100322050

B.Tech
(SEM VI) THEORY EXAMINATION 2017-18
MECHATRONICS

Time: 3 Hours   *Total Marks: 100*

Note: **1.** Attempt all Sections. If require any missing data; then choose suitably.

SECTION A

1.   **Attempt** *all* **questions in brief.**   2 x 10 = 20

   a) What do you understand by mechatronics?
   b) Differentiate between conventional and mechatronics system design.
   c) Define a stepper motor or stepper servomotor.
   d) What do you understand by Ratchet & Pawl?
   e) Explain Pneumatic and Hydraulic actuation systems.
   f) Explain the concept of Buses in microprocessors.
   g) Define a actuator.
   h) What are gear trains?
   i) Describe the types of Electric drives.
   j) Explain the functions of Mechanical spring.

SECTION B

2.   **Attempt any** *three* **of the following:**   10 x 3 = 30

   a) Differentiate between a sensor and a transducer. Explain the functioning of proximity sensors.
   b) Explain the functions of directional control valves & pressure control valves. Explain the applications of bearings.
   c) Describe the elements of Microprocessors & Microcontrollers. Explain the key differences between the architecture of Microprocessors & Microcontrollers.
   d) Explain the working principle and operation of an electromechanical disc-control mechatronics system.
   e) Define Vehicle suspension Control systems. Describe the design of a Computer Printer.

SECTION C

3.   **Attempt any** *one* **part of the following:**   10 x 1 = 10

   (a) Describe the working principle of transducers. Explain the construction and working of a Displacement transducers.

   (b) What do you understand by Signal conditioning? Describe the process of data acquisition systems.

4.   **Attempt any *one* part of the following:**   10 x 1 = 10

  (a) Describe what are Mechanical switches? Describe the function of a solenoid operated
      solid state switch.

  (b) Describe the working principle of Electrical Drives. Explain closed loop controllers

5.   **Attempt any *one* part of the following:**   10 x 1 = 10

  (a) Explain Programmable logic controllers. Describe the Application-specific
      Processors (ASICS)

  (b) Explain the general Architecture of Microcontrollers. Describe the features of the
      Softwares that can be used for Microcontrollers.

6.   **Attempt any *one* part of the following:**   10 x 1 = 10

  (a) Explain the applications of an Industrial Robot and describe its control features.

  (b) Describe the applications of Automobile Engine Control in mechatronics. Write a
      case study on Automobile Engine Control.

7.   **Attempt any *one* part of the following:**   10 x 1 = 10

  (a) Explain the working principle of Micro-mechanical Systems? Explain the design of a
      FAX machine.
  (b) Describe the principle of operation of an NC Machine in detail. State some
      applications of an NC Machine.