.
4. State the principle of operation of RTD.
5. What is a semiconductor strain gauge?
6. Mention the typical applications of LVDT.
7. What is the necessity for bellows and diaphragms?
8. List any two acceleration transducers.
9. Distinguish between open loop and closed loop control systems.
10. Write the transfer function of a pneumatic actuator.

PART B — (5 × 16 = 80 marks)

11. (a) (i) Explain the dynamic characteristics of a measuring system. (8)
(ii) Derive equations for the step and ramp responses of a first order system. (4 + 4)

Or

- (b) Define and derive expressions for the following parameters of a second order system :
(i) Resonant frequency
(ii) Resonant peak
(iii) Bandwidth. (5 + 5 + 6)
12. (a) Discuss the theory of radiation pyrometers. Write a note on the different radiation receiving elements. (16)

Or

- (b) Describe the constructional features, principle of operation and applications of a thermo-couple. List the thermoelectric laws and their significance. (16)
13. (a) Explain the working of the following :
(i) Ultrasonic flow meter
(ii) Micro manometer. (8 + 8)

Or

- (b) Describe pressure gauge method of level measurement in open tanks and closed tanks with necessary diagrams. (16)
14. (a) With neat diagrams explain the features and operation of :
(i) RVDT (8)
(ii) Optical encoder. (8)

Or

- (b) Discuss in detail the principle of piezo electric transducers, various types and their characteristics and their applications. (16)

15. (a) With neat diagrams discuss about the automatic speed control of drives. (16)

Or

- (b) With neat sketch explain a pneumatic position control system. List its merits and demerits. (16)
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