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Paper Id 121212 **Roll No.** | | | | | | | | | | |

B.TECH
(SEM VI) THEORY EXAMINATION 2018-19
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. Derive a mathematical model for spring-mass-damper system.
b. Draw Ladder Logic for AND &OR logic gates. Give their truth tables also.
c. Draw the symbol of 4/2 DCV and 4/3 DCV.
d. Define Data Acquisition.
e. What is the principle of operation of Eddy current sensors?
f. Differentiate between Sensor & Transducer. Give one example of each.
g. Define an actuator.
h. Differentiate between conventional and mechatronics system design.
i. Define a stepper motor or stepper servomotor.
j. Why closed-loop controllers are preferred in automating a system?

SECTION B

2. Attempt any *three* of the following: **10x3=30**

a. Discuss the architecture of a microcontroller.
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. Discuss the architecture of PLC in detail. A motor is switched on by pressing a springreturn 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.
d. Discuss operating principle of NC Machine in detail.
e. Define Vehicle suspension Control systems. Describe the design of a Computer Printer.

SECTION C

3. Attempt any *one* part of the following: **10x1 = 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: **10x1 = 10**

a. Explain the working principle and operation of an electromechanical disc-control mechatronics system.
b. Explain the functions of directional control valves the applications of bearings.

5. Attempt any *one* part of the following: **10x1 = 10**

a. Explain the applications of an Industrial Robot and describe its control features.
b. Explain the working principle of Micro-mechanical Systems? Explain the design of a FAX machine.

6. Attempt any *one* part of the following: **10x1 = 10**

a. What are the three types of Pressure Control valve? Explain with the help of suitable diagram.
b. With the help of neat sketch, explain the working and application of Electric Drive System.

7. Attempt any *one* part of the following: **10x1 = 10**

a. Describe what are Mechanical switches? Describe the function of a solenoid operated solid state switch.
b. Explain Programmable logic controllers. Describe the Application-specific-, Processors (ASICS)