

R16

Code No: 138GG

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B. Tech IV Year II Semester Examinations, July - 2021

INTRODUCTION TO MECHATRONICS

(Electrical and Electronics Engineering)

Time: 3 hours

Max. Marks: 75

**Answer any Five Questions
All Questions Carry Equal Marks**

- 1.a) What is the meaning of integration in mechatronics? What are the notable features of a pneumatic actuator?
b) List the important features of smart sensors. Describe the construction and uses of different proximity switches. [7+8]
- 2.a) Define the term component. Explain component based design view.
b) Schematically show various components of the machine control systems. [7+8]
- 3.a) With a neat block diagram, explain the interfacing of i) relays and ii) solenoids with a PIC microcontroller.
b) Draw the equivalent circuit of a DC motor and illustrate with equations how the torque decreases with increasing speed. [7+8]
- 4.a) Discuss the various techniques that can be used to detect faults.
b) Explain how faults can be found in microprocessor based systems with the help of the following techniques and devices
i) Visual inspection ii) Logic probe iii) Logic pulser
iv) Logic clip and v) Logic analyser. [7+8]
- 5.a) Explain in detail about jump control used in PLC using a Ladder diagram?
b) What are the factors to be consider for selecting PLC? [7+8]
- 6.a) Explain the basis of Ladder programming used in PLC.
b) With neat diagram, explain the working of data acquisition system. [7+8]
7. With a circuit diagram, explain the interfacing of following sensors with a microcontroller.
a) Diode/phototransistor pair c) Distance measuring sensor
b) Photoreflexor sensor d) Line tracing sensor. [15]
- 8.a) Explain different control modes used in Programmable Motion Controllers
b) Explain application of Laplace transform in analysing differential equation of a control system. [7+8]

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