**SHAHEED BHAGAT SINGH STATE TECHNICAL CAMPUS, FEROZEPUR**

ROLL No.: 

Total number of pages: [ ]

Total number of questions: 08

M.Tech. || ME|| 1st Sem

# Mechatronics

## Subject Code: MME-510

### Paper ID:

Time allowed: 3 Hrs

Max Marks:100

**Important Instructions:**
- **Attempt any five questions**
- **All questions carry equal marks**
- **Assume any missing data**

Q. 1.  (a) Define a control system. With neat diagrams, explain and distinguish open and closed loop control systems.
(b) Identify the various elements that might be present in a control system involving a thermostatically controlled electric heater.

Q. 2.  (a) What is the difference between the terms sensor and transducer? What is a smart sensor?
(b) With appropriate illustrations explain the working of an absolute encoder.

Q. 3.  (a) Explain the principles of the Wheatstone bridge. How is it used with strain gauges?
(b) What is a multiplexer? Explain the basic principle of a multiplexer which can be used to select digital data inputs.

Q. 4.  (a) What are the two basic motion types? What is the purpose of analyzing a complex motion?
(b) What is the function of a bearing? With the help of neat sketches describe various forms of ball bearings.

Q. 5.  With the help of neat diagrams, explain the following:
   (i)     Four bar chain
   (ii)    Zener Diodes and
   (iii)   Bipolar Transistor.

Q. 6.  What is a microcontroller? What are the factors that need to be considered for selecting a microcontroller? Give two examples of how microcontrollers are used.

Q. 7.  Explain, for a microprocessor, the roles of
   (a) Accumulator, (b) Status, (c) Memory address and (d) Program counter registers.

Q. 8.  Write short notes on the following:
   (a) Adaptive Control
   (b) Continuous and discrete processes
   (c) Neural Networks