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Question Paper Code: 37703

B.E. / B.Tech. DEGREE EXAMINATION, MAY 2022

Seventh Semester

Mechanical Engineering

01UME703 - MECHATRONICS

(Regulation 2013)

Duration: Three hours

Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 2 = 20 Marks)

1. What is a smart sensor? List out its functions.
2. List down the types of proximity sensor.
3. State the function of a control valve.
4. Elucidate the significance of Process control valves.
5. Give an example for two-step mode control unit.
6. How can adaptive controllers be defined?
7. What are the main component parts of a PLC?
8. Write about the relay?
9. List down the applications of wireless surveillance balloon.
10. Name the sensors used in car engine management system.

PART - B (5 x 16 = 80 Marks)

11. (a) (i) Explain the terms used to define the performance of a measurement system. (8)
(ii) Explain working principle of a force measuring transducer with a neat diagram. (8)

Or

- (b) (i) List some of the methods of temperature control systems and explain anyone with a sketch. (8)
(ii) Analyze the factors to be considered in the selection of sensors for a specific application. (8)
12. (a) Explain about the primary functions of mechanical actuation systems. (16)

Or

- (b) Explain the following mechanical actuation system used in Mechatronics system
(i) Cam (ii) Ratchet and pawl. (16)
13. (a) Explain in detail Gain-scheduled and self- turning adaptive control system with a suitable block diagram. (16)

Or

- (b) With a block diagram explain the velocity control with feedback system for the movement of a load using suitable controller. (16)
14. (a) Explain the factors considered for the selection of a PLC. (16)

Or

- (b) (i) Explain in detail about jump control used in PLC using a ladder diagram. (10)
(ii) Draw the delay ON and OFF timer ladder diagrams. (6)
15. (a) Discuss in detail, various design factors to be considered while designing a mobile robot? (16)

Or

- (b) List out the various sensors used in Engine management system and explain the design of a Mechatronic system used in Engine management system? (16)