Reg. No. : ☐☐☐☐☐☐☐☐☐☐☐☐☐

Question Paper Code : 11536

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2012.

Seventh Semester

Mechanical Engineering

ME 2401/ME 71/ME 1402 – MECHATRONICS

(Common to Production Engineering)

(Regulation 2008)

(Common to PTME 2401 – Mechatronics for B.E.(Part-Time) Fifth Semester
Mechanical Engineering –Regulation 2009)

Time : Three hours   Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Give an example for a transducer and state its transduction principle.

2. State the advantage of capacitive type proximity sensor.

3. Name the control components in a hydraulic actuation system.

4. What is a servo motor?

5. Define fluid inertance.

6. What are the features of an operational amplifier?

7. What is a PLC?

8. What is an 'internal relay' in a PLC?

9. List the drawbacks of traditional design approach.

10. What is the role of opto-isolator in robot control?

PART B — (5 × 16 = 80 marks)

11. (a) (i)   List and define the dynamic characteristics of sensors.

         (ii) With an example explain the various functional units of a
               measurement system.   (8+8)

Or

     (b) Suggest a sensor whose output is an electrical signal for the following
          and explain them in detail   (8+8)

          (i)   Vacuum pressure measurement in the range of 10^{-2} to 10^{-6} torr

          (ii) Velocity of hot gas in a conduit.

12. (a) (i)   Using a simple circuit explain the basic components required for a
               hydraulic actuation system.

         (ii) List the types of bearings and brief about each.   (8+8)

Or

     (b) With the help of proper control circuits explain the speed control of AC
          and DC motors.   (16)

13. (a) Explain the model building using the basic building blocks for a

          (i)   Automobile suspension system

          (ii) Electrical motor.   (8+8)

Or

     (b) Discuss in detail about PI and PD mode electronic controllers. (8+8)

14. (a) Explain the configuration of a PLC. List the considerations in selecting a
          PLC.   (12+4)

Or

     (b) Using simple programs explain the data handling operations in a
          PLC.   (16)

15. (a) Explain the various stages in mechatronics design approach and state how it differs from the traditional approach. (16)

Or

(b) Detail about the various functional components in a Wireless surveillance balloon system. (16)

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