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Question Paper Code: 47703

B.E. / B.Tech. DEGREE EXAMINATION, NOV 2018

Seventh Semester

Mechanical Engineering

14UME703 - MECHATRONICS

(Regulation 2014)

Duration: Three hours

Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 1 = 10 Marks)

1. The sensors are classified on the basis of
 - (a) Functions
 - (b) Performance
 - (c) Output
 - (d) All of the above
2. Inductive proximity sensors can be effective only when the objects are of _____ materials.
 - (a) Ferro magnetic
 - (b) Diamagnetic
 - (c) Paramagnetic
 - (d) All of the above
3. Which energy is converted into mechanical energy by the hydraulic cylinders?
 - (a) Hydrostatic energy
 - (b) Hydrodynamic energy
 - (c) Electrical energy
 - (d) None of the above
4. What is the function of electric actuator?
 - (a) Converts electrical energy into mechanical energy
 - (b) Converts mechanical torque into electrical energy
 - (c) Converts mechanical energy into mechanical torque
 - (d) None of the above

5. The basic building blocks of the models used to represent mechanical systems are_____
- (a) spring, mass & dashpot (b) voltage, current & resistance
(c) resistance, capacitance & inductance (d) force , resistance & vibration
6. _____of PLCs can be done in very little time.
- (a) Programming (b) Installation
(c) Commissioning (d) All of the above
7. PLCs are programmed using what language?
- (a) Natural Language such as English (b) C-language
(c) Relay-ladder logic (d) None of the above
8. _____ PLC programming methods.
- (a) Structured text (b) Ladder diagrams
(c) Function block diagram (d) All of the above
9. Engine management system is made up of
- (a) Sensors (b) Actuators
(c) Microprocessor (d) All of the above
10. Pneumatic system operates maximum of _____bar
- (a) 10 bar (b) 12 bar
(c) 6 bar (d) 240 bar

PART - B (5 x 2 = 10 Marks)

11. Define hysteresis loss.
12. List the materials used for belts
13. What is a digital logic control?
14. List any four criteria for selection of PLC.
15. What is engine management system?

PART - C (5 x 16 = 80 Marks)

16. (a) Describe the Mechatronics design process with the aid of a block diagram and highlight the emerging areas of Mechatronics (16)
Or
(b) With neat sketch explain various bonded type strain gauges. (16)
17. (a) (i) Explain in detail about various types of stepper motor. (16)
Or
(b) Explain the four quadrant operation of a dc drive. (16)
18. (a) Explain in detail about various control modes used in system design. (16)
Or
(b) Explain in detail about the mathematic modelling of rotational translational mechanical system. (16)
19. (a) Explain the basic structures of PLC. Explain in detail about the programming of a PLC. What are the advantages of PLC? (16)
Or
(b) Describe the basics of PLC programming with suitable illustrations. (16)
- 20.(a) Explain in detail about various stages in designing Mechatronics systems. (16)
Or
(b) Present a case study pertaining to the design of a wireless surveillance balloon. (16)

