

B.E DEGREE EXAMINATIONS: NOV/DEC 2014

(Regulation 2009)

Seventh Semester

MECHATRONICS ENGINEERING

MCT120: Design of Mechatronics System

Time: Three Hours

Maximum Marks: 100

Answer all the Questions:-

PART A (10 x 1 = 10 Marks)

1. A good example of standalone mechatronics system is
 - a) Wire aircraft
 - b) Washing machine
 - c) CIM
 - d) Humanoid robot
2. In a feedback system, the system's
 - a) stability increases
 - b) Gain increases
 - c) sensitivity increases
 - d) Disturbance increases
3. Simple D to A conversion can be achieved using a weighted series of resistors and a single OP AMP configured in which of the following modes?
 - a) Voltage follower
 - b) Integrator
 - c) Summing amplifier
 - d) Differential amplifier
4. An IEEE 488 bus contains
 - a) 8 data lines, and 1 Address lines
 - b) 5 control lines , 3 hand shake lines and 8 data lines
 - c) 3 control lines, 5 hand shake lines and 8 data lines
 - d) 5 control lines, 3 hand shake lines, 8 data lines and 4 address lines
5. A sensor that converts speed of rotation directly into an electrical signal is called
 - a) Tachogenerator
 - b) Tachometer
 - c) Orifice meter
 - d) Venturimeter
6. LVDT cannot be used for measuring
 - a) Pressure
 - b) Temperature
 - c) Velocity
 - d) Displacement

7. Thermopiles are the combination of a
- a) Number of thermocouples connected either in series or parallel b) Number of thermistors connected in parallel or series
- c) Number of RTD's connected in both series and parallel d) None of the above
8. The _____ robot is positioned for work with two linear movements and one angular rotation.
- a) Cartesian co-ordinate b) Cylindrical Co- ordinate
- c) Spherical Co- ordinate d) Articulated Co- ordinate
9. Which AI system provides a diagnosis to a specific problem?
- a) Intelligent agent b) Geographical information system
- c) Data mining system d) Expert system
10. Generally, AI systems analyze imprecise and subjective information. This information is called _____.
- a) Blurred data b) Inclusive information
- c) Fuzzy logic d) Dirty data

PART B (10 x 2 = 20 Marks)

11. What is meant by code generator?
12. Define Ergonomics.
13. List out the handshake signals in IEEE 488 bus system.
14. Write a note on GPIB characteristics?
15. What is meant by Data Acquisition System?
16. Define Gauge factor.
17. Discuss the application of robot pick and place operations.
18. What are Deflection Sensors?
19. Differentiate between active and passive sensor.
20. How are fuzzy sets defined in Fuzzy Logic?

PART C (5 x 14 = 70 Marks)

21. a) Explain with suitable scenario hardware software tradeoffs with respect to information processing systems.

(OR)

- b) What is the importance of industrial design in overall product design process? Explain with suitable scenario.

22. a) What is real time interfacing and graphical interface system? Discuss their applications in the field of data acquisition and control.

(OR)

b) Explain in detail about GP-IB GP-IB Interface Functions.

23. a) Design and develop the mechatronics system for the application of transducer calibration test rig for specific automotive applications.

(OR)

b) Design and develop the mechatronics based pH control system for specific application.

24. a) Explain in detail about autofocus camera and exposure control system.

(OR)

b) Design and develop the mechatronics based De- Icing temperature control system for aircraft wing application.

25. a) Explain in detail about fuzzy logic control for suitable case.

(OR)

b) What is meant by artificial intelligence? Explain Various tools of AI.
