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

R 3343

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2007.

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. Define sensitivity in measurement system.
2. What is meant by order of the system?
3. What are the advantages and resistance based thermometers?
4. What is the purpose of protecting radiation shield in total radiation pyrometer?
5. What is ionisation? and how it helps in pressure measurement.
6. How will you measure level of measurement in automobile fuel tank?
7. What is RVDT?
8. What is the relationship between acceleration and vibration measurement?
9. What are the advantages of automatic control of drives?
10. Name the sensors and transducers needed to control a machine tool.

PART B — (5 × 16 = 80 marks)

11. (a) (i) Explain generalised measurement system with block diagram. (8)

(ii) Explain how generalised measurement system principles help in the mechatronics system design. (8)

Or

(b) (i) Derive the expression for second order mechatronics system response for step input. (12)

(ii) What is the difference between active and passive sensors? Give an example. (4)

12. (a) Explain the working principle of resistance temperature detectors with neat sketch. (16)

Or

(b) (i) Write short notes on : Thermistor materials and thermistor types.(6)

(ii) Explain the working principle of disappearing filament type pyrometer with neat sketch. (10)

13. (a) What is pirani gauge? Describe working principle, advantages and limitations of pirani gauge. (16)

Or

(b) Explain the construction and working of hot wire anemometer? (16)

14. (a) (i) What is meant by temperature compensation in strain gauges? Explain. (8)

(ii) What is optical encoder? Explain it's applications. (8)

Or

(b) Explain the displacement measurement using LVDT with proper circuit and block diagram. (16)

15. (a) How proportional and integral control techniques help to control the speed of rotating elements in mechatronics system design? (16)

Or

(b) (i) What is the necessity of two step controller in pneumatic actuators? Explain. (8)

(ii) Explain the control mechanisms involved in a modern machine tool. (8)
