

Roll No.

Total No. of Pages : 02

Total No. of Questions : 08

M.Tech.(Mechanical Engineering) PT (Sem.-4)

MECHATRONICS

Subject Code : MME-510

M.Code : 38211

Time : 3 Hrs.

Max. Marks : 100

INSTRUCTIONS TO CANDIDATES :

1. Attempt any FIVE questions out of EIGHT questions.
2. Each question carries TWENTY marks.

1.
 - a) Differentiate between open and closed loop control systems. Draw block diagrams and give 2 examples each of open and closed loop control systems.
 - b) Is robot a mechatronics system? Discuss giving reasons.
2.
 - a) Differentiate between RTDs and thermistors used for temperature measurement.
 - b) What is a load cell? Discuss the use of strain gauges for force and pressure measurement.
3.
 - a) What is the role of filtering in signal conditioning? Draw the characteristics of four basic types of filter and briefly discuss them.
 - b) What is the significance of digital signals in mechatronics systems? Discuss the conversion of analog signals to digital signals.
4.
 - a) Differentiate between hydraulic and pneumatic power systems. Also, draw neat and labelled schematic diagrams of hydraulic and pneumatic power systems.
 - b) Explain the terms – mechanism and kinematic chain. Discuss the mechanical aspects of motor selection.
5.
 - a) What is a Zener diode? Discuss its use as a voltage regulator in electrical and electronic circuits.
 - b) What are bipolar transistors? Differentiate between npn and pnp types of transistors.

6. What are the advantages and limitations of using stepper motors *vis-à-vis* DC servomotors in automation? Discuss the principle, construction and working of permanent magnet brushless DC motor.
7.
 - a) Make truth tables for AND, OR, NAND, NOR and XOR logic. Also derive the Boolean expressions for the same from truth tables.
 - b) Discuss the similarities and differences between a microprocessor and a microcontroller.
8. Write notes on :
 - a) Laplace Transformation and its applications.
 - b) Programmable Logic Controller.

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