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**Question Paper Code : 51048**

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2014.

Seventh Semester

Mechanical Engineering

080120045 — MECHATRONICS

(Regulation 2008)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. State the principle of proportional-plus-derivative controller.
2. Write the transfer function of a second order system.
3. Write short notes on the principle of operation of photoelectric switches.
4. Write short notes on brush less motors.
5. What do you mean by latching contact?
6. State the functions of operational amplifiers.
7. Compare microprocessor and micro controller.
8. Where are the position and velocity loops situated?
9. Write short notes on micro sensors.
10. List few applications of MEMS.

PART B — (5 × 16 = 80 marks)

11. (a) (i) Briefly explain about servomechanism. (8)  
(ii) Derive the output response if a step input is applied to a 2<sup>nd</sup> order system. (8)

Or

- (b) (i) With neat block diagram, explain open-loop and closed-loop systems. (8)  
(ii) Compare the features of hydraulic and pneumatic actuators. (8)

12. (a) (i) Explain the method of speed control in AC motors. (8)  
(ii) Explain the working principle of incremental encoder. (8)

Or

- (b) (i) Briefly explain about SCR controlled motors. (8)  
(ii) Discuss how displacement is sensed by LVDT. With neat sketch show how it can be made phase sensitive. (8)
13. (a) (i) Explain about latching circuit. (8)  
(ii) Briefly explain about the functions of signal conditioning equipment. (8)

Or

- (b) (i) Explain the sequencing circuit for a two double acting cylinder. (8)  
(ii) Describe the specification, characteristics and limitations of operational amplifiers. (8)
14. (a) Explain the architecture of MCS 51 controller.

Or

- (b) (i) Explain the adaptive control with constraints using lathe as example. (8)  
(ii) Explain the position and velocity control loops for continuous path control. (8)
15. (a) (i) With neat sketch, explain the features and operation of a micro valve. (8)  
(ii) Explain bulk manufacturing process in detail. (8)

Or

- (b) Explain about the mechatronic system design of piece counting system in a manufacturing plant.
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