

**Question Paper Code : Q 2335**

B.E/B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2009.

Sixth Semester

Mechatronics Engineering

MH 1353 — DESIGN OF MECHATRONICS SYSTEM

(Regulation 2004)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. What are the areas integrated by mechatronics?
2. State the stages of mechatronics design process.
3. Why is an interface used to connect a peripheral device with the microprocessor bus system?
4. What is overframing?
5. Which mechatronic device is used to measure force?
6. What is a calibration system?
7. What arrangement can be made to measure the thermal cycle fatigue of a ceramic plate?
8. How is skip control in a CD player achieved?
9. What is condition monitoring?
10. State the applications of microsensors in mechatronic systems.

11. (a) (i) Distinguish between open loop and closed loop systems. (10)  
(ii) Identify the various elements that might be present in a control system involving a thermostatically controlled electric heater. (6)

Or

- (b) (i) Distinguish between traditional and mechatronics design with a case study of bathroom scale. (10)  
(ii) What is the role of man machine interface in mechatronics design? Give atleast two examples. (6)
12. (a) (i) Discuss any five interface requirements for using interface devices in mechatronic systems. (10)  
(ii) Discuss handshaking between two devices in detail. (6)

Or

- (b) (i) Discuss analog to digital conversion in detail. (10)  
(ii) Discuss the hardware and software used in data aquisition systems. (6)
13. (a) The shaft speed of a DC motor has to be measured using rotary optical encoder. Explain the arrangement with a diagram.

Or

- (b) Two conveyors are arranged one below the other in perpendicular direction. A pick and place robot is used to detect the arrival of the object on the upper conveyor, pick it and place it on the second conveyor. Discuss the arrangement with a diagram.
14. (a) An automatic, auto-focus, reflex camera is designed. Show the block diagram of the electronic system of the camera including the sensors and actuators and discuss in detail.

Or

- (b) A car engine management system is designed with electronic control system for engine. Discuss the sensors and actuators used with a block diagram.

15. (a) A production shop floor is being automated. Discuss the application of mechatronics to achieve automation with a block diagram.

Or

- (b) Discuss artificial intelligence in mechatronics. Explain with a case study how it can be used in controlling and assisting the automobile in city driving conditions.

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