Printed Pages : 1 **Roll No.** | | | | | | | | | | | **EEN021**

B. TECH.

THEORY EXAMINATION (SEM–VI) 2016-17

MECHATRONICS

Time : 3 Hours ***Max. Marks : 100***

Note : *Be precise in your answer. In case of numerical problem assume data wherever not provided.*

SECTION-A

1 Attempt all parts: (2 x 10=20)

a) Differentiate between Sensor & Transducer. Give one example of each.

b) What is the principle of operation of Eddy current sensors?

c) Why Signal Conditioning is required?

d) Define Data Acquisition.

e) Draw the symbol of 4/2 DCV and 4/3 DCV.

f) What for Rack & Pinion used in Mechanical Actuation system?

g) Give difference between Serial and Parallel Communication Interface.

h) Draw Ladder Logic for AND &OR logic gates. Give their truth tables also.

i) Why closed-loop controllers are preferred in automating a system?

j) Derive a mathematical model for spring-mass-damper system.

SECTION-B

2 Attempt any FIVE from the following: (10 x 5 = 50)

a) What is an encoder? How incremental encoder can be used to measure velocity?

b) With the help of schematic diagram, explain the data acquisition system. What are the roles of filtering and amplification of signals in signal conditioning?

c) Differentiate between Direction Control Valve and Process Control Valve.

d) What are the three types of Pressure Control valve? Explain with the help of suitable diagram.

e) Write down the system equation for Torsional spring-mass-damper system.

f) With the help of neat sketch, explain the working and application of Electric Drive System.

g) Discuss the architecture of a microcontroller.

h) Discuss the architecture of PLC in detail. A motor is switched on by pressing a spring-return push button start switch, and the motor remains on until another spring-return push button stop switch is pressed. Draw the ladder logic for the same.

SECTION-C

Attempt any TWO from the following: (15 x 2 = 30)

3. Discuss a case study on Automobile Engine Control.
4. What are Micromechanical Systems? Explain the case study on Computer Printer.
5. Discuss operating principle of NC Machine in detail.