

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.

**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**